Research title
“A Comparison of the Dynamic Balance between Non Practitioners and Practitioners of Some Sports Activities”
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Abstract:
The research aims at identifying the differences between non-practitioners and practitioners of some sports activities (gymnastics, soccer, and running) according to some variables of dynamic balance. The research was conducted on a sample of (30) gymnasts. Their characteristics were as follows: age 19.10 ± 1.22, height 173.53 ± 3.33, weight 69.13 ± 5.78, training age 13.90 ± 1.09, a sample of (30) soccer players whose characteristics were as follows: age 19.27 ± 1.89, height 174.37 ± 3.73, weight 71.43 ± 7.75, training age 11.40 ± 0.89, a sample of (30) runners whose characteristics were as follows: age 18.53 ± 1.61, height 172.20 ± 3.24, weight 68.17 ± 6.59, training age 11.30 ± 1.06, and a sample of (30) non-sport activity practitioners whose characteristics were as follows: age 18.87 ± 1.83, height 174.33 ± 5.52, weight 69.27 ± 6.62. The researcher used the descriptive survey method for its relevance to the nature of the research and conducted a set of balance measurements on the total sample using a dynamic balance measurement device (Balance Test MFT) by measuring the balance left / right side direction in addition to measuring the balance forward / backward direction. The data were statistically processed by using SPSS software and were analyzed to identify the significance of differences between the four research sample groups by conducting the one-way variation analysis and Scheffe test. The results revealed significant differences between non-practitioners and practitioners of the sports activities according to the left / right and forward / backward dynamic balance measurements. The results also showed that the soccer and gymnastics players exceeded the running players and non-practitioners in the balance measurements under study.

Keywords: Dynamic Balance, Gymnastics, Soccer, Running, Non-Practitioners of Sports Activity.

Introduction:
Generally, balance is a key element in many movements that are performed in many sports activities, especially those activities that require a sudden turn while performing the movements in which the player loses his balance, which in turn leads to the need to restore that balance quickly to perform a new movement. Balance is the real zero point for each direction in the movement in the space which means that the total force affecting the body is equal to zero. (1, 2)
Dynamic balance is the type of balance which means the ability to maintain the balance of the body during movement, which is important and necessary especially for sports that require movement in a tight space with a change in the course of movement in which the player may lose balance. (3)
Dynamic balance is one of the complex abilities as it gets affected by many factors. These include sensory information resulting from somatosensory and visual and vestibular systems, as well as the motor range of joints and muscular strength. Dynamic balance is also responsible for the correct implementation of the difficult and complex sports movements, and also to prevent injury. Scientific literature suggests that the dynamic balance is an important requirement for many sports activities. On the other hand, previous studies also focus on the importance and effect of the sports practice on the dynamic balance and comparing it with non-practice.

Dynamic balance in the various sports activities performed by adults has been studied by Matsuda S, et. al., 2010, Shaw S, et. al., 2008, Paillard T, et. al., 2006 and Davlin CD, 2004. (14, 15, 16, 11) Other studies aimed at comparing the dynamic balance between different sports activities such as those of Hrysomallis, 2011, Bressel et. al., 2007, Perrin P, et. al., 2002. (17, 18, 7)

However, according to the data collected by the researcher from the previous studies, most of the previous studies focused on assessing the dynamic balance by field methods, not by laboratory methods. Some of these studies have compared the practitioners of sports activity with non-practitioners with different age group and gender of those of the current study, which means that the activities’ nature and their requirements of dynamic balance are also different. The difference in gender was one of the important factors that affect dynamic balance. (19)

All of the mentioned studies were applied to samples outside Egypt, which means that there is a lack of the dynamic balance related-studies to compare the variables between non-practitioners and practitioners of sports activities under study.

**Research objectives:**
- Identifying the level of dynamic balance of non-practitioners and practitioners of some sports activities – (gymnastics – running – soccer).
- Identifying the differences between non-practitioners and practitioners of some sports activities – (gymnastics – running – soccer) in the dynamic balance measurements (left / right, forward / backward).
- Identifying the temporal distribution of the balance of each sector in its base during the measurement of dynamic balance (left / right and forward / backward) for non-practitioners and practitioners of some sports activities – (gymnastics – running – soccer).
- Identifying the significance of differences between the dynamic balance measurements (left / right and forward / backward) for non-practitioners and practitioners of some sports activities – (gymnastics – running – soccer).

**Research questions:**
- What is the level of dynamic balance of non-practitioners and practitioners of some sports activities – (gymnastics – running – soccer)?
- What are the differences between non-practitioners and practitioners of some sports activities – (gymnastics – running – soccer) in the dynamic balance measurements (left / right, forward / backward)?
- What is the temporal distribution of the balance of each sector in its base during the measurement of dynamic balance (left / right and forward / backward) for non-
practitioners and practitioners of some sports activities – (gymnastics – running – soccer)?

- What is the significance of differences between the dynamic balance measurements (left / right and forward / backward) for non-practitioners and practitioners of some sports activities – (gymnastics – running – soccer)?

- **Methods:**

- **Participants:**

After the approval of the total sample’s members to conduct the research measurements, the research was conducted on a random sample of (120) individuals, divided into a sample of (30) gymnasts, (30) soccer players, (30) runners and (30) non-practitioners of sports activity and their characteristics according to table (1) were as follows:

**Table (1) Statistical description of the four research samples in measurements (age, height, weight, training age)**

<table>
<thead>
<tr>
<th>Sample</th>
<th>Statistics</th>
<th>Variables</th>
<th>Age</th>
<th>Height</th>
<th>Weight</th>
<th>Training Age</th>
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<tr>
<td><strong>Gymnastics N = 30</strong></td>
<td>Mean</td>
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<td>173.53</td>
<td>69.13</td>
<td>13.90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>1.22</td>
<td>3.33</td>
<td>5.78</td>
<td>1.06</td>
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</tr>
<tr>
<td></td>
<td>Minimum</td>
<td>17.50</td>
<td>165.00</td>
<td>59.00</td>
<td>12.00</td>
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</tr>
<tr>
<td></td>
<td>Maximum</td>
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<td>83.00</td>
<td>15.00</td>
<td></td>
</tr>
<tr>
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<td>0.26</td>
<td>-0.53</td>
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<tr>
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<td>0.43</td>
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<td>0.43</td>
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</tr>
<tr>
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<td>0.83</td>
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<tr>
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<td>0.61</td>
<td>0.66</td>
<td></td>
</tr>
<tr>
<td></td>
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<td>0.98</td>
<td>0.87</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td><strong>Soccer N = 30</strong></td>
<td>Mean</td>
<td>19.27</td>
<td>174.37</td>
<td>71.43</td>
<td>11.40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>1.89</td>
<td>3.73</td>
<td>7.75</td>
<td>0.89</td>
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<tr>
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<td>Minimum</td>
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<td>165.00</td>
<td>61.00</td>
<td>10.00</td>
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</tr>
<tr>
<td></td>
<td>Maximum</td>
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<td>181.00</td>
<td>86.00</td>
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<td>0.43</td>
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<tr>
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<td>0.05</td>
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<td>0.86</td>
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<tr>
<td><strong>Running N = 30</strong></td>
<td>Mean</td>
<td>18.53</td>
<td>172.20</td>
<td>68.17</td>
<td>11.30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>1.61</td>
<td>3.24</td>
<td>6.59</td>
<td>1.06</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
<td>15.50</td>
<td>164.00</td>
<td>60.00</td>
<td>10.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
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<td>180.00</td>
<td>88.00</td>
<td>13.00</td>
<td></td>
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<tr>
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<td>Skewness</td>
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<td>-0.02</td>
<td>0.81</td>
<td>0.10</td>
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<td>0.43</td>
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<tr>
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<td>0.71</td>
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<td>-1.23</td>
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<tr>
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<tr>
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<td>0.64</td>
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<tr>
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<td>Asymp. Sig. (2-tailed)</td>
<td>0.95</td>
<td>0.58</td>
<td>0.77</td>
<td>0.80</td>
<td></td>
</tr>
<tr>
<td><strong>Non-practitioners N = 30</strong></td>
<td>Mean</td>
<td>18.87</td>
<td>174.33</td>
<td>69.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>1.83</td>
<td>5.52</td>
<td>6.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
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<td>188.00</td>
<td>81.00</td>
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<tr>
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<td>Skewness</td>
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<td>0.21</td>
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<td>Std. Error of Skewness</td>
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<td>0.43</td>
<td>0.43</td>
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<tr>
<td></td>
<td>Kurtosis</td>
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<td>Std. Error of Kurtosis</td>
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<td>0.83</td>
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<tr>
<td></td>
<td>Kolmogorov-Smirnov Z</td>
<td>0.59</td>
<td>0.64</td>
<td>0.72</td>
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</tr>
<tr>
<td></td>
<td>Asymp. Sig. (2-tailed)</td>
<td>0.88</td>
<td>0.80</td>
<td>0.62</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (1) which illustrates the statistical description of the four research samples in the measurements (age, height, weight, training age) shows that the data of the four samples are moderately distributed according to the values of the skewness and kurtosis coefficients compared to their standard error parameters and the data given by Kolmogorov-Smirnov test which refers to the homogeneity of the four sample members.
- Procedures:
Dynamic balance capacity was measured using MFT Balance Test; MFT (My Fitness Trainer Version 1.7) (Figure 1,2,3), asking the subjects to lean to the signal direction of sense of sight appearing for 30 sec. on a foothold moving left / right and forward / backward. Balance scale is recorded from 1 to 5 points at the unit of 0.1, and the value of good balance is recorded close to 1 point, the balance time in each sector is also calculated on the balance board during the total measurement time.

![Balance Test Board (MFT)](image1)

![Test Instructions.](image2)

![Balance Test (MFT) (Left/Right)](image3)

![Balance Test (MFT) (Forward/Backward)](image4)

Scoring:
1= Excellent Stability, 2= Good Stability, 3= Improvable Stability, 4= Disappointing Stability, 5= Bad Stability. [20, 21]

Table (2) shows the statistical description of the four research samples in dynamic balance measurements left / right, forward / backward using balance test MFT.
Table (2) Statistical description of the four research samples in dynamic balance measurements left / right, forward / backward using balance test MFT

<table>
<thead>
<tr>
<th>Sample</th>
<th>Variables</th>
<th>Statistics</th>
<th>Left/Right</th>
<th>Forward/Backward</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gymnastics</strong></td>
<td>Mean</td>
<td>2.53</td>
<td>2.56</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>0.42</td>
<td>0.46</td>
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</tr>
<tr>
<td></td>
<td>Minimum</td>
<td>1.58</td>
<td>1.38</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>3.28</td>
<td>3.16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skewness</td>
<td>-0.14</td>
<td>-0.35</td>
<td></td>
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<tr>
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<td>Std. Error of Skewness</td>
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<tr>
<td></td>
<td>Kurtosis</td>
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<td>-0.34</td>
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<tr>
<td></td>
<td>Std. Error of Kurtosis</td>
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<td>0.83</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kolmogorov-Smirnov Z</td>
<td>0.52</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Asymp. Sig. (2-tailed)</td>
<td>0.95</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td><strong>Soccer</strong></td>
<td>Mean</td>
<td>2.27</td>
<td>2.27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>0.44</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
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<td>1.21</td>
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</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>3.03</td>
<td>2.89</td>
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<td>Skewness</td>
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<td>Std. Error of Skewness</td>
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<td>0.43</td>
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<tr>
<td></td>
<td>Kurtosis</td>
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<td>Std. Error of Kurtosis</td>
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<td>0.83</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kolmogorov-Smirnov Z</td>
<td>0.66</td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Asymp. Sig. (2-tailed)</td>
<td>0.77</td>
<td>0.80</td>
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</tr>
<tr>
<td><strong>Running</strong></td>
<td>Mean</td>
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<td>3.17</td>
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<td>Std. Deviation</td>
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<tr>
<td></td>
<td>Minimum</td>
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<td></td>
<td>Maximum</td>
<td>3.76</td>
<td>3.75</td>
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<tr>
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<td>Skewness</td>
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<td>-0.29</td>
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<tr>
<td></td>
<td>Std. Error of Skewness</td>
<td>0.43</td>
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<td>Kurtosis</td>
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<td>Std. Error of Kurtosis</td>
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<td>Kolmogorov-Smirnov Z</td>
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<td>Asymp. Sig. (2-tailed)</td>
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<td><strong>Non-practitioners</strong></td>
<td>Mean</td>
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<td>Maximum</td>
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<td>-0.74</td>
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<tr>
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<td>Kolmogorov-Smirnov Z</td>
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<td></td>
<td>Asymp. Sig. (2-tailed)</td>
<td>0.87</td>
<td>0.81</td>
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</table>

Table (2) which illustrates the statistical description of the four research samples in dynamic balance measurements left / right, forward / backward using balance test MFT, shows that the data of the four samples are moderately distributed according to the values of the skewness and kurtosis coefficients compared to their standard error parameters and the data given by Kolmogorov-Smirnov test which refers to the homogeneity of the four sample members.
- Data Analysis:
The data were statistically analyzed using the (v. 18, IBM, USA) version of (SPSS) software, where the differences of the dynamic balance between the four groups (gymnastics, soccer, running, non-practitioners) were calculated using ANOVA and Scheffe tests.
To distinguish the differences in left/right, forward/backward dynamic balance for all groups researcher used Independent samples t-test and the level of significance of all data analysis was set to p<.05.

- Results:

Table (3) Classification of the four research samples in the dynamic balance measurements (left / right, forward / backward) according to their levels using the MFT balance tester

<table>
<thead>
<tr>
<th>Sample</th>
<th>Left/Right Level</th>
<th>Forward/Backward Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gymnastics N = 30</td>
<td>Good Stability</td>
<td>Good Stability</td>
</tr>
<tr>
<td>Soccer N = 30</td>
<td>Good Stability</td>
<td>Good Stability</td>
</tr>
<tr>
<td>Running N = 30</td>
<td>Improvable Stability</td>
<td>Improvable Stability</td>
</tr>
<tr>
<td>Non-practitioners N = 30</td>
<td>Improvable Stability</td>
<td>Disappointing Stability</td>
</tr>
</tbody>
</table>

Table (4) Analysis of the differences between the four research samples (gymnasts - soccer players - runners - non-practitioners of sports activity) in the dynamic balance measurements under study N = 120

<table>
<thead>
<tr>
<th>Variables</th>
<th>Statistics</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance Test (MFT) - Left/Right</td>
<td>Between Groups</td>
<td>51.37</td>
<td>3</td>
<td>17.12</td>
<td>104.71**</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>18.97</td>
<td>116</td>
<td>0.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>70.34</td>
<td>119</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance Test (MFT) - Forward/Backward</td>
<td>Between Groups</td>
<td>59.86</td>
<td>3</td>
<td>19.95</td>
<td>128.13**</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>18.07</td>
<td>116</td>
<td>0.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>77.93</td>
<td>119</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Significant at (0.05) = 2.68 ** at the level of (0.01) = 3.94

Table (5) Results of Scheffe test to compare the four research samples in the dynamic balance measurements under study

<table>
<thead>
<tr>
<th>Variables</th>
<th>Samples</th>
<th>N</th>
<th>Mean</th>
<th>Mean Difference &amp; Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Soccer</td>
</tr>
<tr>
<td>Balance Test (MFT) - Left/Right</td>
<td>Gymnastics</td>
<td>30</td>
<td>2.53</td>
<td>0.26</td>
</tr>
<tr>
<td></td>
<td>Sig. (0.11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soccer</td>
<td>30</td>
<td>2.27</td>
<td>0.82-*</td>
</tr>
<tr>
<td></td>
<td>Sig. (0.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Running</td>
<td>30</td>
<td>3.09</td>
<td>0.89-*</td>
</tr>
<tr>
<td></td>
<td>Sig. (0.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-practitioners</td>
<td>30</td>
<td>3.98</td>
<td></td>
</tr>
<tr>
<td>Balance Test (MFT) - Forward/Backward</td>
<td>Gymnastics</td>
<td>30</td>
<td>2.56</td>
<td>0.28</td>
</tr>
<tr>
<td></td>
<td>Sig. (0.06)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soccer</td>
<td>30</td>
<td>2.27</td>
<td>0.90-*</td>
</tr>
<tr>
<td></td>
<td>Sig. (0.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Running</td>
<td>30</td>
<td>3.17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-practitioners</td>
<td>30</td>
<td>4.11</td>
<td></td>
</tr>
</tbody>
</table>
Table (6) Differences between Balance Test (MFT) Left/Right and Balance Test (MFT) Forward/Backward in Four Groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Statistics</th>
<th>Balance Test (MFT) Left/Right</th>
<th>Balance Test (MFT) Forward/Backward</th>
<th>Mean Difference</th>
<th>(T)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gymnastics</td>
<td>N = 30</td>
<td>SD ±M</td>
<td>SD ±M</td>
<td>2.534 ± 0.42</td>
<td>2.556 ± 0.46</td>
<td>0.02-</td>
</tr>
<tr>
<td>Soccer</td>
<td></td>
<td></td>
<td></td>
<td>2.275 ± 0.44</td>
<td>2.271 ± 0.40</td>
<td>0.00</td>
</tr>
<tr>
<td>Running</td>
<td></td>
<td></td>
<td></td>
<td>3.092 ± 0.39</td>
<td>3.166 ± 0.36</td>
<td>0.07-</td>
</tr>
<tr>
<td>Non-practitioners</td>
<td></td>
<td></td>
<td></td>
<td>3.982 ± 0.36</td>
<td>4.114 ± 0.35</td>
<td>0.13-</td>
</tr>
</tbody>
</table>

Table (6) which illustrates the differences between the balance test (MFT) left / right and balance test (MFT) forward / backward in the four groups shows that the calculated (t) value is less than the tabulated (t) value at (0.05) indicating that there are no significant differences between the left / right, forward / backward measurements of the four groups.

- Discussion:
Table (3) which illustrates the classification of the four research samples in the dynamic balance measurements (left / right, forward / backward) according to their levels using the MFT balance tester, shows that the sample of gymnasts and soccer players was at a good level of dynamic balance in the left / right and forward / backward measurements while the sample of the runners was able to be improved in the dynamic balance in the
left / right and forward / backward measurements, and the sample of non-practitioners was at a disappointing level of dynamic balance in the forward / backward measurement. Table (4) which illustrates the analysis of the differences between the four research samples (gymnasts - soccer players - runners - non-practitioners of sports activity) in the dynamic balance measurements under study showed that there were significant differences between the four research groups in these measurements as the calculated (P) value was greater than the tabulated (P) value of these measurements at the level of (0.01).

In order to determine the direction of the differences between the four research groups and in light of the results of table (5) that illustrated the results of Scheffe test to compare the four research samples in the dynamic balance measurements under study, the results of the Scheffe test for the dynamic balance measurement for each of the four research groups showed that there are no significant differences between the soccer players and the gymnasts in both measurements, while the soccer players and gymnasts exceeded the runners and non-practitioners of sports activity in both measurements, and the runners exceeded the non-practitioners of sports activity in both measurements, finally the practitioners of sports activity generally exceeded the non-practitioners of sports activity in the left / right and forward / backward dynamic balance measurements and this is consistent with Shirley et al (2012), (22) which also pointed that the practitioners of sports activity exceed the non-practitioners in the ability of dynamic balance. The study also agrees, regarding the differences between the various sports activities in general in the dynamic balance with the studies of Hrysomallis C. (2011), (18) and Bressel E., et. al., (2007), (7) and Perrin P., et. al., (2002), (17).

The arithmetic means of the four groups in the left / right and forward / backward measurements show that the arithmetic mean of the dynamic balance measurements are high, which confirms the fact that the dynamic balance of the two sides is higher than the forward dynamic balance, and this is related generally to the falling mechanism and its causes which is mainly resulted of the low frontal balance according to the study of Jin-seok Oh, Jin-hong Park (2013) (23)

The results also show that the soccer group in the dynamic balance capacity of the measurements exceeds all of the other three groups when comparing their arithmetic means, which is consistent with the study of Rashi Bhat and Jamal Ali Moiz (2013) (24) which confirmed the superiority of soccer players over the field hockey players in the dynamic balance capacity, as the soccer activity requires more dynamic balance capacity to meet the requirements of the activity according to its technical performance. Finally, table (6) shows that there are no significant differences between the left / right and forward / backward measurements for the four groups which in turn confirms the effectiveness of the MFT test in measuring the dynamic balance since the values resulting from the measurements reflect the dynamic balance capacity of each of the four samples under study.

- **Conclusions:**
- Sport’s activity is affected by and affects the ability of dynamic balance when evaluating this ability using the MFT balance test.
- Soccer players and gymnasts are more balanced than the runners especially in the dynamic balance measurement.
- In the light of the results of the research, only one measurement either left / right or forward / backward can reflect the dynamic balance capacity when the target is to evaluate that ability in general using the MFT balance test.

References:


Hawaii International Conference on Education

Topic: Why is Calculus so important in leading a person to a career in STEM?

Topic Area: Mathematics Education

By: Dr. Antoinette Davis

Mathematics Faculty

Sullivan University/CSU-Global

2-3 sentence description: Calculus has been regarded as a difficult subject for many years. Many people would say that this sequence of courses is the determiner on whether a person will pursue a career in STEM or not. Confidence has a lot to do with whether students will pass these courses or not.
“In some sense, the worst preparation a student heading toward a career in science or engineering could receive is one that rushes toward accumulation of problem-solving abilities in calculus while short-changing the broader preparation needed for success beyond calculus (Bressoud, Mesa, & Rasmussen, 2015).”

As noted in the above quote, some students tend to enter calculus and they are under-prepared for the course content. Students that want to major in STEM fields need a strong foundation in the sequence of calculus to go into higher levels of mathematics and engineering courses. Many students do not have the proper foundation of math in middle and high school and this is detrimental when they enter college and they encounter mathematics courses that they are not ready for. Most colleges still use separate classes that underprepared students must pass before enrolling in college-level classes, while recent research indicates that integrating remedial learning with regular college courses brings better results (Kolodner, 2016). I think that this type of courses in college can be helpful to students but there is a rush to master these courses to move on to higher level math courses. If a student needs lot of time to master these remedial courses, then it can harm them because their degree program will take a lot longer to complete. Some students may have to switch majors if they do not master these remedial math courses.

But based on high school preparation, “If we set high expectations and teach well, the vast majority of high school students will be able to finish algebra well before their senior year. Some will be ready to move on to pre-calculus and calculus courses. Others may be served by courses offering additional practice at other mathematics skills (Bennett, p. 50).” As you can see, all students may not go on to Precalculus or Calculus courses but there are courses that are still available to fulfill their requirements for math credits in high school.

For the select group of students that master the remedial courses in college, they are often placed in an Algebra or PreCalculus course. Once they pass through these courses, they are placed into the Calculus sequence. Duval (2015) found that great, personable lecturers that were always available for questions on the online forums and their attitude that calculus was not impossible to learn, even if you stumbled at first. Often times, the idea of passing Calculus has a lot to with patient teachers that know how to teach the subject. On top of this, a software was used for the course to ensure continual practice during the course. The easier ones were interactive, and offered step-by-step solutions if you got stuck; The software acted a lot like a video game; if you showed that you really understood a concept, it leveled you up and asked you tougher questions (Duval, 2015).

Calculus instructors play a large role in student satisfaction based on the following items: Creating a positive atmosphere in which the instructors encourage students to ask questions; maintaining a positive attitude towards students’ mistakes; keeping reasonable pacing of the lecture to ensure all students are on the same page, with time for individual, pair, or group work; setting high standards and clear expectations that all students can meet, and having the
availability to answer student questions and respond to students’ needs (Bressoud, Mesa, & Rasmussen, 2015).

In mastering calculus, it is helpful to have some type of software that students can use to practice problems each week. This allows students to practice their work after class in preparation for homework, quizzes, and tests. Overall, it helps students to see a visual representation of the work that they have seen in the class lecture. Calculus occupies a unique position as gatekeeper to the disciplines in science, technology, engineering, and mathematics (STEM) (Bressoud, Mesa, & Rasmussen, 2015). Because of this position in a lot of college majors, students need to pass these Calculus courses so that they can take other courses in their majors.

Ellis, Fosdick, & Rasmussen (2016) found that when comparing women and men (in Calculus I) with above-average mathematical abilities and preparedness, we find women start and end the term with significantly lower mathematical confidence than men; this suggests a lack of mathematical confidence, rather than a lack of mathematically ability, may be responsible for the high departure rate of women. When it comes to ability, women may need more confidence and encouragement to persist in the field. Confidence can be seen in various ways but overall, you will have to find ways to appeal to both genders in the classroom. Appropriate supports (like tutoring and after-school mentoring) should be in place to ensure the success of all students. Ellis, Fosdick, & Rasmussen (2016) found that if women persisted in STEM at the same rate as men starting in Calculus I, the number of women entering the STEM workforce would increase by 75%.

In closing, Calculus is the driving force behind a lots of STEM majors. But we must find ways to make sure that we have all hands-on deck in order to keep the students motivated, engaged, and confident so that they can start and finish these courses within the semester. The goal is to move these students through the courses so that they can begin higher-level math courses so that they can enter their majors and complete their degrees on time.
References


Ellis, J., Fosdick, B., Rasmussen, C. (2016). Women 1.5 Times more likely to leave STEM pipeline after Calculus compared to men: lack of mathematical confidence a potential culprit.

Hawaii International Conference on Education

Topic: Effectively using Screen Recorders (like Screencast-o-Matic) to promote student participation

Topic Area: Distance Education

By: Dr. Antoinette Marie Davis

Mathematics Faculty

Sullivan University/CSU-Global

2-3 sentence description: Screen Recorders have been used for many years to record various items. But now, screen recorders can be used to record short videos of content that can be sent out to students. These videos are helpful when you are working in online and distance environments and students want videos that were created to help them to master the information.
Abstract: Screen recorders have been used for many years to record videos based on course content. However, most of these recorders were not within reach due to their price tag. Some of them required various steps for downloading and it took up too much space on the hard drive. Now, there are many free screen recorders that can be used to record videos for your courses. The author has used Screencast-o-matic for many years to record math and technology videos with ease. Screencast-o-Matic is a free recorder that can be used to record your screen for short instructional videos. If instructors are looking for a no-cost option for a screen recorder that is easy to install and record content, then Screencast-o-Matic is the best option around.

Screen recorders are the best way to use technology as a means of instruction. Multimedia is the best way to bring students to the forefront based on technology that can be used to facilitate content. These recorders have been used for many years for various reasons: recording class content, recording videos for presentations, etc.

Here are some screencasting options:

- Filmora Scrn (www.filmora.wondershare.com)
- Camtasia Studio (www.techsmith.com)
- Jing (www.techsmith.com/jing-tool.html)
- Screencast-o-matic (www.screencast.com) (My Favorite Screencast Program)
- SnagIt (www.techsmith.com/snagit.html)
- Apple QuickTime Player (www.apple.com/quicktime)
- Screencastify (www.screencastify.com)

Screencasting can allow you to:

- Record and present a speech, a story, an interview, or a conversation.
- Screen capture a presentation along with narration.
• Screen capture a demonstration of a math problem being solved using a drawing program.
• Create tutorials and step-by-step video demonstrations on how to use laboratory equipment or specific software programs.
• Provide training on a range of topics.
• Offer explanations and clarifications of complex concepts.
• Record chunked lectures, or break up longer lectures into smaller segments (Bart, 2010).

The best way to do these types of recordings is to create a step-by-step sheet on what you would like to record. Most times, these instructions can help you to create a video that is clear and concise for students to review in preparation for upcoming assignments. A lot of these videos can be sent out early to get students to review the material before coming to class.

One of the use of Screencast-o-matic is recording a short Introduction for an online course. Often times, these courses do not have live components so a video is a great way to introduce yourself to the class. I have used these videos for a short preview of how to navigate the online course and students are able to watch these videos at their convenience.

Many people wonder what happens to the videos after you record them on Screencast-o-matic. You have two options in terms of storage: You can save it to the Screencast-o-matic server or you can send your video to your YouTube Channel. Please note that your YouTube Channel must be set up before you decide to record a video so that it will allow for quick linkage when you are done.

Here are some best practices for completing a Screencast-o-matic video:
• Use a script so that you can have a clear direction on what you want to say in the video.
• Keep the video short (less than 5 minutes) so that students will want to watch the video.
• Rehearse before recording a video so that there are no errors.
• Make sure that you have proper lighting so that your screen is not dark during your recording.
• Setup your YouTube Channel early so that you can have your videos transferred to your Channel.
• Record your video in a quiet area so that you are free from distractions.

Overall, there are plenty of screen recorders on the market but Screencast-o-matic is the best on the market right now. If you would like to record videos for your course or seminar, please review the above tips as you prepare for your recording. Please make sure that you are mindful of the time as you record these videos. The goal is to keep students engaged so that they will apply these videos to their upcoming assignments. Lastly, in using screen recorders, you must know that you can use it as a supplement to your course instruction but it should not replace the lecture. It would be helpful to add recordings in parts of the instruction where students will need more time to process the information.
References

Pre-Service Teachers Exploring the Engineering Design Process with 3D Printing

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Pre-Service Teachers Exploring the Engineering Design Process with 3D Printing

Abstract

Attracting students to careers in Science, Technology, Engineering, and Math (STEM) requires exposure to learning activities that incorporate these subjects. The presence of STEM-related learning activities in K-12 classrooms requires teacher preparation programs to provide opportunities to develop skills to teach these practices. Many elementary teacher preparation programs have adequate preparation with science, math, and technology, but limited exposure to engineering. This study examined pre-service teachers understandings of engineering before and after participation in an engineering design process challenge using 3D printing. Engineering has become an important element in the Next Generation Science Standards (NGSS), which have been adopted by many states. Other states include engineering standards within their state standards. Pre-service elementary teachers should have the knowledge to integrate the engineering design process into their teaching as well as integrate technology such as 3D printing. This is a necessary skill set for all teachers to prepare students in STEM-related careers. Elementary pre-service teachers participated in a semester-long course involving the engineering design process and 3D printing. The results of the study showed increased knowledge and views for most aspects of engineering by participating in this experience.

Keywords: 3D printing, Engineering Design Process, STEM, 21st-Century skills
Preparing elementary pre-service teachers to teach students to be ready for tomorrow’s workforce continues to change with the increased use of technology. Teaching science, technology, engineering and math (STEM) to elementary students should start early to catalyze an interest in STEM-related careers. This STEM integration requires the teacher to have the background to teach it. Many schools and curriculums emphasize the importance of STEM, yet the preparation of elementary pre-service teachers do not always require courses to prepare them to teach it. Methods courses typically include science, math, social studies, and literacy with either a stand-alone technology course or technology embedded throughout the coursework. Engineering education is generally underestimated and neglected for the sake of other subjects (Howe & Wilbarger, 2006; Yasar, Baker, Robinson-Kurpius, Krause, & Roberts, 2006). Also, lack of confidence in teaching engineering in the elementary setting, elementary teachers rarely teach it. Therefore, it is necessary to provide opportunities for pre-service teachers to learn about the engineering design process (EDP) in their coursework so they will teach it in their future classrooms. Participation in semester-long activities has been shown to equip pre-service teachers with creative methods of teaching K-12 engineering at the elementary level (Mativo & Park, 2012). Participation in semester-long activities also has been shown to improve the views on the nature of engineering and can lead to a development of engineering literacy in pre-service teachers and their awareness to teach this to elementary students (Kaya, Newly, Denlz, Yesilyurt, & Newly, 2017).

Integrating engineering in science methods courses with pre-service teachers can begin to build the skills necessary to teach the EDP. Engaging pre-service teachers in the engineering with authentic real-world engineering challenges is important. Challenges
can incorporate content-specific challenges in the areas of life science, physical science, earth, and space science, but can also be challenges that meet standards for engineering. In addition to content area standards, technology can also be integrated. Kaya et. al (2017) introduced the EDP using educational robots. Blending technology with engineering design challenge provides additional skills of problem-solving, critical thinking, and collaboration, which are all essential for engineering careers.

While many studies have explored the use of robotics for engineering integration, few have explored the use of other technologies such as 3D printing. As technologies such as 3D printing emerge, utilizing the technology to teach engineering could be a way to engage students and provide them with the same skills (problem-solving, critical thinking, and collaboration) needed for the future careers in engineering. Trust and Maloy (2017) surveyed 51 educators and found that 75% of their students developed creativity, critical thinking, problem-solving and self-directed learning when working on 3D projects. 3D printing allows students to cycle through EDP as they create prototypes and print their projects. 3D printing has emerged as a new tool that allows for the creation of objects designed in a 3D modeling program. It is important to distinguish that 3D printing alone does not require you to use the EDP, but 3D can be used as part of the EDP. With the increased availability of 3D printers now available in educational settings, pre-service teachers need experience and confidence to integrate these tools, in addition to tools like robotics. The applications of 3D printing are vast, but to be effective in an educational setting, it must have a purpose and tied to the content area and engineering standards.
Purpose of the Study

The purpose of the study was to introduce the engineering design process using 3D printing with pre-service elementary teachers to determine if this enhances their knowledge and views of the nature of engineering. Engineering in elementary education is limited due to teacher knowledge and confidence in the subject. If the knowledge and views can change in a positive direction during teacher preparation, engineering activities could become more prevalent in elementary schools.

Standards Alignment

Engineering practices are embedded with the NGSS standards (NGSS Lead States, 2013) for elementary education. Twenty-six states were involved in creating the NGSS standards, in addition, many states have their own state standards that include the practice of engineering. Using 3D printing can easily be used to meet the engineering standards with designing, constructing, testing, and revising 3D prints. In addition, 3D printing allows students to develop skills in creativity, critical thinking, collaboration, problem-solving, and perseverance, which are identified as 21st-Century skills. The Hanover Research (2011) that analyzed six major 21st-Century learning reports, found four 21st-Century skills cited by all: creativity and imagination, critical thinking, collaboration and teamwork, and problem-solving. Lastly, as we continue to prepare students for the future, other standards are also part of many school districts framework for technology integration. International Society for Technology in Education (ISTE) has revised the technology standards for students in 2016. In the 2016 standard revision, the shift was for students not just using technology to learn, but to experience transformative learning with technology. Seven student standards developed by ISTE for students
include similar ideas addressed in the 21st Century skills, such as innovative designer, empowered learner, and creative communicator (ISTE, 2016). 3D printing can be a transformative way to learn with technology to meet the ISTE standards.

**Methods**

**Participants**

Nineteen pre-service teachers voluntarily participated in the study within the context of an elementary science content course. The course was 16 weeks in length and included topics of the nature of science, engineering, life science, physical science, and earth science aligned to NGSS and state academic standards in science. The engineering design challenge using 3D printing spanned over the 16-week course. Prior to the initial discussion on engineering design, the pre-service teachers participated in a questionnaire on the Views of Nature of Engineering (VNOE). The VNOE was modified by Kaya, Newley, Yesilyurt, & Newley (2017) from the Views of Nature of Science Version-C (VNOSC) that was developed by Lederman et. al (2002) to assess nature of engineering views. VNOE consisted of eight open-ended questions related to the views of engineering related to our study (see Appendix A). Pre-service teachers were given an anonymous link to the questionnaire before and after the completion of the project.

**Unit Description**

After the questionnaire was given, the pre-service teachers were introduced to the EDP with a challenge to construct a catapult. A catapult was chosen for this challenge to teach content area standards related to simple machines. The pre-service teachers were guided through the five steps of the EDP commonly used in elementary classrooms: Ask, Imagine, Plan, Create, and Improve developed by
Engineering is Elementary ® (EiE, 2016), an elementary engineering curriculum developed by the Museum of Science, Boston. Throughout the experience, an emphasis was made that the experience was about the process, not the product.

The second EDP challenge introduced to the pre-service teachers was to construct a simple machine of their choice (inclined plane, pulley, wheel and axle, wedge, or screw) that could be used to assist someone or to change something that already exists. The second challenge was broken down into multiple steps and followed the five steps of the EDP. The pre-service teachers were required to create a blog post as they went through this process to document the steps. The pre-service teachers were given two weeks to design and research a prototype of the simple machine. The pre-service teachers presented their prototype in a round-robin type cycle to get feedback. Modifications were incorporated into the next prototype. At this point, students were introduced to the concept of 3D printing for the next prototype. To create the prototype model in 3D, a program called TinkerCad® was used. TinkerCad® is a free online 3D design and printing software program. After the students created the designs in TinkerCad®, the files were exported to print with the 3D printer. The pre-service teachers worked independently on the projects and could modify the designs as needed until the end of the course. Final designs regardless of the success or failure were presented to the class. Throughout the experience, emphasis again was made that the experience was about the process, not the product.
Data Analysis

Data analysis was completed by assigning codes based on the participant’s responses. The codes assigned were uninformed, partially informed, and fully informed on whether they captured the meaning of the nature of engineering (NOE). If the participant captured the meaning of the NOE, the response was labeled fully informed. If the participant captured the meaning with some discrepancy, the response was labeled partially informed. If the participant's response was opposite of NOE, the response was labeled uninformed. This analysis was similar to what was reported by Kaya, Newley, Yesilyurt, & Newley (2017). The guiding principals of the NOE used for this study specifically reflected K-12 engineering education. Hartman (2016) identified eight aspects of the NOE for K-12 education identified both by K-12 teachers and university faculty in both science and engineering. Six of the eight were located in the NGSS text (see Table 1.)

Table 1.
Comparison of NGSS language to the aspects of engineering (Hartmann 2016).

<table>
<thead>
<tr>
<th>Hartman (2016)</th>
<th>NGSS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Divergent</strong></td>
<td></td>
</tr>
<tr>
<td>The solution to an engineering problem is but one attempt to meet criteria while staying within constraints. There is rarely one right answer to engineering problems. Multiple successful solutions are possible.</td>
<td>Multiple solutions (NRC, 2011, p. 41).</td>
</tr>
<tr>
<td><strong>Creative</strong></td>
<td></td>
</tr>
<tr>
<td>Engineers use creativity in addition to logical thinking throughout problem identification, design, implementation, and communication processes.</td>
<td>Creative process (NRC, 2011, p. 206).</td>
</tr>
<tr>
<td><strong>Iterative</strong></td>
<td>Failure and improvement (NRC, 2011, p. 207).</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Learning from failure is important to engineers because early designs often do not meet criteria and constraints. They analyze these early failures to identify issues and improve the design so the final solution can be successful.</td>
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<table>
<thead>
<tr>
<th><strong>Model-Driven</strong></th>
<th>Developing Using Models (NRC, 2011, p. 206).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineers develop models (e.g. mathematical, visual, or physical) to support the design, testing, and implementation to reduce the risks of building full-scale items.</td>
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<tr>
<th><strong>Communicative</strong></th>
<th>Communicating Information (NRC, 2011, p. 278).</th>
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</thead>
<tbody>
<tr>
<td>Engineering requires communication between team members and other stakeholders</td>
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<tr>
<th><strong>Constrained</strong></th>
<th>Specifying constraints and criteria (NRC, 2011, p. 68).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering designs must meet constraints (such as economic, environmental, social, safety, etc.) and are evaluated against criteria (such as economic feasibility, performance, the risk of failure, public interests, etc.).</td>
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<tr>
<th><strong>Collaborative</strong></th>
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<tbody>
<tr>
<td>Engineering work is typically a team effort with input and knowledge spread among many people with varied expertise.</td>
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<tr>
<th><strong>A Unique Way of Knowing</strong></th>
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</thead>
<tbody>
<tr>
<td>Engineers expand engineering knowledge through empirical tests, experience, and applying science and mathematics. These processes are related to but distinct from the way science expands knowledge.</td>
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</table>

Hartman further recommended that the aspects of Creative, Collaborative, and Communicative should be treated as practices rather than aspects because they are not unique to engineering. Because of the alignment with NGSS and the VNOE survey, we
still considered Creative an aspect for this study, but Collaborative and Communicative were not evaluated. In addition, because of the importance of knowing the difference between science and engineering, Unique Way of Knowing was also included in the study. Responses for each aspect and an example of the level are found in Appendix B.

**Results**

Knowledge of “What is engineering?” for the pre-service teachers overall increased from before and after the engineering challenge. The number of uniformed and partially uniformed decreased, and the number of fully informed increased. Many of the informed responses after the activity included the steps of the EDP and language on how engineering is a process. Uninformed or partially informed responses prior to the activity by the participants did not have reference to the process or were limited to construction or building. The number of pre-service who held informed NOE views of the aspects of divergent, creative, iterative, model-drive, and unique-way of knowing increased or stayed the same with the exception of the aspect of constrained (see Figure 1.). The results indicate that the participants were not informed about the larger social and cultural constraints involved in engineering before or after the activity. Pre-service teachers who held uniformed or partially informed NOE views for the aspects of divergent, creative, iterative, model-drive, and unique-way of knowing, declined from before and after the activity. Responses in each ranking category for all aspects are presented in Appendix B.
Discussion

Exposure to engineering activities for elementary pre-service teachers does help to increase the knowledge and views of engineering. While the number of fully informed was high for all aspects even before the activity, the shift in knowledge and views increased. Results are similar to those reported by Kaya et. al (2017) who used robotics instead of 3D printing. However, it is recognized that the number of participants is low and a larger sample may or may not yield the same results. It is also recognized that additional questions regarding the collaborative and communicative aspects should be
added to better align with 21st-Century skills and the ISTE standards. Although we did not analyze the collaborative or communicative aspect of engineering, participants were asked to draw a picture of an engineer at work and explain the picture. The pictures and explanations of the pictures did not contain many references to people working together (collaborative). The 3D challenge was done individually and not with others, and the pre-service teachers did not see the connection of engineering being collaborative or communicative, despite two class periods devoted to peer feedback and collaborative work.

Early integration of engineering practices in elementary schools and technology integration is essential to increase interest in STEM-related careers but requires teacher knowledge to implement effectively. Teacher preparation for elementary teachers should include experiences in engineering. We found that using new technology such as 3D printing can be used to teach the EDP and increase knowledge and views of the nature of engineering. In addition, 21st-Century skills can be gained with this type of experience and provide knowledge of how new technology can be integrated into required standards and curriculum. The benefits of integrating engineering and 3D printing go beyond the scope of the survey and unfortunately were only captured in observations during the semester with the engagement in this type of learning.
References


Appendix A

View of Nature of Engineering Questionnaire (VNOE)

1. What, in your view, is engineering?

2. What makes engineering different from science, philosophy, and religion?

3. What is an engineering design process?

4. After engineers have developed an engineering design, does the design ever change?

5. Do engineers use their creativity and imagination during the engineering design process?

6. Some claim that engineering is infused with social and cultural values. That is, engineering reflects the social and political values, philosophical assumptions, and intellectual norms of the culture in which it is practiced. Others claim that engineering is universal. That is, engineering transcends national and cultural boundaries and is not affected by social, political, and philosophical values and intellectual norms of the culture in which it is practiced. Please justify which claim you believe best describes the social aspect of engineering.

7. How do you define the work of an engineer? What do engineers do?

8. Draw a picture of an engineer at work.

9. Describe your picture in a few words and why you drew what you drew.
Appendix B

Pre-service teachers’ responses for each aspect of engineering for each ranking category.

<table>
<thead>
<tr>
<th>Question</th>
<th>Uniformed</th>
<th>Partially Informed</th>
<th>Fully Informed</th>
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<tbody>
<tr>
<td>What, in your view, is engineering?</td>
<td>“Engineering is about the ability to control mechanical equipment the way it is supposed to and will be able to fix the issues as well.”</td>
<td>“Engineering is trying to solve a problem by creating some sort of design/machine.”</td>
<td>“Engineering is the process of creating, building, and designing. It involves a variety of processes that includes brainstorming, revising and creating products or ideas. It involves products that do work. Engineering also includes technology and improving our society through invention.”</td>
</tr>
<tr>
<td>How do you define the work of an engineer? What do engineers do?</td>
<td>“They are working with computers and stuff like that consistently. Other than that I really don't know?”</td>
<td>“Engineers build and create a variety of things.”</td>
<td>“Engineers design and create things that are beneficial and useful for our world.”</td>
</tr>
<tr>
<td><strong>Model-Driven</strong></td>
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</tr>
<tr>
<td>What makes engineering different from science, philosophy, and religion?</td>
<td>“It just has to do with technology exclusively”</td>
<td>“Engineering is a step beyond questioning. You must create something in order to answer your question.”</td>
<td>“Engineering is different from science, philosophy, and religion because it uses all three of these in the process. Science is definitely a necessary component to create the parts and pieces necessary. Philosophy and religion may come in play with the morals, ethics, and”</td>
</tr>
<tr>
<td><strong>Unique Way of Knowing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Divergent</td>
<td>Iterative</td>
<td>Creative</td>
</tr>
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<td>------------------------------------------</td>
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<tr>
<td>What is an engineering design process?</td>
<td>“I have no clue”</td>
<td>“You brainstorm, sketch your design, make a prototype, and then tweak the prototype until it is the way you want the final object to be.”</td>
<td>“An engineering design process is the way of advancing learning of something. You start by thinking and creating a design. An important part is to look at what you have created and make changes to it. This is a continuing cycle.”</td>
</tr>
<tr>
<td>After engineers have developed an engineering design, does the design ever change?</td>
<td>“Yes, because Science is changing every time.”</td>
<td>Yes - it changes when it needs adjustments.</td>
<td>“A design can absolutely change after engineers have developed an engineering design because they are always looking for improvements (i.e. lighter, faster, stronger, longer lasting, etc.). A design almost always changes after it is first created.”</td>
</tr>
<tr>
<td>Do engineers use their creativity and imagination during the engineering design process?</td>
<td>&quot;I am sure they do or would need to for some projects&quot;</td>
<td>&quot;Yes, they should be, but at the same time, their creativity and imagination must establish on current science knowledge.&quot;</td>
<td>“Yes, using your creativity and imagination is important in engineering because if you did not use those, all products would be similar or we would not create any new products.”</td>
</tr>
<tr>
<td>Do you think that engineering is infused with social and cultural values or is universal and not affected by social, political, and philosophical values? <strong>Constrained</strong></td>
<td>&quot;Everyone does bring his or her own bias into his or her job (even if they try not to) but I do not think that political and other values have a major impact on the engineering process.&quot;</td>
<td>I believe it is a little bit of both. Anyone, regardless of culture, ethnicity, nationality, etc. can become an engineer. However, the way in which someone designs a solution to a current problem can and may be influenced by their social and cultural values.</td>
<td>I think that engineering is affected by what people consider a problem around them, this opinion can be affected by social and political values. So if a society considers homelessness to be a problem (which it is) then people who believe that will attempt to find solutions.</td>
</tr>
</tbody>
</table>
Introduction

Succession planning is normally categorized by the identification and nurturing of internal personnel to fill leadership roles in an organization (Witt/Kieffer, 2008). This is most often achieved through training programs or career ladders that assist in leading personnel through positions that incorporate increasingly higher levels of responsibility in anticipation of advancement to the upper levels of leadership (Hanover Research Council, 2014).

Although seen by the corporate business world as a critical element in sustainability and efficiency, higher education environments have been slow to embrace formal succession planning and it has only recently become a topic of consideration at colleges and universities (American Council on Education, 2018).

The Issue

Some educational institutions have an informal system to replace leaders; however, few have a formalized process (Hanover Research Council, 2010). Also, when institutions do have a system, such planning tends to be conducted at only the highest levels of leadership such as at the board, president or chancellor levels (Witt/Kieffer, 2008). However, it is somewhat uncommon, and may even be suggested to be unheard of, at other levels of leadership in colleges and universities, and especially at the mid-level positions of academic officer, dean and chair. Interestingly, especially from a student and public perspective, the prestige and quality of an educational institution is often derived from its mid-level leadership personnel rather than its pinnacle leaders. This potential oversight creates a distinct problem that educational institutions must address.
Conversely, in the corporate world, effective succession plans are based upon well-developed competencies and objective assessment of candidates (Clunies, 2004). Similarly, Hartle (2004) stated that, unlike educational organizations, public and private sector organizations have adopted a systematic approach and long-term view toward succession planning. By undertaking such an approach, organizations have created a systematic process for not only tracking people but also preparing them for leadership roles. Hartle refers to this effective process as the *leadership pipeline*.

Today, higher education institutions are faced with needing to successfully navigate a fast-paced and wide-ranging educational world. Mid-level leadership personnel are required to understand the impacts of continuous change, address the ever-increasing demand of managing large scale work environments, be efficient and financially creative, and ensure high quality educational experiences and programming (Hickson, 2015).

Unfortunately, hesitant decision-making or a revolving door of ideas, plans, and implementation strategies from unsuited mid-level leadership personnel is likely not the most conducive way for educational institutions to ensure that educational excellence is maintained and expanded upon. Therefore, the need for the development of effective leadership models has likely never been greater. Institutions and institutional leaders can benefit when intentional succession planning experiences are created. The necessity to consider future pathways and who is *at the helm* is an important issue that should not be left to chance.

**Effective Succession Planning**

Much of what is known about effective succession planning has come from research conducted on the practices that take place in the corporate world. Such researchers critically identify that the focus of succession planning should not only address competencies for the current situation and environment but must also consider the types of competencies that might be required to meet any potential future change or challenges. Therefore, succession plans need to have a degree of flexibility and, most importantly, be linked to strategic plans.

Mihm (2003) identified six common practices in succession planning. These are:

- Active support of top leadership where succession planning is anticipated, and potential individuals identified
- Linking succession planning to strategic planning.
- The identification of potential individuals early in their careers
- Emphasizing job assignments that provide developmental experiences in addition to formal training.
• Addressing diversity, leadership capacity, and retention
• Selecting leaders to facilitate transformation efforts to foster change

By adopting such practices, Mihm (2003) suggested that organizations can identify a pool of candidates from which succession plans can occur for key leadership positions. Such a systematic process enables potential candidates to be compared against organizational needs and leadership requirements rather than purely a supervisory report recommending advancement. Thereby, creating a body of next generation leaders before the present leadership personnel group leaves the work environment.

With regard to the world of education, the nature of the promotion and tenure work environment found at many institutions can result in a somewhat rapid turnover of leadership personnel. Although, this can allow for institutional transformation and an opportunity to implement organizational change, it can only be realized if the turnover of leadership is managed in a systematic manner. Therefore, succession planning initiatives need to be carefully considered and, when established, should address and be aligned to institutional vision planning.

Although a substantial amount of what is understood about effective succession planning has come from areas outside of education, Hartle (2004) considered the educational workplace environment and contended that there are five characteristics of an effective educational succession plan. These are:

• Integration...succession and leadership development need to be an integrated part of recruitment, retention, performance management, and organizational strategies
• Definition...the identification of long-term leadership needs
• Flexibility...plans need to be revisited and changes made where necessary
• Fluidity...candidate pools need to be fluid and not restrictive
• Personal Development...professional development is sought after in individuals through the recruitment process and encouraged for retention

Hartle further contended that the education sector needs to learn from the corporate sector and adopt a combination of succession planning and leadership development approaches at various levels.

In a similar vein, when considering the issues of educational leadership, Hargreaves, et al. (2003) concluded that successful planning included intentional and systematic identification of leadership requirements, the identification of a pool of potential candidates, and the development of leadership competencies in candidates. Thereby, making succession planning thoughtful and ensuring that potential leaders are ready for takeover.
Although somewhat late in understanding the need for and establishing intentional, effective succession planning, educational institutions can learn from the vast amount of knowledge gained from the practices of others. In many ways, educational institutions need to fully adopt the notion of learning themselves!

**Ideas for Implementing Effective Succession Planning**

The following series of ideas are put forward for consideration to create intentional and systematic succession plans that support effective leadership transition and create the best opportunities for success.

**Time, Effort, and Transparency.** It must be clearly understood that succession planning requires time and effort. The identification of potential mid-level leadership personnel requires thoughtful practice and a systematic approach. This process must also be viewed as fair and trustworthy by the academe. Therefore, transparency is of critical importance.

**Timeliness.** Research has clearly shown that the identification of leadership potential occurs early in careers. This allows for development and carefully selected exposure to leadership experiences to occur. For example, *Leadership Shadowing* can help potential leaders develop awareness and understanding through observation alongside a colleague both within department/faculty and across departments/faculties.

**Gaining Authentic Experience.** The use of floating responsibilities can assist in the gaining of leadership experience. For example, *Project Leadership* can provide authentic leadership responsibility and authority experience for a specific project that has a limited time frame with a specific outcome.

**Creating a Systematic Approach.** Leadership potential needs to be developed through annual performance processes. Discussion of leadership needs to take place alongside consideration of publishing records, teaching performance and grant acquisition. Further, the offering of or establishing a mentorship experience to provide informal advice and consultation between an experience leader and a potential leader has much merit. Similarly, the opportunity of working alongside a coach who can support identified areas of focus. This can specifically ensure that potential leadership personnel work in areas of possible weakness and develop a wide range of experiential leadership readiness.

**Research, Teaching...Administrative Streams.** It has started to be accepted in some institutions that personnel can present different but equally valuable qualities. This has resulted in the recognition of a particular staff member strengths through *Research* or
Teaching Stream positions. Therefore, perhaps the consideration of an Administrative Stream is timely.

Concluding Thoughts

The literature on succession planning is most clear in stating that one of the most successful succession planning strategies is the early identification and training of potential leaders. Without this early start, organizational effectiveness can be impacted. It is also apparent that many organizations outside the education sector take a long term, strategic and comprehensive view of succession planning and consider it an integral part of overall strategic planning. Succession planning does not start with choosing the next candidate to fill a vacancy. Succession planning is anticipatory, it is based on strengths and needs.

This paper identifies the present lack of effective succession planning in educational institutions, the perceived benefits to be gained from effective succession planning, and ideas of how effective succession planning could be implemented in higher education environments. The unique challenges of a world that is increasingly demanding, complex, and diverse requires present day leaders, especially at the mid-levels, to organize systematic processes to identify, support and develop the leadership teams for tomorrow. The failure of not doing so will not only create a vacuum in the knowledge transfer but also potentially impact learning experiences for students. Educational institutions can not continue to ignore the necessity of effective succession planning, determining and achieving future success requires it.
References


Title: An Exploratory Phenomenology Study of Educators’ Bullying Experiences in the Workplace

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Abstract:

Bullying behaviors in the workplace are marked by repeated events of intimidation that creates a pattern of humiliation and fear in the victim. School staff are not immune to this behavior. Although studies have been conducted on student to student bullying behavior, little research has been done concerning adult to adult bullying in the educational workplace. A qualitative exploratory phenomenological study was completed to determine the relevance of the issue of bullying among adults in schools and to explore the effects that adult bullying has on staff members and the school organization. Organizational cultural theory, emotional intelligence and
humiliation theory were used to understand the phenomenon of adult bullying in the educational workplace setting. Two research questions guided the study: What are the personal and professional experiences of educators in the K-12 school systems as targets of bullying behavior in the workplace? What were the personal and professional repercussions of educators in the K-12 school systems who experienced workplace bullying? Participants responded to a survey and self-elected to interview. Results showed that the problem is significant. Participants were from the East and West coasts of the United States. Interviewees reported lowered attendance, humiliation, depression, loss of self-confidence and self-worth and a fear of coming to work, with most eventually leaving their positions or the school district. School districts and Human Resource personnel need to create or review a workplace bullying policy and consider trainings for administrators and staff members on how to mitigate the effects that can hinder educational progress because of adult bullying.
1. **Title:** Developing the Teacher Educator  
2. **Topic:** Teacher Education  
3. **Presentation Format:** Workshop  
4. **Presentation Description:** The primary formal measures used by teacher educator faculty to assess their effectiveness have been student course evaluations. To allow teacher educators to receive multiple iterations of feedback, we have developed frameworks and protocols to allow teacher educators to learn from their colleagues and teacher candidates in ways that foster a culture of learning and transparency.  
5. **Author:**  
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   b. US PREP National Center  
   c. Texas Tech University  
   d. [Sarah.beal@ttu.edu](mailto:Sarah.beal@ttu.edu)
This action research study examined the influence of a portfolio process on the practices of teacher educators. The participants in this study were teacher educators in a university. The study was designed to combat the limited ways in which teacher educators receive feedback on their teaching. The teacher educator portfolio process enabled teacher educators to engage in professional learning around the teacher educator pedagogy of rehearsal, receive feedback in multiple ways over one semester, and utilize the feedback to make changes in their instruction. Because the process was cyclical, the measures enabled them to set goals, apply new learning, and engage in continual reflection and growth.

A qualitative methods study was employed to investigate (a) how teacher educators engaged in the portfolio process, (b) ways in which they found value in the process, and (c) ways in which they made changes to their teaching as a result of the feedback. Data were collected through pre-and post-intervention interviews, observations, and peer triad feedback forms. The study design aligned with two theoretical frameworks: situated learning theory and adult learning theory. Participants filmed themselves teaching twice, administered two teacher candidate feedback surveys, collaborated with their peers to examine their teaching together, and applied the feedback they received in order to strengthen their teaching. Throughout the study and at the conclusion, teacher educators used feedback from their students and peers to reflect on their own practices as teacher educators.

The results of this study indicated that the participants found value in the pedagogy of rehearsal, watching their peers teach, and receiving feedback from both their peers and students. The data also showed that the teacher educators made changes in their instruction. Lastly, the participants valued the time to collaborate with peers who share common content and job expertise. Future research should include making modifications to the current portfolio process
to involve evidence of teacher candidate learning, allowing teacher educators to investigate how teacher practices influence teacher candidate learning.
Title of submission
Reports on Issues Related to Teaching
This proposal is for reports related to innovative instruction techniques in teaching foreign language.
“Teaching and learning complicated grammar rules using multimedia, such as the Modern Standard Arabic “Imperative” verb tense grammar rule.”

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Abstract:
As complicated the Arabic grammar is, the “Imperative” grammar rule could be introduced in a productive and fun way, which will enable learner’s acquisition of such complicated grammar rule in a much easier and faster way.

There are very limited academic resources covering the Arabic imperatives, thus other sources addressing other languages as a second or foreign language are cited for the purpose of support and confirmation. For example, in the English language, the imperative function is giving commands based on the level of directness such as orders, demands, requests, advice, recommendation, warnings, instructions, expository, directives, invitations, permission, acceptances, and wishes (Cowan, 2008). In many other languages, Imperatives are directives
conveying a force of commanding, prohibiting, suggesting, permitting, or requesting by the speaker; the typical function of imperatives is to get the recipient to do or not to do something (Aikhenvald, 2010). Similarly, the function of the Arabic Imperatives is giving commands based on the level of directness. However, the Arabic imperative verb is conjugated based on the gender and number of the person/persons spoken to and not for the person speaking (Alosh, 2010). Forming the Arabic Imperatives has its own grammatical rule, which is dropping the prefix letter of the conjugated present tense verb for the second person and adding the letter / [Alif] then placing the short vowel / [kasrah] under the letter / [Alif] (Alosh, 2010).

In this paper, the author shares his approach and technique in teaching the Arabic Imperative verb tense conjugation by using a multimedia file, such as an online video clip of an Arabic song and its lyric. Learners work with Arabic authentic materials and participate in several tasks, such as pre-tasks, main task, and post-tasks, which highlight all three dimensions of language: “(1) structure or form; (2) semantics or meaning; and (3) use or the pragmatic conditions governing appropriate usage” (Larsen-Freeman, 2014, p. 258). Students need to know the three dimensions to be able to produce the language meaningfully and appropriately (Larsen-Freeman, 2003).

*Work cited in this abstract*


*A comprehensive list of references will be listed in the full paper.*
Conversations about ethical decision-making exist in a climate of misinformation within social and political forums. The issue of ethical decision-making in the context of educational leadership within a school environment has not been recently investigated. The purpose of this qualitative exploratory case study was to examine the perceptions of education leaders who observed the processes faculty employed when ethical decision-making commenced throughout the school day. Data was collected during interviews with education leaders who answered semi-structured, open-ended questions. The findings led to self-reflection, redefining their role as an authentic leader and a deeper understanding of school culture, thus creating systemic change.

**Purpose**

The purpose of the qualitative exploratory case study was to address education leaders’ awareness of the processes faculty at their school site employ in ethical decision making throughout the school day. The study explored education leaders’ perceptions if an ethical climate exists within their school site, how teachers report issues that may be of ethical concern for possible investigation, and available training. Data was gathered through phone interviews with ten education leaders. Without this data, education leaders may not fully understand the role and relationship of faculty to the importance of making sound ethical decisions for the betterment of the school community (Schulte et al., 2002).

**Rationale**

Applying knowledge and creating an ethical classroom culture is the responsibility of teachers (Campbell, 2008). A professional code of ethics for teachers exists in other countries. The Finnish teachers’ ethical sensitivity study (Kuusisto, Tirri, & Rissanen, 2012) examined teacher’s perceived ethical sensitivity within the classroom based on training, reflection on teaching, years within the profession, and ethical competence. In the U.S., a universal professional code of ethics does not exist. The teaching profession demands attention of the intangibles, those of morality and ethics, including educator conduct with students, colleagues, administration, and the school community (Campbell, 2003).

Emerging research has demonstrated the benefits of evaluating school climate as an aspect of keeping schools safe, focusing on the direct relationship of student and teacher interactions via an ethical climate and principles inclusive of trust and motivation (Schulte et al., 2002; Demir &
Karakus, 2015). However, specific research on education leaders’ perceptions if an ethical climate exists within a school’s culture has not been fully examined.

**Method, Location, Population, Sampling, and Sample**

A qualitative study providing a detailed description of education leaders’ perceptions of faculty ethical decision making was appropriate for this study (Merriam, 2009; Yin, 2013). The geographic location of the research study was Northern California. The sample of participants was drawn from individuals who are education leaders known to the researcher via professional associations. The administrators were contacted via email with a letter of introduction regarding the research study and a request for their participation. Selection was based upon meeting the criteria for participation. Participants signed and returned an Informed Consent Form prior to interviews. The sample included ten education leaders from four different types of school systems; public, charter, and private secular and non-secular. The population of four men and six women who participated in the study had a minimum of five years of education leadership experience. Each shared personal experiences and observations of faculty ethical decision making. The education leaders consisted of one superintendent, six principals, and three vice-principals.

**Instrument and Data Collection**

Phone interviews with a purposeful sample of ten education leaders was conducted. Semi-structured telephone interviews allowed the researcher to start with general open-ended questions and follow up with probes. The researcher who conducted the interviews was an instrument of the study. The interviewer developed a relationship with participants and the nature of interviewer/participant relationships directly influenced the amount and depth of data.

Transcriptions of the interviews were sent to the participants checking to make sure the comments from the participants were accurately represented. Saturation, where no new ideas were evident, was reached after ten interviews. A content analysis approach was employed since flexibility of analysis allows researchers to describe the data in a more systematic way (Finfgeld-Connett, 2013; White & Marsh, 2006).

**Data Evaluation and Analysis**

Notes were read separately and compared to find commonalities, followed by thorough analysis of the data. During the initial phase of analysis, demographics were identified. The inductive analysis process was employed where a comprehensive understanding of the data was expounded, including units of meaning and findings (Ziegler, Paulus, & Woodside, 2006). To visually denote each of the themes and establish codes, the text was highlighted in five different colors in a Word document (Johnston, Rasmusson, Foyil, & Shopland, 2017).

**Results/Findings**
Based on insights and knowledge acquired in observing faculty at their respective school sites, education leaders gained a deeper understanding of what is needed to improve ethical decision making and school culture. The findings revealed education leaders need to do a better job of employing an awareness of authentic self, willingness to learn, and seek innovative change to their leadership style to forge honest discussions and gain faculty trust.

The content analysis revealed the following themes: teacher experience/training, years teaching at a school, and self-preservation which demonstrated a direct correlation between ethical decision making of faculty to the education leadership style at the school. Systems thinking, and systemic change may contribute to developing an awareness of trust and mutual respect among education leaders and faculty.

**Discussion**

For education leaders to incorporate a broader perspective, dig deeper, and think systemically, questions must be asked advocating school change (Goldman & Senge, 2014; Betts, 1992). This awareness was based in part on traditional approaches of managing and observing faculty at the school site (Lannon-Kim, 1991). Instead, education leaders need to shift focus on what is driving ethical decision making, how teachers report issues of ethical concerns for possible investigation, and site based or district level training opportunities in the identification of ethical issues. Therefore, this study sought to unveil what systemic changes education leaders may implement based on breakthrough moments in the realization that they need to do more to promote a positive and ethical school culture.

**Recommendations**

Education leaders can benefit by developing an understanding of the role and relationship of faculty to the importance of making sound ethical decisions for the betterment of the school; thus, leading to a positive change in school culture.

**Contributions**

The findings from this study may provide education leaders with a greater understanding of the constructs in which faculty make ethical decisions at their schools and the importance of including systems thinking to assess and develop programs to cultivate a culture of honesty and trust. The results of this study may add to the body of knowledge of school reform, ethical decision-making processes, systems thinking, and purposeful change.

**References:**


Title of Submission: Unmasking the Noise Within: Applying the Cognitive Behavioral Model to Musical Artists

Topic Area: Educational Psychology; Other Areas of Education

Presentation Format: Roundtable Discussion

Description: This paper integrates music, mental health, and education from the lens of an artist. It will serve to guide educators and mental health clinicians how to apply the Cognitive Behavioral Model and its processes to their work with musical artists in helping them to decrease their emotional and creative roadblocks utilizing an inside out approach.

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Abstract

For years research has been conducted on various aspects of music, mental health, and education but within these concepts, few have integrated music with mental health practices and theory, and the potential impacts on enhanced learning. If educators were to view social issues from the lens of an artist whose life experiences are filled with colorful thoughts, emotions, and other cognitive characteristics, then they can better understand the integration of music and the cognitive behavioral model, and its intrinsic and extrinsic effects of enhanced learning on the artist and listener. This article not only summarizes theoretical concepts of the Iso Principle and Conflict Transformation that provide an outside in approach to enhanced learning but also suggests partial utilization of the cognitive behavioral model and the process artists can apply to uncover their emotional and creative roadblocks utilizing an inside out approach. This article provides an expansion of the benefits in enhancing the Cognitive Behavioral Model Process with an Artist Process. It is through the unveiling that this article will provide examples of musical artists who have utilized their celebrity status to promote local and global education and change on causes they are passionate about through their musical platforms and philanthropic efforts.

Keywords: Cognitive Behavioral Therapy; Music; Educational Psychology; Mental Health, Music Therapy
I have been concerned about the education of black children for more than 40 years. As an academic, I first wrote about the academic challenges facing black children in 1990 (Lomotey, 1990). There is a role that school principals can play to improve the success of black children. However, I am fully aware that the most significant relationship is between the teacher and the student; this is where “the rubber meets the road.” Still, with a culturally responsive orientation, principals can make a difference. More specifically, black principals can play a unique role in ensuring that -- in schools with large numbers of black children -- black culture is highlighted. Because of a shared culture, black principals can more easily communicate more effectively with black children (Lomotey, 1989).

If black principals can make a difference for black children and since there is some research that suggests that male and female principals lead differently, I concluded that it would be important to look at the research -- limited as it is -- on black female principals. Over the past 20 or so years, several studies have been done on black female principals. The first studies that I uncovered were published in 1995 and 1996 (Dillard, 1995; Tweedle, 1996). It was not until 2000 -- less than 20 years ago -- that two other studies appeared (Hobson-Horton, 2000; Bagwell, 2000). This is the first comprehensive review of the literature on these leaders.

In this review, I consider research on black female principals through addressing six fundamental queries: (1) Where does research on black female principals appear? (2) At what level(s) (i.e., elementary, middle and high school) are black female principals studied? (3) What theoretical underpinnings do researchers employ when studying black female principals? (4) What research methodologies do researchers employ when studying black female principals? (5) What are the primary foci of studies of black female principals and (6) What are the key findings in studies on black female principals?

I seek, in part, to provide guidance to researchers in this area. As in most fields, some subareas are overstudied, while others are understudied. I
illustrate what areas are overstudied and where critical gaps in the research may exist.

All of the studies contained in this review include samples made up exclusively of black female principals in the US. Excluded studies were those that focused on:

- black female principals outside of the US
- black female assistant principals.
- black female principals that were not actual studies
- black female principals and black females aspiring to become principals
- black female principals and other building level or district level administrators
- black female principals being compared to any other group

Through a thorough review of the literature, the studies considered in this review were uncovered. Each publication was secured through the Western Carolina University (WCU) Library; some materials are held in the WCU Library and others were borrowed through Interlibrary Loan Services or purchased. Substantial assistance was provided by the Library staff, most notably Beth McDonough, Research & Instruction Librarian.

There are 51 studies included in this review. As is the case within the general field of educational leadership, most of the studies appeared in dissertations. Forty-one of the included studies appeared in dissertations (80%).

In concluding the literature review, I consider implications for professional development of principals, principal preparation programs and research
Too often individuals involved in the search process for academic positions -- at all levels -- are not adequately knowledgeable of the process and fail to take sufficient advantage of the opportunity. Newly minted PhDs -- as well as some seasoned academics -- fail to understand the key ideas when considering faculty positions, when interviewing for faculty positions, and, perhaps most importantly, when -- after having been offered a position -- negotiating with the institution’s representative (e.g., the program director, the department head, the dean or the provost).

In this session, I will begin with key considerations that should be addressed prior to applying for a faculty position. These include thinking about the type of institution where one wants to teach. For example, there are major research institutions where the teaching load is less and research, scholarship and securing research dollars typically weigh significantly more heavily than teaching and service. Alternatively, there are teaching colleges and regional institutions with different expectations. These distinctions will be discussed in the session.

Other issues to consider before applying for positions include making sure that one is represented appropriately in such things as their phone’s voice message, on the Internet and on their social media pages. These things are routinely checked by search committees and search firms in this day and age.

Equally important is learning -- before the interview -- as much as possible about the institution and the individuals with whom one will interact during the interview. This information can be gained through web searches, including a search of the institution’s website and googling the people on campus.

The second area that I will address in this workshop is important considerations during the interview. These include:

- giving complete answers
- being confident, but not arrogant
• not negotiating
• emphasizing one’s philosophy and one’s theoretical strengths
• being prepared with one’s own questions
• arriving on time (which means arriving early)
• not trash-talking one’s current supervisor or place of employment

Finally, in this workshop I will focus on what happens after the interview. While the entire process -- from the time the interview ends until the appointment letter arrives -- will be addressed, primary focus will be on items that may present opportunities for negotiation. These include -- but are not limited to -- salary, (some fraction of) moving expenses, rank, computer equipment, spousal (or significant other) employment, in-close parking, reduced teaching load, (additional) travel money, guaranteed summer teaching, a bridge loan, campus/city house-hunting visits and graduate assistant(s).

This workshop will be fairly equally divided into two sections. In the first 45 minutes there will be an interactive session, wherein I will provide the basic information summarized above regarding important information needed before, during and after the interview. In the second segment, I will address concerns, questions and observations presented by session participants.

I am well prepared to conduct this workshop. I have been an untenured professor, a tenured professor, a department head, a provost and a campus CEO (for 10 years). I have spent more than 30 years studying these issues, encountering them (from both sides of the table) and assisting others from all across the country in addressing them.
Effects of Flipped Learning on Japanese Undergraduate Students’ Global Learning

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Abstract
This study was aimed at investigating the effects of flipped learning on Japanese undergraduate students’ global learning. The research participants were 15 undergraduate students, who took the global education course in the academic year 2018 at a Japanese university. The data such as pre/post-test, a questionnaire, and reflective notes were collected and analyzed qualitatively and quantitatively to examine the effects of the flipped learning approach employed in the course.

Key Words: Global Education, Flipped Learning, Higher Education, Japan
Introduction

The world has been changing at a dramatic speed due to world-wide phenomena associated with globalization. More people, products, money, information, and so on move across nations than ever. This enhances interconnectedness of people, events, and systems in politics, economy, culture, ecology, and technology on a global scale (Anderson, 1979). Meanwhile, there have appeared issues or problems such as global warming, nuclear issues, and refugee issues facing us no matter where we live. One of the biggest organizations working for global issues is the United Nations. It developed Millennium Development Goals (MDGs) in 2000 at the UN Millennium Summit to address eight issues and all the member states agreed to work on these issues. According to the UN Millennium Development Goals report (2015), it concluded that this MDGs project was partially successful in that even though some issues were satisfactorily eased, the other issues remained unsolved and, at the same time, new issues arose. By reviewing its outcomes, the UN established 17 Sustainable Development Goals in 2015 and this project is currently under its way. In short, it is still a long way to solve such global issues. In fact, Bremmer (2012) maintains that we are living in the world without any leading organization or nation called “G-Zero” world. If so, we are not able to rely on the organizations or nations working for global issues, but we should take actions to solve them by ourselves. Therefore, education needs to prepare the youth to be capable of doing so. In this sense, global education can play a major role to achieve this goal.

Global Education

Global education was born in the U.S. in the late 1960s in order to prepare the young to effectively and responsibly live in a global society and has developed since then. Global education attempts to achieve this goal by developing students’ global perspectives. Although different scholars and educators suggest different elements as components of global perspectives, the six conceptualizations: perspective consciousness; cross-cultural learning and cross-cultural communication skills; global interdependence; global history; global issues; and participation in a global society are the most common (Kasai, 2009). Each definition of the six conceptualizations is as follows:

1. Perspective Consciousness – The recognition that every individual has a perspective that is not universally shared, while the perspective can be continuously formed and reformed by influences over time (Hanvey, 1976)

2. Cross-cultural Learning and Cross-cultural Communication Skills – Knowledge about one’s own culture and other cultures, and skills in effectively interacting with people from diverse cultures and countries (Merryfield & Subedi, 2001)

3. Global Interdependence – Interconnectedness of people, events, and issues linked to one another, and the ways in which they affect and are affected by other people, events, and issues (Pike & Selby, 2000)

4. Global History – A history that is interconnected across the world and it may also consist of interrelated regional histories (Anderson, 1979)
5. Global Issues – Persistent worldwide problems that cannot be solved by one nation alone (Alger & Harf, 1986). Global issues include human rights, pollution, poverty, ethnic conflicts, and population problems.

6. Participation in a Global Society – People’s actions on a local scale to solve or ease global issues that they learn about (Alger, 1985).

Global education was introduced at the beginning of the 1970s in Japan and it has been practiced mainly in some subject areas such as English and social studies (Ishimori, 2015). However, this practice tends to be very limited in that only a small number of the teachers who are concerned about global education put it into practice under their tight or limited teaching conditions (Kasai, 2018). Therefore, it is necessary to develop an effective and efficient instructional approach to teach global perspectives. To satisfy such a need, flipped learning was employed and implemented in a global education course at a higher educational institution in Japan.

**Research Context**

**Purpose of Study**

This study was aimed at investigating the effects of the flipped learning in the global education course on undergraduate students’ global learning in terms of its effectiveness, efficiency, and appealing.

**Research Site**

The research participants were 15 undergraduate students, who took a global education course in A.Y. 2018 (from April to July) at a Japanese university, a private university in a western part of Japan. The global education course, a 4-credit course (30 lessons / 90 minutes per lesson), was designed to teach all the six conceptualizations in global perspectives. This course (Refer to Table 1) mainly consists of two parts: a knowledge building part and a teaching analysis one. The study focused on the former part: lessons 3-16.

<table>
<thead>
<tr>
<th>Lessons</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lessons 1-2</td>
<td>Introduction to Global Education</td>
</tr>
<tr>
<td>Lessons 3-16</td>
<td>Building Knowledge of the Six Conceptualizations</td>
</tr>
<tr>
<td>Lessons 17-30</td>
<td>Analysis of Teaching the Six Conceptualizations</td>
</tr>
</tbody>
</table>

**Instructional Framework of This Course**

An instructional framework by teaching all the six conceptualizations was constructed based on
relevancy of the contents among them (Kasai, 2018). The framework was illustrated below.

![Instructional Framework for the Course](image)

*Figure 1. Instructional Framework for the Course*

The rationales for this instructional framework are that the first four conceptualizations respectively overlap in terms of the learning contents and that they are also considered as prerequisite elements to learn about global issues and solutions to the issues. In short, perspective consciousness and cross-cultural learning and communication skills enable students to collect information about global issues from multiple sources including people with diverse cultural backgrounds and to critically analyze it, while global interdependence and global history help them to understand global issues as systems, in which we have been influencing and influenced by these issues for a long period of time no matter where we live. Therefore, the order of teaching these conceptualizations in this course were (1) perspective consciousness; (2) cross-cultural learning and communication skills; (3) global interdependence; (4) global history; (5) global issues; and (6) participation in a global society.

In addition to the use of this instructional framework, flipped learning was employed to teach the six conceptualizations effectively and efficiently. First, the contents of the six essential conceptualizations in global perspectives were documented, which resulted in the text titled “Living as a Global Citizen.” Meanwhile, short quizzes were developed to measure students’ acquisition of the contents. Then, the contents of the text were published into three types of media formats (PDF, MP3, and Scorm Package¹) and these media resources as well as the check quizzes were uploaded in Moodle, an open e-learning platform.

In the global education course, the students studied the contents of each conceptualization through the three media resources and answered a check quiz before class. In the classroom, they checked the answers of the quizzes as well as spent most of the lesson time on various types of learning activities to deepen the target conceptualization that they learned online. After class they were required to post their reflective messages about their learning experiences in the Moodle system as well as read their classmates’ messages and replied to at least two of them. This flipped learning cycle in this course is illustrated in Figure 2.
Figure 2. Flipped Learning Cycle

Since this course lasted 15 weeks and had two lessons: one on Thursdays and the other one on Fridays, e-learning assignments (studying the contents and answering a check quiz) were announced at the end of Friday’s lessons (due before the following Thursday’s lessons). Then, the students learned about the target conceptualization that they studied online by participating in various relevant learning activities in class (See Table 2).

Table 2
Flipped Learning Lessons of the A.Y. 2018 Global Education Course

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Date</th>
<th>In-Class Learning Topics</th>
<th>E-Learning Assignment Announced</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4/5</td>
<td>Course Introduction</td>
<td>Preface &amp; Introduction</td>
</tr>
<tr>
<td>2</td>
<td>4/6</td>
<td>Education and Society</td>
<td>Perspective Consciousness</td>
</tr>
<tr>
<td>3</td>
<td>4/12</td>
<td>Perspective Consciousness</td>
<td>Cross-cultural Learning</td>
</tr>
<tr>
<td>4</td>
<td>4/13</td>
<td>Cross-cultural Learning</td>
<td>Cross-cultural Communication Skills</td>
</tr>
<tr>
<td>5</td>
<td>4/19</td>
<td>Cross-cultural Learning</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>4/20</td>
<td>Cross-cultural Communication Skills</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>4/26</td>
<td>Cross-cultural Communication Skills</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>4/27</td>
<td></td>
<td>Global Interdependence</td>
</tr>
<tr>
<td>9</td>
<td>5/10</td>
<td>Global Interdependence</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>5/11</td>
<td>Global Interdependence</td>
<td>Global History</td>
</tr>
<tr>
<td>11</td>
<td>5/17</td>
<td>Global History</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>5/18</td>
<td>Global History</td>
<td>Global Issues</td>
</tr>
<tr>
<td>13</td>
<td>5/24</td>
<td>Global Issues</td>
<td>Participation in a Global Society</td>
</tr>
<tr>
<td>14</td>
<td>5/25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>5/31</td>
<td>Participation in a Global Society</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>6/1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Data Collection and Analysis Methods

Scores of pre/post-tests, responses to the questionnaire, and reflective notes were collected and analyzed qualitatively or quantitatively, or both to examine how effective, efficient, and appealing the flipped learning was for the participants to learn the essential conceptualizations in global perspectives. Methods to analyze the data for the study were listed in Table 3.

Table 3
Summary of Data Analysis Methods

<table>
<thead>
<tr>
<th>Target to Investigate</th>
<th>Data Source(s)</th>
<th>Analysis Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness</td>
<td>Pre- and Post-test</td>
<td>Wilcoxon Signed-Rank Test</td>
</tr>
<tr>
<td></td>
<td>Reflective Notes</td>
<td>Qualitative Coding (Sato, 2008)</td>
</tr>
<tr>
<td></td>
<td>Questionnaire</td>
<td>Descriptive Statistics</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Questionnaire</td>
<td>Descriptive Statistics</td>
</tr>
<tr>
<td>Appealing</td>
<td>Questionnaire</td>
<td>Descriptive Statistics</td>
</tr>
</tbody>
</table>

Findings and Implications

A Wilcoxon Signed-ranks test was conducted to investigate the effects of the e-learning in this course on the participants’ acquisition of six conceptualizations in global perspectives. The results showed that there was a statistically significant difference between the scores of the pre-test and those of the post-test (See. Table 4), and thus it can be concluded that the participants performed the post-test (Mdn=21.00) better than the pre-test (Mdn=10.50), Z=2.52, p<.01, r=.89. In short, the flipped learning seemed effective for them to acquire basic knowledge of the conceptualizations.

Table 4
Result of Wilcoxon Signed-Rank Test (2 Related Samples)

<table>
<thead>
<tr>
<th>Ranks</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>pre-test - post-test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative Ranks</td>
<td>0a</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Positive Ranks</td>
<td>8b</td>
<td>4.50</td>
<td>36.00</td>
</tr>
<tr>
<td>Ties</td>
<td>0c</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test Statisticsb

<table>
<thead>
<tr>
<th></th>
<th>pre-test - post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>-2.521a</td>
</tr>
<tr>
<td>Exact Sig. (2-tailed)</td>
<td>.008</td>
</tr>
</tbody>
</table>

a. Based on negative ranks.
b. Wilcoxon Signed Ranks Test

Next, the reflective notes that the participants posted in the Moodle system were analyzed through qualitative coding to examine the effects of in-class activities. The reflective notes were divided into the following seven conceptualizations: learning activities for perspective consciousness; cross-cultural learning; cross-cultural communication skills; global interdependence; global history, global issues; and participation in a global society. The notes were coded to find
words, phrases, and sentences indicating their learning about the contents of the conceptualizations in global perspectives and calculate the number of them. For example, a student posted the following message about a debating activity, “Through the debate I learned that it is very difficult to explain what we are thinking to another group (CC) and also I'm not sure this is right but I just felt that our perspective is influenced by our background and culture (PC).” The student stated a difficulty in communicating with people with different cultural backgrounds in the first highlighted sentence, while she mentioned one of the features of people’s perspectives: changeability in the second one. Thus, the student was considered having learned about cross-cultural communication skills and perspective consciousness through this activity. The results of coding all the reflective notes (See Appendix B) showed that most of the participants made comments about all the conceptualizations in global perspectives across all the learning activities and the 100% stacked bar chart produced based on the result (See Table 5) indicated that the learning activities mostly helped them to study the target conceptualizations as planned.

Table 5
Result of Reflective Note Analysis (100% Stacked Bar Chart)

<table>
<thead>
<tr>
<th>Learning Activities for PC</th>
<th>Learning Activities for CL</th>
<th>Learning Activities for CC</th>
<th>Learning Activities for GD</th>
<th>Learning Activities for GH</th>
<th>Learning Activities for GI</th>
<th>Learning Activities for PG</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG</td>
<td>GI</td>
<td>GH</td>
<td>GD</td>
<td>GI</td>
<td>GH</td>
<td>PG</td>
</tr>
<tr>
<td>100%</td>
<td>80%</td>
<td>60%</td>
<td>40%</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Considering the results above, it can be concluded that e-learning and in-class learning respectively seemed effective for the participants to acquire the six conceptualizations in global perspectives. Meanwhile, both e-learning and in-class learning tended to be mutually beneficial. According to the questionnaire (See Appendix C), 12 out of 13 respondents (one respondent answered “Neutral”) answered “Very Helpful” or “Somewhat Helpful” to question 8 in the questionnaire, asking whether the online assignments were helpful to their in-class learning. There seemed to be a possibility that “division of labor for effective learning” (Miyaji, 2009, p. 98) allowed the participants to study the target conceptualizations effectively and, at the same time, both e-learning and in-class learning synergistically enhanced the participants’ learning as well.

The flipped learning approach in this course possibly helped the participants to learn the conceptualizations more efficiently than before. According to the questionnaire, 10 out of 12 respondents answered that they completed the online assignments within 30 minutes. One of the reasons why they could complete for such a short period of time was because the online assignments enabled the participants to study them in the way they preferred. According to the questionnaire (questions 2, 3, and 5), they worked on the assignments in various places (9-homes,
1-campus, 2-home and public transportation, and 1-working place) by using different tools (10-personal computer, 1-smart phone, 1 tablet PC, 1-personal computer and smart phone) and media (4-Scorm Package, 9-PDF). In short, the online assignments could possibly meet the needs of the participants’ diverse learning styles, which resulted in their efficient study (Jun, Kubota, and Suzuki, 2008).

Finally, appealing of this flipped learning was examined by employing John Keller’s ARCS model. This model is one of the instructional designs including four factors (Attention, Relevance, Confidence, and Satisfaction) to maintain or enhance learners’ motivations and this model particularly deals with appeal of the instruction (Keller, 2010). The participants (N=13) were asked to answer the questions in the questionnaire (questions 16 – 19) based on these four factors. All the respondents, except for one respondent answered “Neutral” to question 18, answered these four questions positively. This result seemed to indicate that this flipped learning successfully provided the instruction which had some appeal for them to study the conceptualizations. This finding possibly resulted from careful selection of the learning activities, which the previous study (Kasai, 2018) had already found appealing.

**Conclusion**

This study attempted to examine the effects of the flipped learning approach on undergraduate students’ global learning at a Japanese university in terms of its effectiveness, efficiency, and appealing. The results indicated strong positive effects. However, there are some rooms to improve it. The flipped learning in this study distinguished e-learning tasks (studying the contents through the media, answering the check quizzes, posting reflective messages, and responding to other students’ messages) from in-class learning activities. This clear distinction of learning activities seemed to enhance students’ learning effectively and efficiently to some extent. However, e-learning has a great potential to engage students in their learning more by creating online tasks encouraging them to interact with learning contents, an instructor, and other classmates (Moore, 1989). In short, there is a high possibility to integrate more e-learning tasks in this flipped learning approach. For example, students can complete some learning activities online such as discussions, share their work, and give feedbacks on it each other. This further integration is expected to make this flipped learning more effective, efficient, and appealing.

**Acknowledgement**

This work was supported by JSPS KAKENHI Grant Number JP16K01149.

**References**


Appendices

Appendix A: Results of the Pre-Test and Post-Test (N=8)

<table>
<thead>
<tr>
<th>Student</th>
<th>Pre-Test</th>
<th>Post-Test</th>
</tr>
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<tr>
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<td>10</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>6</td>
<td>16</td>
<td>35</td>
</tr>
<tr>
<td>7</td>
<td>17</td>
<td>29</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>24</td>
</tr>
</tbody>
</table>

Appendix B: Results of Reflective Note Analysis

<table>
<thead>
<tr>
<th></th>
<th>PC</th>
<th>CL</th>
<th>CC</th>
<th>GD</th>
<th>GH</th>
<th>GI</th>
<th>PG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Activities for PC</td>
<td>13</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Learning Activities for CL</td>
<td>5</td>
<td>9</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Learning Activities for CC</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Learning Activities for GD</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Learning Activities for GH</td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Learning Activities for GI</td>
<td>1</td>
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<td>2</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Learning Activities for PG</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
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*PC=Perspective Consciousness, CL=Cross-cultural Learning, CC=Cross-cultural Communication Skills, GD=Global Interdependence, GH=Global History, GI=Global Issues, PG=Participation in a Global Society
Appendix C: Results of the Questionnaire (N=13)

Footnote

1. Scorm (Sharable Content Object Reference Model) package is a set of standards or specifications for e-learning. It enabled the students to read and listen to the text all at once on the same screen for the global education course.
Measuring Success in a Doctor of Nursing Practice (DNP) Program: Results of a Longitudinal Study

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“\[This project is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) under grant # D09HP28679, Mutually Beneficial Clinical Partnerships for $1,080,000.00 over 3 years financed 100% by HRSA. This information or content and conclusions are those of the author and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS or the U.S. Government.\]"
Measuring Success in a Doctor of Nursing Practice (DNP)
Program: Results of a Longitudinal Study

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Abstract
What is the best method to measure success in students receiving a doctor of nursing practice (DNP)? The study’s aim was to increase interprofessional collaboration and education with sites, preceptors, and students. The following instruments were used: a) Interprofessional Collaborative Organization Map and Preparedness Assessment to clinical partner sites, b) Enlisting New Teachers in Clinical Environments Preceptor Survey, c) TeamSTEPPS® Teamwork Attitudes and Perceptions Questionnaires to students, c) Interprofessional Collaboration Assessment Rubric to preceptors, students, and faculty, and d) the Self-Assessment of Nursing Informatics Competency Scale to students throughout the program. These were longitudinal assessments of interprofessional collaboration and interprofessional education; students’ attitudes and perceptions; preceptor enticements, and students’ informatics skills. Sites were not ready to embrace interprofessional education for fiscal reasons. Interprofessional collaboration was evident in students, preceptors, and faculty. Preceptors wanted time to teach and online continuing education courses, and students improved their attitudes and perceptions. They improved their informatics knowledge, and were fairly competent using wireless devices.

Introduction
The clinical experience for DNP students working toward becoming nurse practitioners is to find a qualified preceptor for the duration of the program. A preceptor is the direct line supervisor in partnership with academic faculty. Preceptors that are educationally and experientially qualified and eager to serve are like gold. Qualified, effective preceptors improve students’ problem solving, decision-making, diagnostic reasoning, clinical judgment, and time management skills.1

As an outcome of these practice experiences, students’ must show competencies for providing safe, quality care within the scope of their respective licensing. These clinical experiences allow graduate nursing students to apply theoretical knowledge to the real patient in the real world of healthcare. This model of clinical learning has been utilized in many programs of nursing education at all levels of academic preparation.1

As far back as 2002, Bashford found through interactions with preceptors, students learn to recognize subtle changes indicating early warning signs or symptoms of change in condition of patients. Students report gains in self-confidence and improved skills.2 Effective preceptors can also minimize negative student learning experiences and increase positive learning which can result in attracting the students to the healthcare facility for future employment. Everyone in the preceptor environment notices the student’s work ethic, quality of patient care, communication skills and professional behavior. These are all qualities desired in a team member.3

Background
Starting fall 2015, a family nurse practitioner track admitted its first cohort of students. The majority of the clinical sites were located in Northwest Arkansas. Nationally, expansion of scientific knowledge needed for safe nursing practice, growing concerns about quality of care, and increasing complexity of the health care delivery system has led to the recommendation to
prepared advanced practice nurses at the doctoral level. The availability of doctoral-prepared preceptors is critically low in Arkansas. Locally, there is one BSN-DNP program with limited preceptors and without adequate preceptor orientation. Issues include competition for clinical sites and preceptors, impact of students on practice productivity and profit, inconsistent knowledge, skill, and abilities of both students and preceptors. The transition from master’s to doctoral level for advanced practice nursing education will create a prolonged period of time during which there will be variability between available clinical preceptors’ competencies and DNP student learning needs.

**Methods**

This was a 3-year longitudinal study using six valid and reliable instruments to answer the question, “What is the best method to measure success in students receiving a doctor of nursing practice (DNP)”?

The following instruments were used: a) Interprofessional Collaborative Organization Map (IP-COMPASS) to clinical partner sites, b) Self-Assessment of Nursing Informatics Competency Scale (SANICS) to students, c) Interprofessional Collaboration Assessment Rubric (ICAR) to preceptors, students, and faculty, d) Enlisting New Teachers in Clinical Environments (ENTICE) survey to preceptors, and e) the TeamSTEPPS® Teamwork Attitudes and Perceptions Questionnaires (T-TAQ, T-TPQ) to students. These were longitudinal assessments of interprofessional collaboration (IPC) and education (IPE), students’ attitudes and perceptions; preceptor enticements, and students’ informatics competencies.

**Project Goals**

The three year grant funded program had three overall goals. The first goal was to establish a mutually beneficial partnership at seven practice sites for medically underserved, minority, and/or rural communities in Arkansas. The second part of this goal was to establish academic-clinical partnerships throughout Arkansas. Concurrently, partnership sites would be established across the state to address local, regional and national needs. The second goal was to “implement and evaluate an interprofessional, co-preceptor clinical model in seven medically underserved, minority and/or rural communities. The third goal was to prepare 30 practice ready, culturally fluent DNP graduates who will practice in medically underserved Arkansas.

**Goal 1.** Additional clinical sites and preceptors and the needs that this project enhancement of the affiliation agreement with community clinics of Northwest Arkansas. Community Clinic (CC) is a member of the Community Health Clinics of Arkansas (CHCA) association. It is a Level 3 Recognized Patient Centered Medical Home (PCMH) through the National Committee for Quality Assurance (NCQA). CC NWA regularly holds interprofessional team meetings and has an integrated behavioral health model. The current preceptor pool includes master-prepared advanced practice nurses and medical doctors. The project addressed learning needs of the DNP students by providing faculty co-preceptors who work with CC preceptors to co-design the academic and clinical immersion experience and by developing DNP scholarly projects that address the quality and safety initiatives at the clinical site. Enhancement of the Eleanor Mann School of Nursing (EMSON) and CC affiliation was facilitated by implementation of a mutually beneficial partnership model (MBP).

Preceptors and the students were mutually responsible for facilitating learning to meet clinical objectives. Adult learning principles of motivation and participation are inherent to this relationship. Clinical sites benefit because advanced practice registered nurse (APRN) students are more likely to consider the facility as a future employer, DNP scholarly practice projects are more likely to address safety and quality issues pertinent to the clinical site, and community partners feel a part of the education process. Benefits to the students included access to a larger supply of preceptors in a variety of specialties with preceptors based both in the clinical and academic settings. Clinical preceptors are more likely to participate with future APRN students if the students are additionally supported by faculty preceptors and if the students are prepared in the pre-clinical
phase of the program to demonstrate readiness for a clinical experience.

Two key action steps were identified to accomplish this goal: a) identify readiness of selected community health centers in Arkansas for the co-preceptor clinical model and, b) partner with Community Health Clinics of Arkansas (CHCA) to identify additional primary care clinical sites in Arkansas. The expected outcome was to have six additional site agreements and that 80% of clinical practice sites report that EMSON is the preferred academic partner for advanced practice registered nurse students.

An enhanced mutually beneficial partnership between EMSON and CC was established March 2015, prior to notification of grant award. Formal meetings and informal workgroup sessions occurred as students entered the program spring 2016. A three-year schedule for CC and EMSON interaction, partnership, and PDSA cycles was established. Student rotations were determined with the assistance of the Director of Nursing and the Advanced Nursing Education (ANE) Project Director (PD). Students living in the closest proximity to the CC of Northwest Arkansas clinic were selected and invited to join the first ANE cohort fall 2015 and to have an immersive clinical experience for the full three-year DNP program. RCQI and PDSA cycles were identified as a result of student surveys, PD interactions, and student feedback. This was an ongoing process.

CC continues on the cutting edge of quality improvement initiatives, national safety goals, and meaningful use requirements. This rich and timely environment provides an excellent resource for DNP student scholarly projects, implementation projects, and protocol development, revision, and evaluation. Data collected was used to guide CC’s PDSA cycles with mutual target outcomes. PDSA cycles addressing key change ideas include strategies to improve informatics competencies, to develop a scholarly project guideline to enhance the projects’ responsiveness to community partner needs, and to design curricular changes to include integration of entrustable professional activities. These are activities preceptors are comfortable allowing the DNP student to perform independently after competence verification. An MOU was executed between EMSON and CC to address specific objectives of the ANE grant.

CC continues to provide a 4-hour clinic orientation. This was initiated for the first student cohort in spring 2016. It now continues with new cohorts of students. In addition, one-on-one computer training was arranged by the Information Technology (IT) department at CC. Preceptor Agreements were signed at the beginning of each semester and a rotation of preceptors was arranged by the POC at CC – the Clinic Director. Preceptor agreements allow for a clinical immersion experience. CC has identified preceptors in family practice, pediatrics and women’s health including prenatal care. The cohort of six students will complete all primary care clinical hours at the CC. In addition, consistent with the MBP model, DNP students will identify scholarly projects that address CC safety and quality improvement initiatives.

As of August 2018, the school of nursing had 220 active clinical agreements, 18 MOU partnerships, and 450 preceptors from which students select for clinical experiences.

Goal 2. The second goal was to “implement and evaluate an interprofessional, co-preceptor clinical model in seven medically underserved, minority and/or rural communities.” This goal had four objectives: a) engage in a collaborative approach to advanced nursing practice clinical education by spring 2016 and ongoing. b) improve recruitment, orientation, and retention of preceptors for DNP students by spring 2016 and ongoing, c) co-design advanced practice nursing curricula for standardized preclinical preparation to have “preceptor ready” DNP students by spring 2016, and d) strengthen the standard of evidence-based practice and population-based strategies in the clinical and academic settings by spring 2018.

This goal required engagement in a collaborative approach to advanced nursing practice clinical education. Readiness for IPE was assessed annually using the IP-COMPASS survey. Expected outcomes were that IPE readiness would increase each year.

Interprofessional education was seen as a necessary step to prepare health care workers ready to practice collaboratively. One method to
address this objective included hiring doctoral-prepared clinical faculty to service as clinical co-preceptors, which entail indirect supervision of students under the collaboration of a clinical site preceptor. Additional clinical faculty members were needed to maintain 1:6 faculty-to-student ratios. Doctoral-prepared faculty members were helped to implement the co-preceptor model and to addressing the gap between current master-prepared preceptors and the knowledge needs of DNP students. Methods for hiring followed established University of Arkansas Human Resources procedures. Recruitment was accomplished through informal networking at professional meetings and professional association contact lists.

**IP-COMPASS.** This tool provided both an assessment of a clinic’s preparedness to implement a collaborative practice model and a framework to improve interprofessional learning experiences that lead to students developed interprofessional collaborative skills. Values, structures, processes, practices and behaviors that create an environment conducive to interprofessional learning are measured. IPE readiness was initially assessed March 2016 as indicated by IRB approval fall 2015. Initial results indicated a wide variance in liaison responses. Review of areas marked weak were, in order of percentage responding: a) 60% identified physical space as a barrier, b) 50% reported a lack of recognition for accomplishments at their institution, and c) an overall percentage for all questions currently at 64%. This will serve as a baseline for future measures.

Cumulative 2018 IP-COMPASS results indicated there was more work to do to implement IPC and IPE at clinical sites where students and preceptors work. The PD recommended individual conferences with clinical partners to disclose and discuss specific organizational reasons for the results. As a result, it was suggested that IPC and IPE are relatively new terms and may not be defined across people, organizations, or communities. There was no planned participation by grant staff at individual facilities which may have impacted the results. Faculty members are instrumental in educating students, preceptors and clinical sites. It may be helpful to integrate concepts of IPE and IPC into clinical course curricula. See figure 1.

![IP-COMPASS Facility Assessment of Interprofessional Collaboration (IPC) and Education (IPE)](image)

*Figure 1. IP-COMPASS IPE and IPE Scores of Clinical Partners*
**Goal 3.** The third goal for EMSON’s ANE program was to increase the number of practice-ready, culturally fluent DNP graduates who will practice in medically underserved, minority, and/or rural communities. To prepare a practice-ready graduate, grant activities include improved orientation to the clinical site technology, alignment of student learning goals with immersive clinical experiences, and participation in interprofessional teams in patient-centered medical homes. This required longitudinal data from five surveys selected for this project to measure student changes over the period of the grant.

**SANICS.** Informatics competencies have been linked to safer patient care and better patient outcomes. Pre-clinical course work for DNP students includes an informatics course. SANICS was chosen to assess informatics competencies. SANICS measures competencies in five domains: clinical information roles, basic computer knowledge and skills, applied computer skills, attitudes and wireless device skills. Students were asked to complete the self-assessment upon acceptance to the program, after the informatics course, when they began the scholarly project, and at the end of the program. Student participants were able to use information they gained from the self-assessment to guide learning objectives during the healthcare informatics course and clinical placements.

Results of SANICS and review of informatics competencies published by leading nursing organizations will guide rapid cycle quality improvement initiatives. See figure 2.

**Figure 2. Cumulative SANICS Scores**

Nursing Informatics was offered each fall semester. This course prepares students to explore the standards, selection principles, use, and evaluation of information systems utilized in healthcare settings. Initial SANIC responses were obtained Fall 2015. There were 21 (84%) responses to an invitation to participate in the SANIC survey fall 2015. Sixty-two percent of respondents were enrolled in the BSN-DNP program at the University of Arkansas and lived within the state of Arkansas. The majority (72.4%) of students were female. Six students
(28.6%) were in the post-MSN program. Eleven (52.4%) were full time students, and nine (42.9%) were part time students with a 4 or 5-year plan. Nine (42.9%) students had previously completed an undergraduate information course; and five (23.8%) students had at least one prior graduate informatics course.

Students were asked to rate themselves in the first semester of the graduate nursing program on a scale of 1-5, with 1 = not competent, 2 = somewhat competent, 3 = competent, 4 = proficient and 5 = experts. Range of overall means was 2.56 – 4.17, with an overall survey mean 3.66.

The highest overall mean score was ‘wireless device skills’, which all respondents reported competent or above. The lowest total mean score was ‘applied computer skills: clinical informatics’ which scored 2.56. There were no students who felt they were expert in this domain. The next lowest area was ‘clinical informatics role’. Overall, students self-reported themselves as proficient in the other three domains – basic skills, attitudes, and wireless device skills. Follow-up SANIC responses at the beginning of NURS 6244, which was the clinical course corresponding to the first semester of writing the DNP scholarly project. Fall 2016 results had a range of overall means 2.56 – 4.17; with an overall survey mean 4.25 as compared to 2015 overall mean 3.66. The highest overall mean score was ‘wireless device skills (4.33)’, which all respondents reported proficient or above. The lowest total mean score was ‘applied computer skills: clinical informatics’ which scored 3.32, but it exceeded the fall 2015 cohort who scored 2.56. Students self-reported themselves as proficient in the other three domains – basic skills, attitudes, and wireless device skills. The 3-year summary results for SANICS for cohort 1 were:

All scores improved by the end of the program in 2018. Applied computer skills continued to score lower than other scores (3.88). Clinical informatics role improved to 4.03. The ANE grant team recommended curricular mapping, and to review course outcomes using the DNP Curriculum Template from the National Organization of Nurse Practitioner Faculty (NONPF).10

After further work with DNP students on their scholarly project, it was determined that changes to applied computer skills, e.g. excel spreadsheet formulas, databases, pivot charts, run charts, and introduction to big data concepts were not present. Based on the mapping, curricular changes will be undertaken.

Steps taken to provide immersive interprofessional experiences to DNP students were to a) establish panel of patients for DNP students to follow across clinical courses, and b) schedule clinical rotations for DNP students with referral network.

ICAR. Expected outcomes were measured by the Interprofessional Collaborator Assessment Rubric (ICAR) survey. It was expected that scores over clinical courses as student matriculated the program would improve indicating improved IPC. Students, and preceptors, and clinical faculty responded to six domains: respectful communication, collaboration, roles/responsibilities, collaborative patient/client family-centered approach, team functioning, and conflict management/resolution. Fall 2015 preceptors and faculty scored almost equal.

In the first cohort, overall mean score for preceptors was 4.0, students’ self-evaluation was 3.7, and faculty’s overall mean was 4.0. Students’ self-evaluation reflected lower scores in nine areas, while faculty and preceptors agreed on a ‘consistent’ which equated to 4.0 numerically on the Likert scale instead of ‘frequently’ (3.0), as self-reported by students. The area with the most variance was roles/responsibilities, which was also reflected in the SANIC student survey. Sharing leadership also was seen in the SANIC score. It is noted that there were two different cohorts of students. This data was used as a baseline for comparison in the future.

The second cohort was comprised of post-MSN students in clinical course NURS 6244 data collection. In this cohort, preceptors’ and students’ mean scores were similar. Students rated two subsets of the domain roles and responsibilities lower than both faculty and preceptor. Students rated themselves lower on team functioning with respect to recognizing strategies that will improve team functioning and the relationship between team functioning and quality of care. Conflict management/resolution
was scored lowest of all domains by students’ self-evaluation, but it was higher than the second year cohorts’ responses. They felt they could seek perspectives and opinions of others and clarification when misunderstandings arise.

By fall 2017 there were enough cumulative scores to provide a broader snapshot of IPC. Overall mean scores six domains for preceptors-3.91; students- 3.75, and faculty scores - 3.87. The lowest score was 3.64 on team functioning. Students’ MEAN scores were lower than preceptors/faculty scores in six (6) domains on nine (9) items. They were:
1. (Communication) Communicates opinion or pertinent views on patients care (3.54 – lowest individual score).
2. (Roles) Explains own scope of practice, code of ethics, standards and/or clinical guidelines in relation to collaborative patient-centered relationship (3.65).
3. (Roles) Shares evidence-based or best practice knowledge with others (3.67).
4. (Roles) Shares/alternates leadership with others when appropriate (3.55).
5. (Team) Demonstrates recognition of strategies to improve team functioning (3.67).
6. (Team) Demonstrates recognition of themselves as part of a team (3.67).
7. (Team) Contributes to interprofessional team discussions (3.67).
8. (Patient Centered) Seeks input from patient/client and family (3.64).
9. (Patient Centered) Shares options/health information with patients/clients/families (3.71).

Figure 3 illustrates students’ ICAR scores.

Figure 3. Student ICAR Scores Baseline vs. Cumulative

Analysis of 3-year summary data indicated that students scored themselves lower than preceptors but higher than faculty, which was a change from the initial cohort findings. Overall, scores have increased (improved) as student matriculated the program. The lowest individual score was communication. Consistently, across courses and cohorts, weak individual scores were roles and responsibility. Ultimately, this survey determined results were stable over one three-year cohort. Figure 4 illustrates preceptors’ ICAR scores. Roles and responsibility showed the most variance by students.
Implications for the program include a need for: a) curriculum re-mapping, b) expanding course content in the Roles course, and c) develop robust curriculum that includes communication, roles and responsibilities, team functioning, and conflict management. Figure 5 illustrates faculty ICAR scores.
Figure 5. Faculty Members’ ICAR Scores Baseline vs. Cumulative

ENTICE. To measure preceptor satisfaction and buy-in with the immersive experience for students, the Enlisting Teachers in Clinical Environments (ENTICE) 4 was used. Preceptors’ score may be summarized over the 3-year period, due to stability and consistency of responses. All preceptors were given the opportunity to respond to the survey electronically at the end of each semester when they evaluated their students. The primary motivator consistently was a desire to ‘give back’ to their profession. The biggest barrier was loss of productivity. The ‘type of student’ was also important. Scores lowered the longer the same student remained with the preceptor.

Figure 6 illustrates priorities for why preceptors agree to precept students. Figure 7 illustrates the rank order of barriers preceptors’ experience that discourages them from seeking this as an ongoing experience.
Last, the Teamwork Attitudes Questionnaire (T-TAQ) and Teamwork Perceptions questionnaires (T-TPQ) were used to evaluate student attitudes and perceptions about their respective clinical sites and units over semesters. Expected outcomes are to see a trend of overall improvement in student responses by the end of the project.

**T-TAQ.** This survey was administered to students on completion of respective clinical courses to evaluate attitudes and perceptions they had regarding current clinical site(s).
Mutual Support consistently scored lower than other domains for all cohorts through most courses. Specifically there were three questions that scored below a 2 on the Likert scale. Those questions were: a) asking for assistance, b) providing assistance, and c) personal conflicts. Cumulative results have been analyzed by courses to more clearly pinpoint opportunities for improving. 3-year summary results are: All cohorts increased over all mean scores over the three years. Cohort 3 saw the greatest increase with a 7% increase in overall means from course 1 to course 7. The cumulative findings for T-TAC indicated that all scores improved but mutual support continued to score lowest of all domains. See figure 8.

![T-TAQ 2015 - 2018](image)

**Figure 8. T-TAQ Cumulative Findings**

**T-TPQ.** The Teamwork Perceptions Questionnaire (T-TPQ) was administered to the same cohorts to evaluate attitudes at clinical sites. T-TPQ originated within the TeamSTEPPS framework, and runs parallel with T-TAQ with the domains to formulate responses. 2018 cumulative findings for T-TPQ: Over time, all five domains scored above 4.0. Leadership and mutual support scored lowest. Leadership decreased in fall 2017 NURS 6224 then returned to baseline. Over time, the mean of all five domains were scored above 4.0 and all cohorts noted an increase from start of courses until last course, but there were noted decreases in means between courses. See figure 9.
Figure 9. T-TPQ Cumulative Findings

**Dissemination.** The last step for goal 3 was to disseminate project outcomes. Surveys were quickly implemented after IRB approval fall 2015. Posters, presentations, and publications were disseminated locally, regionally, nationally and internationally. The study resulted in the following six publications:


**Conclusion**

The purpose of the Mutually Beneficial Partnerships in Arkansas was to enhance the educational experience of EMSON DNP students
with their clinical preceptors. The long term impact was to improve the health of Arkansans by ensuring a sufficient number of highly educated and clinically skilled advanced practice registered nurses (APRNs) were available to practice within their scope of practice. The three goals for the project were met in accordance with NONPF, the American Association of College of Nursing – American Organization of Nurse Executive (AACN-AONE), and the AACN white papers and statements.

First, we established mutually beneficial partnerships with 18 practice sites for medically underserved, minority, and/or rural communities in Arkansas. Next, we implemented and evaluated an interprofessional, co-preceptor model in seven medically underserved, minority and/or rural communities and disseminated those results. Last, prepared 39 practice-ready, DNP graduates to practice in medically underserved, minority, and/or rural communities in Arkansas and surrounding states.

The impact of the DNP program in Northwest Arkansas has been a tremendous boost to APRN practice secondary to community exposure to the advanced degree and the inherent knowledge and skills gained in the program. Prospects for Continuing the Project and/or Replicating this Project elsewhere are very good. We were graciously funded with the ANEW grant in 2016. Although it is a training grant, it has folded into and will continue the work the ANE grant initiated.

References


Implementation of the Robotic Vision into the Simulation Environment

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Abstract

Modern industrial robots employ a variety of technologies to enhance their ability to perform certain tasks. In particular, optical imaging systems consisting of cameras and/or light sensors can be used to allow the robot to “see” and recognize objects and make decisions based on which object or objects are currently visible, and can drastically increase the utility and versatility of the robotic arm. However, these imaging technologies are complex and often imprecise if used incorrectly, necessitating a skilled operator to set up and calibrate these systems for a certain task. Although robotics play an essential role at a variety of manufacturing facilities, there is currently no accessible and free software that can give students the opportunity to learn concepts of industrial robotics without purchasing expensive, complex, proprietary software packages. This paper discusses NSF sponsored project to develop an engaging, free, and open-source robotic training software aimed at helping students learn the basics of programming robotic arms as well as concepts of robotic vision systems. Originally, robotic simulation “RobotRun” software was developed as an educational tool for teaching general robotics concepts to students studying robotics and industrial engineering. Our initial concept for the software was limited to just basic operational procedures, but has been recently expanded to include an imaging system simulation to imitate robotic vision system concept.

Introduction

Many existing jobs will be automated in the next 20 years, and robotics will be a major driver for global job creation over the next five years. These trends are made clear in a study conducted by the market research firm, Metra Martech, “Positive Impact of Industrial Robots on Employment” [1]. Many repetitive, low-skilled jobs are already being supplanted by technology. However, a number of studies have found that in the aggregate, the robotics industry is creating more jobs than the number of jobs lost to robots. For example, the International Federation of Robotics (IFR) estimates that robotics directly created 4-6 million jobs through 2011 worldwide, with the total rising to 8-10 million if indirect jobs are counted. The IFR projects that 1.9 to 3.5 million jobs related to robotics will be created in the next eight years [2]. The rapid growth of robotics and automation, especially recently, and its current positive impact and future projections for impact on the US economy are very promising. Even by conservative estimates [1], the number of robots used in industry in the US has almost doubled in recent years. Industrial robot manufacturers are reporting 18-25% growth in orders and revenue year on year. While some jobs will be displaced due to the rollout of robots in the manufacturing sector, many will also be
created as robot manufacturers recruit to meet growing demand. Furthermore, jobs that were previously sent offshore are now being brought back due to advances in robotics [3]. Such rapid growth of robotic automation in all sectors of industry will require an enormous number of technically sound specialists with the skills in industrial robotics and automation to maintain and monitor existing robots, enhance development of future technologies, and educate users on implementation and applications. It is critical, therefore, that educational institutions adequately respond to this high demand for robotics specialists by developing and offering appropriate courses geared towards professional certification in robotics and automation. In addition, certified robotic training centers (CRTCs) will be in high demand by industry representatives and displaced workers who need to retool their skills. Considering the demand for well-trained robotics specialists, educational institutions should not only work to keep the curriculum current; we must also research and implement the best educational practices for delivering this curriculum.

Modern industrial robots employ a variety of technologies to enhance their ability to perform certain tasks. In particular, optical imaging systems consisting of cameras and/or light sensors can be used to allow the robot to “see” and recognize objects and make decisions based on which object or objects are currently visible, and can drastically increase the utility and versatility of the robotic arm. However, these imaging technologies are complex and often imprecise if used incorrectly, necessitating a skilled operator to set up and calibrate these systems for a certain task.

“RobotRun” robotic simulation environment was developed as an educational tool for teaching general robotics concepts to students studying robotics and industrial engineering. Our initial concept for the software was limited to just basic operational procedures (i.e. moving and programming the robot), but we have recently expanded the software to include an imaging system simulation as part of our ongoing effort to expand our simulator’s capabilities.

**Educational Need**

Robotics is a great tool to promote STEM. Given the current shortage of student interest in STEM education, increased attention has been given to the appeal and attraction of Robotics. The interdisciplinary construction of robots, which involves motors, sensors, and programming, makes it a useful pedagogical tool for all STEM areas. The novelty of robotics is instrumental in attracting and recruiting diverse STEM students. In the classroom, robotics can easily be used to introduce a variety of mandatory skills needed to pursue a variety of STEM careers [4-6, 11, 13]. Specifically, a robotics platform advances students’ understanding of both scientific and mathematical principles [6, 7], develops and enhances problem-solving techniques [6, 7, 10-12], and promotes cooperative learning [6-8]. While robotics can be used as an interdisciplinary STEM learning tool, there is also a strong need for industrial certification programs in robotics automation. More and more robots are designed to perform tasks that people may not want to do, such as vacuuming, or are not able to do safely, such as dismantling bombs. They have changed the lives of Amyotrophic Lateral Sclerosis (ALS) patients by giving them the ability to speak after their vocal cords have failed, and have sparked imagination in space exploration (not to mention our fascination with characters like R2D2). As a result, popular interest in robots has increased [5-17]. Global competition, productivity demands, advances in technology, and affordability will force companies to increase the use of robots in the foreseeable future [25, 26]. While the automotive industry was the first to use robotics, aerospace, machining, and medical
industries now also rely on robotic automation [28, 29]. More than ever, trained and certified specialists are needed to maintain and monitor existing robots and to develop more advanced robotic technologies [25, 30-32].

As mentioned, robotics can be used as an interdisciplinary, project-based learning vehicle to teach STEM fundamentals [18-20]. Robotics is a valuable learning tool that can enhance overall STEM comprehension and critical thinking [18, 21-24]. As a result, new programs in robotics automation and applied mobile robots are popping up in the US and abroad. Industrial help from Microsoft, FANUC Robotics America Inc., and MobileRobots Inc., is essential to the growth of these programs. Currently, few universities offer specific robotics degrees, but a small number do offer a degree and/or certification specifically in industrial robotics and automation. Lake Superior State University (LSSU) is one of very few universities in Michigan that specializes in robotics automation; however, it does not have a program to certify industry representatives [44]. With few focused industrial robotics programs, undergraduate industrial robotics training often occurs in electrical engineering technology programs, the focus of our proposed curriculum project. Existence of the “RobotRun” robotic simulation software with additional features of the vision system allows for expansion educational approaches and especially for the institutions that do not have significant funds to invest into expensive industrial software. Capabilities of “RobotRun” allows for teaching advanced topics in material handling and industrial robotic vision solution without the need for expensive hardware. In our previous publications [35-38] we have covered features of the software, and therefore, will focus our attention and added capabilities of the vision system.

Camera Functionality Overview

The “RobotRun” camera system is fully user configurable via an on-screen menu in our application’s user interface, shown in Figure 1, allowing users to set camera position, orientation, horizontal field of view, and aspect ratio, and includes settings which simulate lighting and shutter speed/exposure time as well. An in-situ representation of the camera is also placed in the simulation environment to denote camera position and orientation, and a projection of the camera’s view frustum, the volume of space in which objects are visible to the camera, is drawn as well. Once the camera has been configured to the desired settings, objects can be recorded and catalogued for future reference by selecting that object in the camera view image, found in the bottom right of the camera interface menu. Any objects in view of the camera during the last image capture can be selected, and the user can then attempt to “teach” that object to the camera, which saves a reference of that object and its orientation with respect to the camera provided the image passes certain quality measures. Once an object has been taught to the camera, any objects captured in the future can be compared against this catalogue to match those objects to a known object.

This process of learning to recognize objects based on their appearance is the primary feature of the virtual camera system; when used in conjunction with the robotic arm, it affords the user an additional layer of interactivity between the robotic arm and the objects populating the simulation environment. A set of programming instruction extensions enable the robotic arm to communicate with the camera system by querying the camera with a reference to a previously taught object. The camera will then take a photograph of the scene to determine whether or not any objects matching that taught object are visible, and can return either a true/false value or the specific coordinates of a matching object if it captures any objects that match the previously
recorded object reference. Using these two functions, the robot can then make decisions based on whether or not an object matching that reference is visible (e.g. correct parts will be seen as matching the reference while defective parts will not), and can be instructed to move to objects dynamically, rather than having to rely on objects being in a pre-defined location.

Figure 1: Camera interface menu

**Camera Settings and Controls**

The user can position and orient the camera via the camera menu tab in the “RobotRun” user interface. Upon opening this menu, a series of text fields display to the user the camera’s current position in the virtual environment with respect to the origin, as well as orientation information, horizontal field of view, and aspect ratio. Camera position is described by its 3-dimensional Cartesian coordinates X, Y, and Z, which represent the camera’s distance from the origin, in millimeters, along the robot’s longitudinal, vertical, and lateral axes, respectively. Camera orientation is described similarly, with the camera’s angle of rotation around these same axes being displayed in degrees. Together, field of view, shown in Figures 2 and 3, and aspect ratio describe the shape of the camera’s view frustum, the volume inside which objects will be visible to the camera; field of view represents the horizontal angle of the view frustum, while aspect ratio describes the ratio of horizontal over vertical viewing angle. Users can edit these values via physical keyboard input. Pressing the “Update Camera” button will then modify
the camera’s current values to match the new values, reposition the camera’s model and view frustum visualization, and produce a new image showing what the camera can now see with its updated settings. The default camera values can also be loaded by pressing the “Reset Camera” button.

Figure 2: Camera with large FOV (100)

Figure 3: Camera with smaller FOV (10)
Aside from camera positioning and viewing area settings, our camera simulation also models luminosity and can alter the apparent brightness of an image based on the camera's brightness and exposure settings, as shown in Figure 4. The user can alter these parameters using the slider bars below the camera orientation fields: brightness represents the instantaneous rate of light capture for the camera and is expressed in a generic unit with a value from 0 to 10, while the exposure value is analogous to exposure time in a real camera, and is nominally measured in seconds.

![Figure 4](image.png)

Figure 4: (a) Image with normal brightness (brightness = 1.0, exposure=1.0); (b) Image with reduced brightness(brightness=1.0, exposure=0.1)

Note, that while we do model exposure time for the purposes of object luminance modeling, this value does not actually affect the amount of time it takes to “capture” an image. For the sake of computational simplicity, images are constructed by re-rendering the simulation from the perspective of the virtual camera, rather than accurately modeling the physics of photography via exposure of an array of photo sensors to light over time. This means that, while increasing exposure time increases the overall brightness of an image, it does not result in any blurring or ghosting effects. Once these values are set and the camera is updated, future images captured by the camera will have lighting effects applied to them to make the images appear brighter or darker depending on the settings chosen. This can also affect whether the camera is able to detect an object: as images become darker or more washed-out due to over-exposure, objects become harder to distinguish from the background of the image, and the camera may fail to recognize objects as the brightness of the image tends toward these extremes. Additionally, some objects may have reflective properties, which require different brightness and exposure settings for accurate imaging. The exact details of how these settings affect image quality will be discussed next.

**Teaching an Object**

The process of recording and storing an object for future reference is called “teaching.” Objects that have been taught to the camera can be used to identify other objects that match a given
taught object. Object teaching is done manually by the user, and involves positioning the object in front of the camera, within the camera’s field of view, and taking a snapshot of the scene containing that object by pressing the “Update Camera” button. Once an image containing the object of interest has been captured, the user can select that object to be taught to the camera by simply clicking on that object in that image. Pressing the “Teach Object” button will then evaluate the quality of the image containing that object to determine whether the photo is a suitable representation of that object. Image quality is determined based on two major factors: how much of the object is in frame (and is thus visible to the camera), and how the camera’s current brightness and exposure settings interact with the object. Internally, this quality rating is computed as:

\[ q = v \times l \]

where \( q \) is the overall image quality, \( v \) is the amount of the object visible to the camera, \( l \) is the lighting coefficient; each of these values are expressed as a decimal percentage. An object can be identified as matching a previously taught object for \( q \geq 0.75 \), while teaching the camera a new object requires a somewhat more pristine image to serve as the standard against which other images will be compared (\( q \geq 0.95 \)). The object’s visibility \( v \) is calculated by using a volumetric estimator to determine the portion of the object’s volume that falls within the camera’s viewing frustum, and is given by:

\[ v = \frac{p}{8^3} = \frac{p}{512} \]

For the purposes of this estimate, each object being considered by the camera is modeled as an 8 by 8 by 8 field of points distributed evenly across the maximum length, width, and height of the object. The software then checks each of these points against the orientation and dimensions of the viewing volume to determine \( p \), the total number of these points that fall inside the camera’s field of view. The proportion of these points \( p \) to the total number of points in the model then gives us our initial image quality, \( v \).

The lighting coefficient \( l \) is calculated the following formula:

\[ l = \min(1 - \log_n (e \times b)^2, 1 - \log_n (e \times b')^2) \]

where \( b \) and \( e \) are the brightness and exposure of the camera when the snapshot was taken, respectively, and \( r \) is the object’s reflectivity value. The result of this calculus is that \( l \) is maximized for values of \( e \) and \( b \) such that both \( e \times b \) and \( e \times b' \) are close to 1. For objects with normal reflectivity (\( r = 1 \)), this simply means choosing a combination of \( e \) and \( b \) whose product is 1 (by default, the camera is set to 10.0 brightness and 0.1 exposure time). However, as \( r \), the reflectivity of an object, increases, the maximum value of \( l \) decreases for smaller values of \( e \), as the difference between the first and second logarithmic expression becomes greater. Thus, objects with high reflectivity require greater exposure values in order to obtain an acceptable value for \( l \). Once an object is successfully taught to the camera, it will appear in the taught objects dropdown list in the camera menu, as shown in Figure 5.
The user can then select any previously taught object in order to see the camera representation of that object; when an object is taught to the camera, the camera saves a reference copy of that object that includes the image quality of the object, its orientation with respect to the camera and lighting values, and this preview communicates this information visually to the user via this object preview image. The taught object preview also serves as an interface for any areas of interest that are associated with that object. Areas of interest are pre-defined areas on the object’s face, usually centered around a particular element or feature on that object, that can either be excluded from the camera’s object matching process (e.g. treat two parts that only have a minor visual difference in one area as the same part), or can be selected for additional scrutiny, should there be any features that need to be given special attention to ensure any matches to that object are not false-positives. Areas of interest are defined separately for each of the 6 cardinal faces of the object, which are defined as the front and back side of the planes perpendicular to the 3 cartesian axes of each object, XYZ, in the object’s local coordinate system, and so areas of interest will only be displayed if one of those axes is aligned with the camera’s forward (+Z) axis.

Taught objects can be compared to other objects in view of the camera to determine whether there are other objects currently in view that match said taught object. In real camera systems, this is typically done by taking a high-contrast image of the object and comparing the shape of its outline to that of the previously taught object in an attempt to match these two shapes. However, since we have the benefit of having perfect information about all of the objects in our virtual environment, we can simply compare their object representations to determine whether any matches exist.
space beforehand, we can simplify this process somewhat: rather than attempting to construct an outline of the objects and use complex pattern matching algorithms, we simply assign a set of unique identifying numbers to each model loaded into the simulation. Each model has a separate model ID number and, optionally, a model family ID number as well. If a photographed object is using a model with the same model ID number and is oriented similarly with respect to the camera (ignoring any rotation around the camera Z axis) when compared to a taught object, then the objects are said to match. Additionally, if the object uses a model with the same family ID as the taught object and all relevant areas of interest for the taught object are set to be ignored by the camera, those objects are said to match as well. If an area of interest is neither emphasized nor ignored when comparing an object to a taught object with the same family ID, there is a 50% chance that the objects will be falsely identified as matching.

Axis alignment, both for object matching and for displaying areas of interest, is measured by taking the square of the dot product of each of the object’s normalized axes with respect to the +Z vector; if the squared dot product for any of the object’s cartesian axes is greater than 0.9, that axis is said to be aligned, either with the camera’s look axis, or with the coordinate system of the taught object it is being matched to. More formally:

\[
\text{Object axis is aligned iff } (v \cdot <0, 0, 1>)^2 \geq 0.9
\]

where \(v\) is the normal vector representing one of the object’s axes with respect to the global coordinate system.

**Program Instructions**

The robotic arm uses two program constructs in order to communicate with the camera system: the object position operator, and the object visibility operator. The object position operator is used as the target location for a motion instruction, and is represented in the program syntax as \(\text{Obj}[X]\), where \(X\) is the target taught object. This operator will return the position of the object nearest to the camera that matches the taught object \(X\), or null if no such object is visible. In a typical motion instruction, this would appear as:

\[
\text{L Obj}[X] \ 200\text{mm/s FINE}
\]

where \(L\) is the motion type (linear), \(\text{Obj}[X]\) is the destination of the motion, 200mm/s is the speed at which the robotic arm’s end effector will move, and FINE represents the termination setting of the motion.

The second programming construct available to the user is the object visibility operator, \(\text{Vis}[X]\), which simply returns true if the camera sees one or more objects matching the taught object \(X\), or false if otherwise. In an IF statement, it may appear as:

\[
\text{IF Vis}[X]: \text{call PickUp}
\]

In this case, the robotic arm would respond to the presence of an object matching \(X\) by executing the ‘PickUp’ routine.

**Conclusion**
There is significant demand from industry for well-prepared specialists capable of programming, maintaining, and troubleshooting modern robots. As a result, the goal is to develop a model curriculum and associated tools that can address current and future industry expectations. Although robotics play an essential role at a variety of manufacturing facilities, there is currently no accessible and free software that can give students the opportunity to learn concepts of industrial robotics without purchasing expensive, complex, proprietary software packages. This paper discussed NSF sponsored project to develop an engaging, free, and open-source robotic training software aimed at helping students learn the basics of programming robotic arms as well as concepts of robotic vision systems. Existence of the "RobotRun" robotic simulation software with additional features of the vision system allows for expansion educational approaches and especially for the institutions that do not have significant funds to invest into expensive industrial software. Capabilities of “RobotRun” allows for teaching advanced topics in material handling and industrial robotic vision solution without the need for expensive hardware.

Acknowledgements

This project is supported by National Science Foundation grant DUE-1501335.

References


Piaget, J. “To Understand Is To Invent”, N.Y.: Basic Books, 1974


Promoting Robotics Education by Developing New Open-Source “RobotRun” educational software” A. Sergeyev, S. Kuhl, N. Alaraje, Proceedings of the ASEE Zone 2 Conference, 2017


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Research has indicated that the Leader in Me process has shown success in raising academic scores and reducing behavioral referrals in multiple schools in the US mainland and several other countries. Yet to date, no studies have been conducted to review the effects of the Leader in Me process on schools in Hawaii. Currently there are nine elementary schools which have officially been designated as in the Leader in Me process in Hawaii. This is of the 3,917 schools in the Leader in Me process worldwide. Specifically, this study explored if the Leader in Me process has had a positive effect on schools in Hawaii, with academic improved achievement as indicated by state test data, as well as, improved behavior according to participating school principals’ perceptions of the number of behavior referrals.

Schools in Hawaii are relatively new to the Leader in Me process. Eight of the nine schools have only become Leader in Me schools in the past year or two. With almost 4,000 schools worldwide involved in the Leader in Me process, there has been a growing interest in the success of schools involved in this process. Becoming a leader in Me schools cost thousands of dollars and many hours must be given to the training. It is
important to the community, supporters, and other schools to examine the effect of this process.

Quantitative data was collected using Hawaii Department of Education public record from School Status and Improvement Report on each school in the study using math, science, and reading scores. Qualitative data was collected through personal recorded and transcribed interviews with principals from each of the nine schools.

This data was compared and analyzed with trends graphed to indicate potential progress. Qualitative data was analyzed to explore the perceptions of principals in the schools using the Leader in Me process. Trends were identified and indications reported.

The potential benefits of this study are worthwhile because it is important for the district and other schools to determine if the Leader in Me process is beneficial to the students and schools. These findings could greatly impact principals’ decisions to become involved in the professional development and financial commitment needed in becoming a Leader in Me school. These findings further add to the body of research being accumulated on the Leader in Me process.
Summer Coding and Robotics Enrichment: A Case Study

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Abstract

This case study examines the Summer Coding and Robotics Enrichment Program at an inner city K-5 elementary school in Orange County, California. This school has a nearly 100% Hispanic student population, with most students having an English Learner designation. In addition, the majority have the potential to be the first generation in their family to attend college. Participants in the program do not have Internet access at home, and their only devices are the school provided Chrome Books or handed down smart phones. This program targets the bottom quartile of students, based on a growth measurement test. It also targets students in special programs, including Foster Youth, Special Education and Homeless Families. This competitively funded program is beginning its fourth year of operation this summer and has shown success in improving student reading and math scores, as well as opening up the world of the engineering process, building robots and writing computer code to students who would not otherwise have this opportunity.

This study tells the story of how the humble beginnings of the program, starting with only 10 Ozobots, 5 Dash and Dots and 5 Lego EV3 robots to be shared amongst 40 students grew to having 20 Ozobots, 30 Dash and Dots and 30 Lego EV3 robots. The story continues with how the curriculum developed, from basic line coding to the designing and programming of unique robots with computer aided design (CAD) parts that have been 3D printed, and how mathematics and reading instruction are integrated into the curriculum. Finally, qualitative findings of the effects of this summer program on all stakeholders, including parents, students, teachers and administrators, are explored.

Why Coding and Robotics?

In 2016 Google opened Code Next to bring light to the problem of unfilled computer science jobs, and it is estimated that tens of thousands of these jobs go unfilled in the United States every year (Lafee, 2017). In a talk from 2016, Adeline Setiawan stated the World Economic Forum estimate that automation will eliminate 5 million jobs worldwide by the year 2020. To give students the opportunity to overcome these obstacles, it is important that they become digitally literate and be able to produce 21st century products.

The use of robotics in coding allows students to demonstrate different skills, whether it is in coding, design, building or mechanics (Tompson, 2016). According to Kimberly Hill, Superintendent of Charles County Public Schools in Washington,
D.C., when students learn coding, they learn the essential 21st Century skills of critical thinking, analyzing problems, and developing solutions (Lafee, 2017). These skills taught in our program, by nature, transfer to computer sciences. Furthermore, they also transfer to the 21st century skills sought by employers and can be applied to jobs that do not yet even exist. This is essential because it has been estimated that up to 50% of the jobs our students will have when they are older are not yet a part of society. While the potential of robotics in education can trace back to the early 1990’s (Papert, 1993), it is not yet part of the regular curriculum.

**What We Did**

Our summer robotics program started 5 years ago. We were funded by a competitive grant that gave us $2000 to use on materials and $500 for field trips per teacher, with each teacher required to maintain 20 students. During the summer of 2014, our first year, we had two teachers, in the summer of 2015 we had six, then four teachers in summer 2016 and 2017, and this year, the summer of 2018, we had three. Each year, we have fluctuated from our core three teachers based on funding, as well as the availability of qualified teachers. Needless to say, $2000 did not buy many robots that first year. We were able to purchase 10 Ozobots, 5 Dash and Dot sets and 5 Lego Mindstorms. The next year, we were able to double the amount of robots. That same year, we expanded our program to include a robotics club during the school year. Because of this, we were able to solicit donations through Donorschoose.org, allowing us to purchase an additional 5 Dash and Dot robots. Finally, a district administrator heard about our program and decided that we needed support. This administrator had the balance of our current complement of
20 Ozobots, 30 Dash and 30 Dot and 30 EV3 robots. Currently, funding has been cut to a flat $1500 per class of 20 students and we are in maintenance mode, purchasing replacement parts and expanding the student real-life experiences through field trips.

Our original curriculum was basically trial and error. We knew a little about the robots, but not much. We knew that students were interested, that parents were interested and that we, the leaders, were interested. As teachers, we had been technology consumers for many years, and had only been technology producers in the area of video editing. As far as coding, we had done a little work in BASIC in the 1980’s, and early 1990’s, so the logic of it all made sense to us. There was a little bit of rolling out the robots and letting the students explore and a lot of hoping that things went well.

We implemented our curriculum through incremental steps. It started with simple real life coding applications. Coding, in its simplest sense, is a series of directions to be followed. In this activity, one student was a robot, and the other wrote and then read directions for the first student to move through a maze that had been taped to the floor. This allowed students to experience just how important a properly sequenced and measured code would be.

Next, we gave the students an Hour of Code from code.org. Each student selected the theme that was coded, from Angry Birds to Star Wars. This made it highly motivational for students to move through the structured lessons of how to code. Students enjoyed this activity, and the familiar themes helped to relieve some of the anxiety students felt when faced with the daunting task of writing code.
The first time we introduced robots, the students used Line Code with the Ozobots. This was a highly successful activity that allowed the learners to further lower their affective filters. At the same time, they were able to raise their self-efficacy in regards to coding, helping to build a growth mindset. Students were able to have the Ozobots move around, change speeds, and change colors based on what was line coded.

Upon mastering the line code, students used their previous knowledge from code.org and OzoBlockly on their Chrome Books to begin block coding. This was done through the use of the OzoBlockly program and students were tasked with having the Ozobots knock over a set of bowling pins. This was a real situation in which students tried to solve the problem and went through a trial and error process to improve their code. This activity provided challenges beyond simply coding, as some of the students had difficulty transferring the program from OzoBlockly into their Ozobots. This was overcome by sharing the Ozobots, as some of them picked up the code from the Chrome Book more effectively than others. In the end, most of the students successfully completed this task.

We also used Dash and Dot robots. In this step, students used their knowledge of block coding and added the ability to record sound and voice, which made these robots useful in cross-curricular work. Students programmed Dash to move through a map of the solar system, stopping at different points to explain about the different planets or other heavenly bodies at each point. This integrated science and technology lesson is an example of how Dash and Dot robots can be used in a cross-curricular setting. It is also possible to program them to move
through story maps, timelines or steps in a process to integrate them into other curricular settings, so that the use of robots is not just for the sake of using robots.

Our final robot used was the Lego Mindstorms. This complex robot includes sensors and motors and can be built to custom specifications for specific purposes. While we did not require it, it is possible to design, build and program a completely autonomous Lego Robot by using the included infrared or touch sensors.

In our summer program, students went through the engineering process with their robots. Students identified a real world purpose or problem that, they believed, could be addressed by a robot. Next, they designed a robot to address their purpose or problem. After that, they coded the directions for their robot. After testing, students were either encouraged to improve the physical design of their robot or the code written to direct their robot. We had groups design everything from cookie frosting robots to cleaning robots to robots that helped do the laundry by folding shirts.

Students improved their product in a number of ways. The most common fix made was that students saw weak structural parts of their robots and students designed ways that the robots would be able to complete their tasks without falling apart, or having parts separate from the rest of the robot. Another fix was students realizing that they may have overbuilt their robot to look aesthetically pleasing and that some parts had no utility at all, and could be removed. On the code side, one of the most common fixes was that students worked hard not to omit steps and to carefully measure whether a particular step went too far, or not far enough. We found it helpful for students to use flow charts to check
their programming so that they could see what worked well and what needed to be improved. We also provided scaffolds for the groups that were having trouble. If a group needed extra support we directed them to the Lego education web site where there are instructions for some robots. The students would then be responsible for building the robot with the pre-set instructions and writing their own code independently. The scaffold was necessary due to the 4-week time constraint.

Finally, we interspersed field trips to connect what we were doing to the real world. At the California Science Center in Downtown Los Angeles students visited the space shuttle and saw replicas of mission control. This matched our previous summer’s theme, which was Mission to Mars. It also showed real life applications of coding and how it is used on Mankind’s greatest endeavors. While at the Downey Science Center, students programmed robots to complete specific missions on a space-themed board. This gave them the opportunity to step outside of what they were working on and allowed them to try a different programming task. The Downey Science Center also houses different technologies and models used for space travel, as well as numerous hands-on Science, Technology, Engineering and Mathematics (STEM) exhibits. Finally, our trip to Legoland gave students the experience of life-sized robots and their interaction with the world. One of the most popular rides of the day was the robotic arm. In this ride, students boarded a car at the end of a fully articulating robotic arm. Students chose the thrill level they wanted to experience, and the robotic arm then moved through the pre-set sequence, all while the children rode along in the car.
All of this was done while maintaining reading and math skills through daily practice. We were able to run three groups of 6-7 students for 30 minutes each in both reading and math out of a four and a half hour day. Students were called out of their work teams to receive this instruction. This was all made easier through our partnership with the local Community College’s Teacher Preparation Program. This partnership allowed us to run the small groups, as well as have another adult supervise and advise the teams working on their robots. It also had the added benefit of exposing our students to college students who grew up in their community, had similar experiences to them, have a similar cultural background to them, and who also care about them. This is another way in which we hope to inspire our students to set high goals for their future.

**What Was Said**

The response to our program was overwhelmingly positive. Our district administrators are excited about the depth in which our students are learning. One administrator stated, “It’s amazing. Not only did they identify unique problems, they were able to come up with solutions! This is what college and career readiness is all about.”

There was one parent who reported that her child, “Wanted to enroll in the class that went to Legoland.” While this sentiment did not reflect that the student or parent wanted to learn coding, it did show just how much word of mouth our field trips created when it came to recruiting students. This was especially helpful this year, as we were competing for enrollment with three other programs.
Upon explaining to a student that she was using math to complete her mission, she replied, “This isn’t math. Math is just numbers. This is fun!” Another student stated, “Before I thought it was going to be hard, but then after the class, I knew how to program. I think I could get a job with computers because I already know how to program and debug.”

When asked about their futures, responses were, “I would be good at engineering because I learned how to build robots.” And, “I think this class will help me in the future because I want to be a robotics engineer. And I could learn how the robots work.”

The teachers in the program also enjoyed and learned from the experience. One of our partners said, “This is what teaching should be. Students being exposed to 21st century skills, students that are engaged, students that want to be here everyday, ready to learn. It was a joy teaching this summer program.”

As far as self-efficacy and growth mindset, students stated, “I feel more comfortable with solving problems because I did things I was never able to do before.” And, “It helped me with problem solving. I feel confident that I am asked to check on something robotic I can find out what needs to be made right.” As can be seen from these student interviews, students grew tremendously in our four-week program and are excited about their possibilities for the future.

**Conclusion**

Teaching The Summer Coding and Enrichment has been an exhilarating experience, pushing us out of our comfort zone and grow as educators. We feel
confident that this has made a difference in the lives of our students. Not only did we ensure that they worked on their fundamental and traditional skills during the summer, we exposed them to a 21st Century skill that should transfer, no matter what the future of technology brings. Our success as a program can be measured by one student who simply said, “I am a programmer.”
References


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Hawaii International Conference on Education, January 5-8, 2019  
Proceedings Submission  
Submitted: July 7, 2018

1) **Title of the Submission:** Career Education Implementation into the Grade 4 English Language Arts and Health & Life Skills Curriculum: Teaching Foundational Career Planning Skills

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Abstract

The following unit plan was implemented into a Grade 4 class in Southern Alberta, and was integrated into the English Language Arts and Health and Life Skills curriculum. The unit plan sought to introduce self-awareness as a career-planning skill through various lesson activities, presentations, and class discussions. Activities were rated on their effectiveness at achieving learning outcomes. Students also provided feedback on the overall helpfulness of the unit’s content. 69% of students agreed that the unit helped them learn a lot about themselves; 100% of students reported that the unit helped them learn a lot about careers; 100% of students stated they were excited about what they could do with their lives; and 85% of students reported that the unit made them want to learn more about different careers.

Keywords: career development, curriculum and career integration, elementary career planning, goal-setting, self-awareness
Career Education Implementation into the Grade 4 English Language Arts and Health & Life Skills Curriculum: Teaching Foundational Career Planning Skills

Introduction

Many of Alberta’s youth are uncertain of their career path upon graduating high school (Witko, Bernes, Magnusson, & Bardick, 2006). For this reason teachers are integrating their curricular objectives and lesson activities with future career-oriented learning outcomes. Effective career planning requires a substantial degree of self-awareness (Bardick, Bernes, Magnusson, & Witko, 2006; Code & Bernes, 2006). Foundational career planning skills such as self-awareness are often lacking in today’s youth, and thus educators seek to ameliorate this problem by introducing self-exploratory skills at an early age (Magnusson & Starr, 2000). Young children are surprisingly adept at understanding the importance of finding a suitable career for their futures (Super, 1957). The purpose of building career planning skills such as self-awareness, is not only to aid the student in attaining a meaningful career, but in . Harnessing a child’s imagination is the critical requisite to unlocking a child’s capacity to self-explore. If a child’s abundant aptness to dream can be directed towards career-oriented goals, a new generation of career-competent, self-wise youth may emerge to address Alberta’s volatile job market. The following career unit was designed to be integrated into Alberta’s English Language
Arts and Health & Life Skills curriculum, and pays special emphasis onto the processes of self-exploration and imagination.

**Context of the Teaching Environment**

The proposed unit plan was implemented into a Grade 4 classroom of 13 students, in a rural Catholic school in Southern Alberta. Each lesson spanned approximately two 30 minute periods, once a week, over the course of 10 weeks. The school was located in a small town of approximately 1700 citizens and served a school population of 175 students with 12 teachers and 10 support staff. The large majority of the students’ families worked on local farms, or in one of the small local businesses.

**Unit Plan Objectives**

The unit plan sought to fulfill the following objectives:

Students will:

1. Identify their interests, talents, and skills through a variety of initiation activities.
2. Students will explore a variety of occupations and gain insight into the roles and responsibilities of different jobs.

Furthermore, the unit plan was designed to be cross-curricular in nature, and fulfilled learning outcomes pertinent to Alberta’s Health and Life Skills and English Language Arts curriculum.

**Health and Life Skills Objectives Achieved**

The following learning outcomes as outlined by Alberta Education were achieved by the unit plan:

- L-4.5 - relate personal interests to various occupations.
- L-4.6 - recognize that personal roles will change over time and circumstance.
- L-4.2 - identify ways individuals continue to learn throughout their lives.
L-4.3 - demonstrate effective decision making, focusing on careful information gathering; e.g., evaluating information, taking action and evaluating results.

L-4.4 - distinguish among, and set, different kinds of goals; e.g., short-term and long-term personal goals.

L-4.7 - describe the impact of service contributions on self; e.g., increase in self-worth, confidence and understanding of others. (Alberta Education, 2002)

English Language Arts Objectives Achieved

The following learning outcomes within Alberta’s Grade 4 English Language Arts curriculum were achieved by the unit plan:

4.3.2 - present to peers ideas and information on a topic of interest, in a well-organized form.

4.3.2 - add interest to presentations through the use of props, such as pictures, overheads and artifacts.

4.3.5 - give constructive feedback, ask relevant questions, and express related opinions in response to oral and visual presentations.

5.1.4 - use appropriate language to acknowledge special events and to honour accomplishments in and beyond the classroom. (Alberta Learning, 2000)

Detailed Description of the Unit Plan

Lesson 1: Getting to Know Me
Title page and unit binder. Students were provided with a binder that would be used to store the entire unit’s activities. Moreover, the students were to create a title page for their binder, titled *I Am Unique*, and were to decorate the title page with pictures or words that they believed described their unique individuality.

Bio-poem. The first lesson endeavoured to allow students to begin the process of self-exploration that would serve as the foundation for the rest of the unit’s theme. Students were tasked to create two bio-poems—a poem meant to highlight various facets of each student’s individuality. A template and example of a bio-poem was provided for students to follow (see Appendix A). Students were also allowed to bring any pictures, stickers, or craft supplies that would be used to decorate and personalize their poem.

Interest Inventory. As a way for the teacher to gain insight into the individualities of each of her students, as well as to create an opportunity for the students to gain greater self-awareness, the class was to complete an interest inventory (see Appendix B). The inventory consisted of questions that required students to reflect upon their self-interests.

**Lesson 2: Furthering Self-exploration and Reinforcing Self-knowledge**

Bio-poem presentation. During the first 15 minutes of the lesson, students were to choose one bio-poem from the previous week’s lesson, and were to transfer their bio-poem onto a large poster board which they were required to decorate and personalize with provided craft materials. Upon completing their pride posters, the next 15 minutes were dedicated to allowing each student to present their poster to the class and read their poem aloud. The teacher engaged in a brief discussion with each presenter and highlighted the presenter’s personal strengths, interests, and characteristics as conveyed in his or her poster. This activity served to reinforce each student’s sense of identity and self-knowledge.
Pride Story. As a way to facilitate greater self-exploration, students were to write a story that was to recount a particular event or experience they were proud of. Their story was to include: a chronological description of the event; an explanation of why they were proud to tell the story; what goals they achieved and how they achieved them; and what personal strengths or characteristics were displayed. The students were given 15 minutes to complete their story. Upon completing their story, the class was divided into three groups, where students were given the opportunity to share their stories for the remainder of the period. Each group was assigned a teacher or teacher’s assistant to facilitate a brief discussion at the conclusion of each student’s story. The facilitator was provided with a worksheet that was to be completed for every student (see Appendix C). The worksheet contained activity instructions, a set of questions to guide the discussion, and a space to write a brief synopsis of the student’s story. Using the guide-questions, the facilitator was tasked to aid the group in identifying the presenter’s personal skills, interests, characteristics, and talents. These traits were to be written onto the worksheet, and was to be given to the presenter at the conclusion of the discussion.

Lesson 3: Dreaming About the Future

Dream star activity. As a way to get students to begin thinking and dreaming about their futures, the students were tasked to create a dream star. Prior to the commencement of this activity, the students were instructed to close their eyes and reflect upon their futures. The teacher asked the students to imagine where they hoped to live, what careers they were employed in, and to identify their feelings as they imagined an ideal day in their future. When the guided imagery activity finished, each student was then provided with a cut-out of a star, that was to be personalized and decorated with provided craft materials. The star was to contain the student’s name, as well as a future dream or goal. Once students completed their stars, the teacher hung
each star onto a bulletin board. In the remaining few minutes of the class, the teacher advised the students to bring the following materials that were required for Lesson 4’s activity: a cardboard box (preferably a shoe-box); some newspaper or magazine clippings; pictures of people, places or things that inspire them.

Lesson 4: Finding Meaning

**Dream chest activity.** The cardboard box served as the student’s *dream chest* which was to be personalized and decorated by the student. Craft materials were provided for this purpose; students were also allowed to use the pictures or clippings they brought from home. Students could place into this box, anything they felt was especially meaningful, such as: family photos, pictures of role models, poetry, song lyrics, or any small tokens of deep significance. Each box contained a piece of paper with the description of the dream chest’s purpose (see Appendix C). Students were allowed to bring their dream chests home at the end of the day. The purpose of having this chest was to get students to think about what they found meaningful in life, and perhaps to use this chest as a source of encouragement and inspiration.

Lesson 5: Early Goal Formation

**When I’m 64.** The teacher played the song *When I’m 64* by the Beatles—a song about a man who describes what his life might be like at the age of 64. The song lyrics describe the interests and activities the singer hopes to be doing with his loved one at the age of 64, such as gardening, playing with grandchildren, and owning a cottage. Students were then tasked to create a chronological timeline of what they wished to achieve by the time they are 64 years old. The activity’s marking rubric was also discussed, and provided for the students so they knew what was expected from them (see Appendix D). The purpose of this activity was to get students to start formulating future goals, and to continue dreaming about their futures.
Lesson 6: Heroes and Role Models

**Hero worksheet.** The lesson began with a discussion on what makes a person a hero or role model. The students’ ideas were written on the board. The class came to the conclusion that a hero or role model is someone who has admirable characteristics or accomplishments. The teacher then provided the class with a worksheet (see Appendix F) where students were to: name their hero; provide a reason as to why they believed the person is a hero; draw their hero; list the characteristics they admired in their hero; their hero’s accomplishment(s); and write down anything they wished they could say to their hero. Lastly, they were to answer the three self-exploratory questions on their worksheet which required the students to reflect on how they viewed their family’s chosen careers.

Lesson 7: Introducing Career Exploration

**Career brainstorming.** The topic of career exploration was introduced through a brainstorming activity where students were put into small groups, and were tasked to generate as many job titles they could possibly come up with. After approximately 15 minutes of brainstorming, the groups were dissolved and each group submitted their list of job titles to the teacher. The teacher then created a web of all of the generated career titles onto the board.

**Career family tree.** Students were provided with a family tree template to take home and complete for the lesson (see Appendix G). They were required to research the occupations of the immediate members of their family, and write down their family members’ occupations onto the worksheet’s respective fields.

Lesson 8: Exploring Career Ideas

In order to expound upon the job descriptions of the common careers found in the local community, the two following games were employed:
Career bingo game. A bingo card was given to every student; the card’s matrices contained the job titles of various careers, chosen randomly from a list of 50 local jobs. The teacher read aloud a job description, whereupon the students were to daub-out the description’s corresponding job title on their bingo card. At the conclusion of every bingo round, the teacher provided her class with the answers. A brief explanation of every career involved in the bingo round was also provided by the teacher at the end of every game.

“Who am I” game. The teacher wrote down a job title onto a flashcard, and chose one student to stand at the front of the class and assume the role of his or her job title as prescribed by the given flashcard. The class was to guess the chosen student’s occupation by asking the student “yes” or “no” questions. The student who correctly guessed the given occupation then became the one to stand at the front of the class to assume another prescribed job title.

Lessons 9: Career Day

Guest-speaker presentations. An entire day was dedicated to this final lesson. Three guest-speakers were invited to share their career experiences with the class. Each student was tasked to generate two questions for every guest-speaker, which they were to write onto a provided worksheet (see Appendix H). Between every presentation, the class engaged in discussion, shared what they learned about careers, or played one of the games from Lesson 8 (see Appendix I).

Evaluation of Unit Plan Effectiveness

Formative Assessment Method

The teacher gauged student interest and engagement through verbal feedback provided by the students at the conclusion of each lesson. Furthermore, students could also complete an exit slip at the end of each week where they could state what they liked or disliked about any
particular lesson. Levels of excitement and commitment to completing assignments were also continuously monitored.

**Formative Assessment Results**

Overall, students were generally quite receptive to the lesson material, and were quick to provide positive verbal feedback. They especially enjoyed sharing what they learned with one another, and were eager to express their hopes and dreams for the future. Many students remarked that they especially looked forward to the career class, and were even more excited when they were told that an entire day was dedicated to learning more about careers (Lesson 9).

**Summative Assessment**

**Part 1.** Students were to indicate whether or not they completed the unit’s core activities.

Table 1

*Part 1: Completion of Activities*

<table>
<thead>
<tr>
<th>Activity</th>
<th>I didn’t do it</th>
<th>I did it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bio-poem and Presentation</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
</tr>
<tr>
<td>Pride Stories</td>
<td>1 (8%)</td>
<td>12 (92%)</td>
</tr>
<tr>
<td>Dream Star</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
</tr>
<tr>
<td>Dream Chest</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
</tr>
<tr>
<td>When I’m 64</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
</tr>
<tr>
<td>Heroes &amp; Role Models Worksheet</td>
<td>1 (8%)</td>
<td>12 (92%)</td>
</tr>
<tr>
<td>Career Brainstorming</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
</tr>
<tr>
<td>Career Family Tree</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
</tr>
<tr>
<td>Career Bingo Game</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
</tr>
<tr>
<td>Who I Am Game</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
</tr>
<tr>
<td>Career Day</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
</tr>
</tbody>
</table>
Part 2. Students were asked to provide feedback on the overall helpfulness of each lesson’s core activity. The results of their feedback are as follows:

Table 2

Part 2: Helpfulness of Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Not good at all</th>
<th>Good</th>
<th>Great</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bio-poem and Presentation</td>
<td>0 (0%)</td>
<td>2 (15%)</td>
<td>11 (85%)</td>
</tr>
<tr>
<td>Pride Stories</td>
<td>0 (0%)</td>
<td>2 (15%)</td>
<td>11 (85%)</td>
</tr>
<tr>
<td>Dream Star</td>
<td>0 (0%)</td>
<td>1 (8%)</td>
<td>12 (92%)</td>
</tr>
<tr>
<td>Dream Chest</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
</tr>
<tr>
<td>When I’m 64</td>
<td>0 (0%)</td>
<td>1 (8%)</td>
<td>12 (92%)</td>
</tr>
<tr>
<td>Heroes &amp; Role Models Worksheet</td>
<td>1 (8%)</td>
<td>1 (8%)</td>
<td>11 (85%)</td>
</tr>
<tr>
<td>Career Brainstorming</td>
<td>1 (8%)</td>
<td>0 (0%)</td>
<td>12 (92%)</td>
</tr>
<tr>
<td>Career Family Tree</td>
<td>1 (8%)</td>
<td>2 (15%)</td>
<td>10 (77%)</td>
</tr>
<tr>
<td>Career Bingo Game</td>
<td>0 (0%)</td>
<td>2 (15%)</td>
<td>11 (85%)</td>
</tr>
<tr>
<td>Who I Am Game</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
</tr>
<tr>
<td>Career Day</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
</tr>
</tbody>
</table>

Note: Overall on average, 98% of the students rated the activities as either good or great.

Part 3. The final part of the evaluation required that students indicate the unit’s effectiveness at achieving its goals. They were to respond to the following four statements pertinent to the unit’s objectives:

Table 3

Part 3: Evaluation of Career Planning Unit
**INTEGRATING CAREER PLANNING EDUCATION**

<table>
<thead>
<tr>
<th></th>
<th>I Don’t Agree</th>
<th>I’m Not Sure</th>
<th>I Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. This unit helped me to learn a lot about myself.</td>
<td>1 (8%)</td>
<td>3 (23%)</td>
<td>9 (69%)</td>
</tr>
<tr>
<td>2. This unit helped me to learn a lot about careers.</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
</tr>
<tr>
<td>3. This unit made me excited about what I could do with my life.</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>13 (100%)</td>
</tr>
<tr>
<td>4. This unit made me want to learn more about different careers.</td>
<td>0 (0%)</td>
<td>2 (15%)</td>
<td>11 (85%)</td>
</tr>
</tbody>
</table>

*Note: Overall on average, 89% of the students agreed that this unit met all of the objectives*

**Discussion of Results and Future Directions**

One surprising outcome of this unit was the sense of classroom community the students established. Much of the unit’s content involved a large degree of sharing and listening to the thoughts of others. As the unit progressed, the students became increasingly open and deeply communicative with one another. Students were notably excited to share what they learned, and eager to express their thoughts when engaged in class discussion. Moreover, they were also remarkably motivated to listen to the thoughts and ideas of their peers. Group activities proved to be the most well-received. As students shared their hopes and dreams with each other, they began to identify commonalities between one another which led to a greater overall tenor of respect for every member of the classroom. A continuous emphasis on the affirmation of personal strengths, characteristics and skills was likely a major contributing factor to each student’s growing confidence, and trust in one another. In the future, personal strengths in the context of building a sense of community should be the overarching theme of any career unit.
A lack of time was the greatest constraint to attaining the unit’s objectives. Several students actually asked to research specific careers they felt were fitting to their personal strengths and skills. A research assignment and presentation was originally scheduled into the unit plan, but due to time constraints, the final lesson was set aside. For future implementation, perhaps the unit could be integrated into other school subjects in order to spread out each lesson’s content and thus will allow for a greater coverage of lesson material. For example, research could have been conducted during the class’ computer period, and the unit’s artistic projects that required craft material could have been integrated into the art period. Potential subject areas readily amenable to the unit’s goals are Alberta’s Social Studies curriculum, Information and Communication Technology curriculum, and Art curriculum.

Conclusion

As students slowly mature into adulthood, we as educators carry the responsibility of ensuring that the child learn the necessary skills to be successful in adulthood. Educators must consider the long-term implications of the subjects they teach. If students are not provided with the opportunity to build upon their career-planning skills they are ultimately being done a disservice. The field of education is thus moving towards a more career-oriented agenda. As evidenced by this unit plan, integrating career education into the present curricula to achieve cross-curricular objectives is relatively easy to achieve. If we can harness our students’ imagination towards their future careers, we can look forward to a new generation of successful individuals who are not only confident in their competencies, but will pass these same skills onto a new generation of youth.
References


Appendix A
Templates

Template #1:
Line 1: I am... (Use any number of words to describe yourself)
Line 2: I wonder... (What do you want to know about life?)
Line 3: I hear... (What sounds do you hear in your mind?)
Line 4: I see... (What sights do you see with your mind’s eyes?)
Line 5: I want...
Line 6: I am... (Same as first line)
Line 7: I pretend... (What do you pretend to be or do?)
Line 8: I believe
Line 9: I touch... (What do you reach out and touch)
Line 10: I feel
Line 11: I worry... (that... about... over... when... etc.)
Line 12: I cry
Line 13: I am... (Same as the first line)
Line 14: I understand... (What do you understand in life?)

Template #2:
Line 1: Your first name only
Line 2: 3 traits (characteristics) that describe you
Line 3: Sibling of...
Line 4: Lover of... (any number of people or ideas)
Line 5: Who feels... (any number of items)
Line 6: Who needs... (any number of items)
Line 7: Who gives... (any number of items)
Line 8: Who fears... (any number of items)
Line 9: Who would like to see... (any number of items)
Line 10: Resident of (your city), (your road name)
Line 11: Your last name only

Appendix B
INTEREST INVENTORY

My name is ___________________________________________________

My favourite school subjects are ______________________________________________

My friends are _______________________________________________________________

I like to read books about _____________________________________________________

Things I like are ______________________________________________________________

My favourite colour is _________________________________________________________

In my free time I like to _______________________________________________________

My favourite food is __________________________________________________________

My favourite movie is _________________________________________________________

In the future, I would like to be a _______________________________________________

My favourite sport is _________________________________________________________

Things I dislike are ___________________________________________________________
My Pride Story!

Instructions: During this guided pride story, each student will share a story with their group about something they have been proud of. As the facilitator you can guide the conversation with the following questions.

1. What is something you have done that you were very proud of?
2. Why were you proud of this?
3. How did it make you feel?
4. How did it make other people feel?
5. Who else was involved in helping you achieve your goal?
6. What were the steps you took in achieving your goal?
7. How long did it take you to achieve it?

Brief description of pride story:

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

As a group you will then determine different skills, interests, characteristics, and abilities the student has based upon the details they shared to you of their story. You will list these below and give this list back to the student.

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

Appendix D
MY DREAM CHEST!

You will be decorating a dream chest that is your own personal treasure. This is something I hope you will keep and add to for as long as you want. In this chest you can include pictures from newspapers, magazines, family photos, cartoons, special trinkets, poems, songs, etc. These things should relate to your interests, dreams, inspirations and goals. You can also include stories and pictures of people that you consider to be heroes and role models. You can add to your dream chest anytime you want and this chest is something you can choose to share with the class if you would like or just with me at the end of our unit. This box can be something you visit when you need encouragement or inspiration. It’s a personal thing that the class needs to respect and no one should go in someone else’s dream box without their permission.

I hope you enjoy your dream chest and that it helps you to follow and achieve your dreams!! Remember to always Dream Big!
"When I'm 64" Rubric

You will receive a mark out of 4 on your brainstorm or timeline:

4: 25+ ideas that show thoughtfulness, genuine reflection, dreaming, and creativity.

3: 20+ ideas that show some thoughtfulness, reflection, dreaming, and creativity

2: Less then 20 ideas. Display some thoughtfulness, limited reflection, needs to dream more and be more creative.

1: Less than 10 ideas. Needed more thoughtfulness, reflection, dreaming. Could have been more creative.
MY ROLE MODEL!

NAME: ________________________ DATE: ________________________

Draw a picture of your hero or role model. A hero and role model are people you look up to and inspire to be like in some ways. You can admire them for many reasons including their skills, talents, personality, etc.

My role model is __________________ because __________________

A picture of my role model:

What are some characteristics your role model has that you admire? (List at least 6)

What are some of the things your hero has accomplished?

If you could tell your hero or role model one important thing, what would it be?

Appendix G
Career Family Tree Worksheet

Take a look at the careers chosen by your grandparents, parents, aunts, uncles, and other relatives.

It's fun to think about how family members' career choices have influenced their lives—and it may help you identify things you want and don't want in a career. Fill in each box with the career of the listed person. Add boxes for more aunts, uncles, cousins, brothers, and sisters if you can.

Grandfather's Career  Grandmother's Career  Grandfather's Career  Grandmother's Career
Aunt's or Uncle's Career  Aunt's or Uncle's Career  Father's Career  Mother's Career
Brother's or Sister's Career  ME!  Brother's or Sister's Career

Are there career areas that several of your relatives have pursued? If so, list them here.

________________________________________________________________________

How have your family members' career choices changed over time?

________________________________________________________________________

What do your relatives tell you about reasons to choose or not choose careers like theirs?

________________________________________________________________________

Appendix H
Career Day!

My Questions for our Guest Speakers!

1) My questions for Constable (XXXXX)

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

2) My questions for CTV News Broadcaster Ms. (XXXXX)

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

3) My questions for Country Singer Mr. (XXXXX):

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Appendix I
Grade 4 Career Day!
Itinerary (What’s going on?)

8:40–9:20: Guest speaker: Constable XXXXX from the RCMP

9:20–9:40: Talking Sticks: Work on your talking sticks for a later activity.

10:00–10:40: Guest speaker: Ms. XXXXX from CTV News

10:45–11:30: Talking Circle Activity: Sharing our career family trees.

11:30–12:15: Lunch Break

12:15–12:55: Career Bingo

12:55–1:15: Career Flashcards: Who am I?

1:20–2:05: Guest speaker: Mr. XXXXX – Country singer

2:05–2:15: Recess

2:30–3:00: Mr. XXXXXX Concert

3:00–3:10: Wrap Up Discussion
1) **Title of the Submission**: Teaching Career Planning Skills at the Grade 3 and 4 Level: Cross-curricular Career Education Implemented Within Alberta’s English Language Arts and Health and Life Skills Curriculum

2) **Names of the Authors**: Kristen Grabham, Kerry B. Bernes, and Jonathan Roque

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Abstract

A Career Education unit was integrated into Alberta’s Grade 3 and 4 English Language Arts and Health and Life Skills curriculum and was implemented in two classrooms in a rural elementary school in Southern Alberta. The unit’s objectives emphasized three dimensions of Career Education: self-awareness, career exploration, and goal-setting. Cross-sectional data revealed 89% of the students surveyed rated the activities as either Good or Great; 32% reported that the unit helped them learn a lot about themselves, 50% agreed that the unit helped them learn more about careers, 71% reported that the unit made them more excited about what they could do in their lives, and 68% reported that the unit made them want to learn more about different careers.

Keywords: career development, curriculum and career integration, elementary career planning, goal-setting, self-awareness
Teaching Career Planning Skills at the Grade 3 and 4 Level: Cross-curricular Career Education Implemented Within Alberta’s English Language Arts and Health & Life Skills Curriculum

**Introduction**

A significant portion of Southern Alberta’s youth are undecided and unclear in their career direction upon graduating high school (Witko, Bernes, Magnusson, & Bardick, 2006). The overarching premise of Career Education is that early implementation by educators can serve a role in attenuating this time of uncertainty by introducing career planning skills to their students at an early age, thus allowing such skills to develop over time (Magnusson & Starr, 2000; Witko et al.). The three fundamental dimensions of personal Career Education that are imperative to building career planning skills are: self-awareness, opportunity-awareness, and decision and transition learning (Watts, 1998). These dimensions can easily be integrated into the current teaching curricula to effectively achieve learning outcomes that can establish and build upon a student’s career planning skills (Gitterman, Levi & Ziegler, 1993). The following unit plan targeted early learners at the Grade 3 and 4 level, and effectively employed career-oriented activities to achieve learning outcomes in Alberta’s English Language Arts, and Health and Life Skills curriculum.
Context of the Teaching Environment

The proposed unit plan was implemented in two Grade 3/4 split classrooms in a rural elementary school in Southern Alberta. One classroom contained 17 students, and the other contained 19. Students were within 8-10 years of age, many of whom were several grade levels below their expected reading and writing ability. Many of the students’ families were within lower socioeconomic brackets.

Learning Outcomes Achieved by the Proposed Unit Plan

Unit Objectives Achieved

The unit’s learning outcomes endeavoured to achieve the following:

Students will:

1. Gain self-knowledge in regards to personal interests, strengths, and skills.

2. Discover careers amenable to one’s individuality.

3. Begin to develop future career goals.

The following outcomes retrieved from Alberta’s English Language Arts, and Health and Life Skills Curriculum for Grades 3 and 4, were accomplished by the proposed unit:

Health and Life Skills Objectives Achieved

The cross-curricular objectives achieved by the unit in the Health and Life Skills curriculum are as follows:

*Life Learning Choices: Students will use resources effectively to manage and explore life roles and career opportunities and challenges.

*Students build upon the knowledge, skills and attitudes required to recognize opportunities, critically evaluate options and expand career strategies to meet current and future challenges. Students build upon the knowledge, skills and
attitudes required to recognize opportunities, critically evaluate options and expand career strategies to meet current and future challenges.

L–4.5 Relate personal interests to various occupations.

L–4.6 Recognize that personal roles will change over time and circumstances.

L–4.2 Identify ways individuals continue to learn throughout their lives.

L–3.5 Examine personal skills and assets; e.g., physical, verbal, intellectual.

L- 4.5: The student will relate personal interests to various occupations. (Alberta Learning, 2002)

**English Language Arts Objectives Achieved**

The cross-curricular objectives achieved by the unit in the English Language Arts curriculum are as follows:

1. Students will select from others’ ideas and observations to express personal understanding:

2. Communicate ideas and information in a variety of oral, print and other media texts. (Alberta Learning, 2000)

**Detailed Description of the Proposed Unit Plan**

**Lesson Activities Employed**

All of the unit’s lessons consisted of at least one of the following: class discussion, website exploration, and journalling. Each lesson was done within 30-40
minute class periods over a timespan of 6 weeks, with the exception of Lesson 3, which encompassed three periods. Journal entries and discussions typically took 10 minutes.

Lesson 1: The Importance of Career Education

Discussion on careers, self-knowledge, and goal-setting. The class began with the teacher writing the following statement on the board: “The word ‘career’ means…” Students were divided into groups of three to discuss the question for approximately ten minutes. Each group was then required to share their ideas with the rest of the class, whereupon the teacher could engage the class in a discussion around each group’s idea. This discussion served to indicate the students’ level of understanding on the topic of careers, as well as encourage the students to think about their own career prospects. One student aptly stated, “We are too young to think about our careers right now… I’m only nine years old!” This student’s statement allowed the teacher to address the overarching objectives of the unit: students do not necessarily need to decide upon their definitive future career, but to gain self-awareness--and continue to build upon their self-knowledge--so as to more effectively address this decision when they do reach the age when they must begin to choose a lifelong career. Moreover, the teacher explored the idea of goal-setting, and how effective career planning was directly related to attaining life goals. The following statement was used to prompt further reflection: “If you know where you want to go, you will end up where you want to be.” The teacher then called upon several members of the class to re-explain--in their own words--the relationship between goal-setting, career planning, and self-awareness.

Lesson 2: Looking Forward to the Future
Story and Discussion. Lesson 2 began with reading the book, *Scaredy Squirrel* by Melanie Watt. The story was about a squirrel who would rather stay in his safe and familiar tree, and followed a carefully planned routine. The squirrel did not like taking risks, or venturing beyond his home—that was until he fell from his tree and discovered a flying squirrel. The two characters then went on various adventures together, which changed the squirrel’s general outlook on life. The teacher asked her students to reflect upon, and verbally respond to the following questions:

1. What would you do if you were not afraid of failing?
2. What would you do if you were not afraid of looking silly in front of other people?
3. What do you think your special talents are?

The teacher emphasized that there were no right or wrong answers to her questions, but the students were to freely think and dream of any possibilities. The teacher then provided her own answers to the proposed questions.

Journalling one’s ideas. Students were to complete a journal entry in the context of the following writing prompt:

Imagine that you are 99 years old. I want you to take a moment and think about all of the accomplishments and experiences you have had over the last 90 years. Use the space to fill out all of these accomplishments (accomplishments can be personal, educational, and occupational.

The teacher explained that the students were not to limit themselves in terms of time or money—the only limit was their imagination. In order to aid the students in organizing their ideas, the teacher drew a chart on the board that contained the following sections:
(a) Skills I would like to learn; (b) Travel; (c) Education; (d) Art; and (e) Sports. The teacher jotted down several ideas under each section, and showed students how the chart could be used to create a journal entry by providing an example of an entry she created from her own chart.

**Concluding discussion on lesson activities.** The lesson was concluded with the teacher writing the previously introduced statement: "If you know where you want to go, you will end up where you want to be". The purpose of this discussion was to reinforce the concepts of self-awareness, goal-setting, and career planning, as previously covered by Lesson 1, and to stimulate deeper discussion. The class concluded that in order for effective goal-setting to take place, they had to learn about their unique personal characteristics, which encompassed their: (a) interests; (b) special skills; and (c) strengths. The students were re-directed to their charts and journal entries where they were to identify and add their unique personal characteristics to their journal entries based on what they had just learned from the discussion.

**Lesson 3: Exploring Careers**

**Using online resources.** The students were to bring their journal entries to the computer lab, where they were to explore the Career Cruising website ([www.careercruising.com](http://www.careercruising.com)). They were also to re-read their journal entries, and thereupon read through the various careers profiles on the website. They were then to pick one career from the website to focus on, based on their current self-knowledge. They were to write a journal entry on their chosen career, and were to include as much information as possible about the career, as well as reasons as to why they felt they
would be good at it. The teacher engaged in a brief discussion with every student in the class to aid in their exploration. Due to time constraints, the students were not required to decide upon a final career-focus in one class. Career exploration was thus extended into several class periods over the span of two weeks.

Lesson 4: Furthering Self-exploration

**Journalling and sharing.** Since Lesson 3 encompassed several class periods, Lesson 4 was completed within the same span of time as Lesson 3. Much like Lesson 1, students were to journal their responses to the following prompts:

1. If you had the day off and could do anything you wanted to do, what would it be?
2. If you could surf the internet or read a book about anything, what would it be about?

The journal prompts were written on the board, and the teacher emphasized that the students should be as imaginative as they could in their responses. The teacher also provided her own responses as an example journal entry. The class was allowed approximately 10 minutes to complete their journal response. Once all the students had completed their entry, they were to share their responses with the class. In order to convey a deeper understanding of the relationship between interests and career goals, the teacher led the class in a discussion revolving the following question: “How might my interests change and why?” The teacher paid special emphasis on the idea that as people grow, their lives change, and therefore so do their interests.

Lesson 5: Identifying Strengths
Group activities. This lesson’s activity was based on John Holland’s theory as adapted by Richard Bolle (2004), an imaginary exercise aptly named *The Party*, which postulates that work environments, and the individuals who work in them, can be classified into the following descriptive categories: (a) Realistic; (b) Investigative; (c) Artistic (d) Social; (e) Enterprising; and (f) Conventional. Students were then divided into six groups, which were distributed amongst the six stations that covered a specific descriptive category. Each station had a brief description of its respective category which students were to read aloud, as well as a related activity with accompanying instructions and materials (see Appendix A for the complete list of categories, descriptors, and activities used in this lesson). Each group was allowed five minutes for each station, and were to move onto another station once the teacher had indicated that five minutes had elapsed.

Evaluating Unit Effectiveness

Formative Assessment

Method. In order to gauge each student’s level of interest, and understanding of each lesson’s content, the teacher engaged in one-on-one discussions with each student throughout the various activities. The teacher asked her students to explain in their own words, what they had learned, what they were learning, and their overall interest in each activity. Moreover, these discussions served to clarify and reinforce lesson content.

Results. Students generally responded to lesson activities with excitement and eagerness. Most expressed that the lessons were personally meaningful, and led them
to believe that they could accomplish almost anything. Students were especially positive regarding activities that allowed them to imagine and explore their future possibilities. One critical dimension of the unit plan that required continuous modification and improvement was on teaching self-awareness skills. For example, many students requested more self-explorative activities, and activities that were more physical or “hands-on” in nature such as The Party exercise.

**Summative Evaluation**

The unit was evaluated through a three-part, self-report questionnaire (see Appendix) upon the conclusion of the unit.

**Part 1.** Students were to indicate their level of participation.

**Table 1**

*Part 1: Completion of Activities - Class 1*

<table>
<thead>
<tr>
<th>Activity</th>
<th>I did it</th>
<th>I didn’t do it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal Entry: “99 Years Old”</td>
<td>16 (100.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>Career Cruising</td>
<td>16 (100.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>Journal Entry: “If you had the day off...”</td>
<td>16 (100.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>The Party</td>
<td>0 (0.00%)</td>
<td>16 (100.00%)</td>
</tr>
</tbody>
</table>

Note: One student was absent, and did not participate in the survey

**Table 2**

*Part 1: Completion of Activities - Class 2*

<table>
<thead>
<tr>
<th>Activity</th>
<th>I did it</th>
<th>I didn’t do it</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Part 2. Students were to rate the helpfulness of the core activities found within the lessons. Helpfulness was defined as whether each activity was successful at helping the students to learn more about themselves, or learn more about careers. The results of Part 2 are as follows:

Table 3

*Part 2: Helpfulness of Activities - Class 1*

<table>
<thead>
<tr>
<th>Activity</th>
<th>Great</th>
<th>Good</th>
<th>Not good at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal Entry: “99 Years Old”</td>
<td>9 (56.25%)</td>
<td>6 (37.50%)</td>
<td>1 (6.25%)</td>
</tr>
<tr>
<td>Career Cruising</td>
<td>5 (31.25%)</td>
<td>9 (56.25%)</td>
<td>2 (12.50%)</td>
</tr>
<tr>
<td>Journal Entry: “If you had the day off...”</td>
<td>8 (50.00%)</td>
<td>6 (37.50%)</td>
<td>2 (12.50%)</td>
</tr>
</tbody>
</table>

*Note: Overall on average, 89% of the students surveyed rated the activities as either Good or Great.*

Table 4

*Part 2: Helpfulness of Activities - Class 2*

<table>
<thead>
<tr>
<th>Activity</th>
<th>Great</th>
<th>Good</th>
<th>Not good at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal Entry: “99 Years Old”</td>
<td>8 (44.44%)</td>
<td>6 (33.33%)</td>
<td>4 (22.22%)</td>
</tr>
<tr>
<td>Career Cruising</td>
<td>8 (44.44%)</td>
<td>10 (55.56%)</td>
<td>0 (0.00%)</td>
</tr>
</tbody>
</table>
IMPLEMENTING A CAREER-THEMED LANGUAGE ARTS UNIT

The Party 10 (55.56%) 6 (33.33%) 2 (11.11%)

*Note:* Overall on average, 89% of the students surveyed rated the activities as either *Good* or *Great.*

**Part 3.** The last portion of the evaluation measured the effectiveness of the unit in achieving its learning outcomes. The results of Part 3 are as follows:

**Table 5**

*Part 3: Evaluation of Career Planning Unit - Class 1*

<table>
<thead>
<tr>
<th></th>
<th>I Agree</th>
<th>I’m Not Sure</th>
<th>I Don’t Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. This unit helped me to learn a lot about myself.</td>
<td>5 (31.25%)</td>
<td>8 (50.00%)</td>
<td>3 (18.75%)</td>
</tr>
<tr>
<td>2. This unit helped me to learn a lot about careers.</td>
<td>8 (50.00%)</td>
<td>6 (37.50%)</td>
<td>2 (12.50%)</td>
</tr>
<tr>
<td>3. This unit made me excited about what I could do with my life.</td>
<td>12 (75.00%)</td>
<td>2 (12.50%)</td>
<td>2 (12.50%)</td>
</tr>
<tr>
<td>4. This unit made me want to learn more about different careers.</td>
<td>11 (68.75%)</td>
<td>4 (25.00%)</td>
<td>1 (6.25%)</td>
</tr>
</tbody>
</table>

*Note:* Overall on average, 56% of the students agreed that this unit met all of the objectives.

**Table 6**

*Part 3: Evaluation of Career Planning Unit - Class 2*

<table>
<thead>
<tr>
<th></th>
<th>I Agree</th>
<th>I’m Not Sure</th>
<th>I Don’t Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. This unit helped me to learn a lot about myself.</td>
<td>6 (33.33%)</td>
<td>10 (55.56%)</td>
<td>2 (11.11%)</td>
</tr>
</tbody>
</table>
2. This unit helped me to learn a lot about careers.
   - 9 (50.00%)
   - 8 (44.44%)
   - 1 (5.56%)

3. This unit made me excited about what I could do with my life.
   - 13 (72.22%)
   - 3 (16.67%)
   - 2 (11.11%)

4. This unit made me want to learn more about different careers.
   - 12 (66.67%)
   - 5 (27.78%)
   - 1 (5.56%)

Note: Overall on average, 56% of the students agreed that this unit met all of the objectives.

Discussion of Results and Future Directions

In light of time constraints, in combination with the diverse and complex learning needs of many of the students, creating a lesson that was personally relevant to every student proved to be immensely challenging—but accomplishable. Despite the generally positive reception of the unit’s activities, a significant portion (approximately half) of the students were unsure as to whether the unit helped them build self-awareness or learn more about careers. Nonetheless, most of these students (approximately three quarters) reported excitement regarding their future career prospects and were notably eager to learn more about different careers. These results imply that the career planning unit could have been significantly extended for more in-depth exploration of the various topics. A substantial limitation of the unit was its insufficient time provision. Had the unit been extended, it would be interesting to see if results for Part 3 of the evaluation would have differed. The unit without a doubt did a great job on getting kids excited about their futures and learning more about careers. Where the unit lacked, was in allowing for even greater exploration of the student’s individuality and how his or her unique identity related to the world of work. Students strongly implied throughout the course of the
formative evaluation that the unit kindled a desire to learn more about their careers, and that the unit should have been extended in order to fulfill the learning objectives; both classes came to a similar conclusion. The students requested for more of the same learning activities, but time limitations made this request unfeasible.

Students were notably committed to finishing an activity that involved high levels of variation and learning approaches, such as The Party exercise. Differentiated activities of various levels of sensory engagement are thus important in establishing an atmosphere of continuous learning and discovery. Activities that required a high degree of creativity and imagination were also notably successful. Students were able to generate unique responses that highlighted and clearly represented their unique individualities. Due to time constraints, 30-minute classroom periods seemed insufficient to accomplish journalling responses. Despite the marked success of every lesson’s activities, most students simply asked for more activities similar in nature to The Party. Future implementation could include career-oriented themes in other school subjects, beyond the ones prescribed in this unit plan. Doing so would allow for greater exploration of the unit’s content when allotted time to fulfill learning objectives is limited.

Conclusion

Teachers can effectively employ career-oriented units that can serve to be foundations for their students’ future careers. Young students who possess ample amounts of creativity are in a special position to use their imaginations to set meaningful goals for the future. Our role as educators is to build upon our students’ spirit of discovery and instill a love of learning that will transcend beyond scholastic settings.
Our students must be equipped with confidence in their competencies and knowledge of the world to effectively meet their future challenges set before them. If students can learn to dream and find inspiration in their discoveries, they may overcome the uncertainty that often confronts them when they must make important life decisions. Career Education is an effective avenue in fostering a student’s sense of aspiration, and can easily be embedded to meet the learning needs of almost any student. Educators serve a special role in not only instilling helpful life-skills, but also in helping their students to find meaning in their scholastic work, which we hope will enhance their future careers.
References


Appendix A

Station #1: Problem Solvers Group

Do you like to solve problems? Do you like math problems or word problems? Play this memory game and find out.

Instructions

*Look at the game on the SMART board.

*The members of your group will be taking turns trying to match the words that appear on the card.

Station #2: Artistic Group

Do you like to be creative? Do you like music? Do you like to draw or create stories?

Instructions

*You will see the game called Magnetic Mosaic.

*All of the members can choose to add magnets to the whiteboard together.

OR you can each draw a picture on your white boards and display them on your desk.

Station #3: People Persons

Do you like to teach your friends how to do things? Do you like to help people?

Instructions

*You will find two books at this station.

*In groups of two look at the pages that are marked. Read the page and explain what you have read back to the rest of the group.

OR explain to the group a skill you have just learned, something you like to do, or a really neat fact you know.

Station #4: The Builders
Do you like working with your hands? Do you like to build things?

**Instructions**

*You will find boxes of Lego at this station.

*In six minutes try to build the tallest item you can.

OR build anything you would like!

**Station #5: The Debaters**

Do you like to discuss your point of view? Did you like the debates we did in Social Studies?

**Instructions**

Discuss the following question

**Which of the five senses do you think is the most important?**

**Hearing / Seeing / Smelling / Touch/ Taste**

Try to convince your group members you are right!

**Station #6: The Organizers**

Do you like to work with numbers? Are you good at finding small details?

**Instructions**

*You will find various number tiles at this station

*Who can make the most combinations that add, subtract, or multiply to 100? 150? 200?

Example: $80 + 24 - 4 = 100$ OR $50 \times 2 = 100$
Appendix B

**Career Coaching Across the Curriculum: Student Evaluation Form**

I hope you enjoyed this project. Please complete this evaluation form.

**Part 1: Please let me know if you did the activities.**

<table>
<thead>
<tr>
<th>Activity</th>
<th>I didn’t do it</th>
<th>I did it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal Entry: “99 Years Old”</td>
<td>☐</td>
<td>☑</td>
</tr>
</tbody>
</table>
Part 2: Please let me know if you thought the activity was helpful by circling whether you thought it was “not good at all”, “good” or “great”.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Not good at all</th>
<th>Good</th>
<th>Great</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal Entry: “99 Years Old”</td>
<td>☐</td>
<td>☺</td>
<td>☺</td>
</tr>
<tr>
<td>Researching careers in the Oil and Gas Industry</td>
<td>☐</td>
<td>☺</td>
<td>☺</td>
</tr>
<tr>
<td>Journal Entry: “If you had the day off...”</td>
<td>☐</td>
<td>☺</td>
<td>☺</td>
</tr>
<tr>
<td>The Party</td>
<td>☐</td>
<td>☺</td>
<td>☺</td>
</tr>
</tbody>
</table>

What did you like about this lesson, unit plan or school wide intervention?
How could this lesson, unit plan or school wide intervention be made better?

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

Part 3: Please tell me how much you agree with the following statements by putting a checkmark in the box that best tells me how you feel:

<table>
<thead>
<tr>
<th>Activity</th>
<th>I Don’t Agree</th>
<th>I’m Not Sure</th>
<th>I Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>This lesson helped me to learn a lot about myself.</td>
<td>☹️</td>
<td>😊</td>
<td>😊</td>
</tr>
<tr>
<td>This lesson helped me learn a lot about careers</td>
<td>☹️</td>
<td>😊</td>
<td>😊</td>
</tr>
<tr>
<td>This lesson made me excited about what I could do with my life</td>
<td>☹️</td>
<td>😊</td>
<td>😊</td>
</tr>
</tbody>
</table>
This lesson made me want to learn more about different careers

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

Thank-you very much!
ABSTRACT

Background:
Intrinsic and extrinsic factors, including supervision, motivation, and social connectedness, can affect graduate students’ degree completion and time to graduation. Peer mentorship can promote the development of collaborative learning experiences that have positive impact on student resiliency and academic outcomes. The objectives of this study were to: 1) explore the extent to which peer mentorship promotes graduate students’ social connectedness, positive learning experiences, and academic goals; and 2) identify institution-level strategies to support the development of these relationships.
Methods:
We adopted a mixed methods design for this study. Data were collected through Likert-style online surveys and individual interviews. Sixty-two Master’s and PhD students were recruited from four professional faculties (Education, Medicine, Nursing, and Social Work) at a large Canadian University. Purposive maximum variation sampling facilitated the exploration of common and divergent attitudes and experiences across disciplines. Descriptive statistics were calculated for survey data. A constant comparative method of pattern identification guided the thematic analysis of our interview data.

Findings:
Peer mentorship positively affected students’ developmental outcomes across academic, psychological, and social learning domains. Survey data revealed that participation in these reciprocal peer mentoring relationships reduced student isolation (92.3%), increased understanding of academic cultures, and research topics (73.1%), improved the development of essential skills (73.1%), increased self-confidence (65.4%), and reduced academic stress (53.8%). Interview data highlighted the role of peer mentors in nurturing the development of learning experiences that emphasize community, collaboration, and shared purpose. Students preferred formal peer mentoring initiatives that incorporated early student matching, networking and social events, online forums, collaborative research opportunities, mentorship training, and flexibility to address the needs of a variety of learners.

Conclusions
Peer mentorship can enhance graduate students’ learning experiences and promote positive academic and psychosocial outcomes. While institutional initiatives can support relationship development, stakeholder input can enhance the effectiveness of such programs.
1. Title of the submission: Development of a Comprehensive Emergency Nurse Training Program

2. Name of the Author: Hazel L. Downing RN, MN. Ed.D.

3. Affiliations: Kuakini Medical Center and Hawaii Pacific University

4. Address: 45-045 Kamehameha Hwy, Kaneohe, HI 96744

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6. Abstract:

New nurses in emergency rooms (ER) require specialized training to meet the demands and skill requirements of a healthcare organization. New nurses must be trained to make sound judgements and think critically to ensure patient safety in highly intense work environments. The timeframe to train new nurses for the ER varies from two weeks to three months – depending on institutional policy, cost, and accreditation requirements. Besides timeframe, the problem in most ER training programs is that clinical experiences only involve the emergency department and begin after relevant educational material delivery through lectures. The current educational process can pose limitations in RN performance. The purpose of this study was to improve RN confidence and performance. An innovative teaching method was used to conduct a comprehensive emergency training program spanning eight weeks and featuring an online teaching-learning platform. The program was designed with multiple live lectures, simulations, experienced RN speakers, as well as weekly opportunities for direct patient care. This study sampled three new registered nurses and ten experienced nurses during an Emergency Academy training program at a medical center. The three RNs were also rotated to critical care units to understand a transition of patient care from the emergency room to other units. The textbook from the Emergency Nurses Association was utilized to develop and meet learning objectives. Data was gathered from the samples through discussions, written tests and formative and summative teaching evaluations. The transcribed data was then examined through a content analysis. Results indicated the innovative program allowed for immediate application of lecture to clinical experiences. The online platform promoted collaboration with the educator during any time of the day. The three new RNs highlighted ineffectiveness of the textbook since some of the
topics were covered very superficially. These RNs also pointed out some speakers chosen for the program lacked personal clinical experience and were not conducive to their learning. Results also emphasized the usefulness of supplemental learning material, online collaboration and various opportunities provided for application. The overall study concluded that the new RNs had an effective transition to emergency care. Confidence in skills increased with repeated simulations and practice. The experienced ER nurses in the study noted application of effective critical thinking, attention to detail, teamwork, and confidence in nursing skills from each new RN. This study has implications for emergency and other specialty nursing educators and hospital administration to critique current programs and supplement educational activities to promote patient safety.
A few exceptional BSN students have the opportunity to work with an RN preceptor during their senior year. Students assigned to a RN preceptor in a specialty unit are typically trained for about 12-14 weeks. The BSN preceptor students are usually exposed to clinical experiences with one assigned RN preceptor at a given specialty. Because each nursing student is trained for a single nursing specialty, the problem is these students may miss out on experiences connecting to other specific learning outcomes required in the BSN program. These experiences may range from basics on handling a cardio-pulmonary arrest situation, working with specific intravenous and arterial lines, administering common medications, familiarity with emergency interventions, and so on. However, these experiences may not be seen in all specialty areas on a routine basis. A faculty member oversees the experience of the BSN student preceptor but is not constantly present on the clinical unit. A case study sampled six senior BSN preceptor students working with different RN preceptors during a 12-week preceptorship at one university. The purpose of the study was to determine the relationship between extra emergency care simulation activities and preceptor student preparedness as a new graduate. To enhance learning, weekly meetings with the faculty and a simulation activity were added to the preceptor program. Students engaged in required simulated skills to supplement their learning. Simulations of a mock code, defibrillation, pacemaker, emergency drugs, chest tubes and use of intravenous and arterial lines were added to the preceptorship program to assist the students in gaining confidence in required skills. An immediate debriefing post simulation allowed the students to reflect, compare experiences, and ask questions. Furthermore, engaging the preceptor student with the faculty to share daily experiences and participate in meaningful discussions supplemented learning. Data
was gathered through observations, interviews, and a questionnaire. An analysis of the data concluded with two main findings: the preceptor student nurse was better prepared in emergency care and students gained confidence in decision-making as well as in application of relevant concepts required of a nurse graduate. This case study has implications for nursing education with preceptorship programs and for healthcare organizations training staff using RN preceptors. This study also provides scope for future research on topics: evaluation of preceptor skills in emergency care, improving engagement of student preceptor nursing skills, and engaging RN preceptors in simulation experiences for BSN preceptor students.
Virtual Field Trip—Quantum Leap

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Abstract

Classes go on actual field trips to supplement in-class learning and activities, visiting places such as farms and nurseries. The instructor contacts the farm or nursery owner, explaining the purpose of the visit and what the class would like to see. A date and time is finalized, and transportation is arranged. However, field trips have some shortcomings. They are limited to visiting places on the island of Oahu and close to the University of Hawaii because of the transportation costs and time. Once at the farm or nursery, it is sometimes difficult for everyone in the group to see or hear the speaker. Some students wander off from the group or are inattentive. Transportation can be costly. To complement field trips, I created the virtual field trip assignment. Each student contacts the owner of a farm or nursery, explains the assignment, and gets permission to visit for a personal tour. The student interviews the owner about the operation and takes pictures. Later, each student gives a PowerPoint talk in class about the farm and writes a report about the visit. The advantages of a virtual field trip include students are free to choose the farm or nursery that they want to visit. This could be a farm on another island in Hawaii, the US mainland, or in a foreign country. The student may be able to see and hear about things that the owner would not show or tell to a large group of students. The class gains experience in oral and written communication. This networking opportunity could possibly lead to an internship or a job. One of the things that did not work was when students were given the option of working in pairs, the work was sometimes not equally divided. Only one student in a group visited the farm or nursery. In conclusion, virtual field trips can complement actual field trips. The class learns firsthand about a diverse range of farms and nurseries. Students have the opportunity to improve oral and written communication. Virtual field trip visits have led to students getting future internships or jobs.

Additional index words. Student engagement, active learning, firsthand experience, field excursions, industry engagement, Hawaii
Introduction

Traditional field trips. A field trip typically involves going to an enterprise and touring it in person. Field trips and on-site visits play an important role in horticultural courses. It enables students to see a work environment, observe worker skills and duties, and be aware of the latest industry technologies that are being used. Well-planned field trips benefit students by enhancing and supplementing in-class studies with real world situations. Industry engagement provides a valuable learning experience and a preview of future careers for students (Burns and Chopra, 2017). However, instructors sometimes face instructional, economical, and logistical constraints that can hinder their planning and conducting of actual field trips (Harkess et al., 2007).

Traditional virtual field trips. An alternative is the virtual field trip, which is a computer-based, multimedia simulation of actual field trips. Virtual field trips can stand-alone and be used in place of actual field trips, be used to help students prepare for an actual field trip, or be used in classroom discussions after an actual field trip. Harkess et al. (2007) developed fifteen DVD-based virtual field trip videos of greenhouse operations across eight U.S. states. The use of Second Life, an online 3-D virtual world, enabled student participation in real-world simulations (Leggette et al., 2012). Meezan and Cuffey (2012) developed the Virtual Field Trip of California Geomorphology, which uses Google Earth, Google Maps, and field site photographs. The augmented reality geospatially oriented Grand Canyon Expedition field trip game modules for mobile smart devices enhanced student interest in learning geosciences (Bursztyn et al., 2017).

Objective. The objective of this article is to discuss how virtual field trips were used to promote student engagement in TPSS 300 Tropical Production Systems, an undergraduate Tropical Plant & Soil Sciences (TPSS) course at the University of Hawaii.

TPSS 300

Description. TPSS 300 Tropical Production Systems is a four-credit course consisting of three 50-minute (or two 75-minute) lecture periods and a 3-hour (or a 2-hour) laboratory period each week. The number of lecture periods each week and the length of the laboratory period has varied over the years. It is a prerequisite for several upper division production courses—TPSS 401 Vegetable Crop Production, TPSS 402 Flower and Foliage Crop Production, and TPSS 403 Tropical Fruit Production. Offered each spring semester, TPSS 300 was a required course for TPSS undergraduate students, but is now an elective (Table 1).

Lectures are held in one of our department’s classrooms. Depending upon the topic, laboratory periods are held in the classroom, at the Magoon Greenhouse Facilities (a 10-minute walk from campus), Pope Laboratory greenhouses on campus, and at on-campus and off-campus sites.

Demographics. TPSS 300 class enrollment typically consists of sophomores to seniors from TPSS though there are students from other majors in the College of Tropical Agriculture and Human Resources (Natural Resources and Environmental Management, Molecular Biosciences and Bioengineering, Plant and Environmental Protection Sciences, and Plant and Environmental Biotechnology Program). Students from outside our college (Botany, Exploratory Health
Sciences, Anthropology, Interdisciplinary Studies, Management, Exploratory, Marketing, General Arts and Sciences, English, Economics, Pre-Business, Hawaiian Studies, American Studies, Architecture, Spanish, Computer Science, Finance, and Unclassified) have also enrolled. There has even been an International Exchange student from Japan.

Created in 1997, I have been teaching it since 2008. Student enrollment has ranged from a minimum of 6 (in 2016, 2018) to a maximum of 24 (2013), with an average of 13 students.

**Virtual Field Trips**

*Traditional field trips.* Since first taught in 1997, TPSS 300 has had traditional field trips during its laboratory session. However, student course evaluations of TPSS 300 indicated that students were not satisfied with the course, particularly with the duplication of TPSS 300 field trip visits with those of other TPSS courses. In my first teaching of the course in 2008, to address the duplication of visits, different sites were selected for traditional field trips and the use of virtual field trips was implemented (Kobayashi and Perez, 2009).

*Virtual field trip assignment.* The goal of the virtual field trip assignment was for each student to create an oral presentation of a farm or nursery so that it would simulate as if the whole class was going on a field trip to that agricultural enterprise. Each student chose and visited a commercial farm or nursery, interviewed the owner or manager, took pictures, and learned about the operations of the enterprise. It was the student’s responsibility to select a farm or nursery, contact the owner, and arrange transportation to the enterprise. They needed to ask permission if taking pictures was allowed. If not, then that farm or nursery could not be used for the assignment. Once a farm or nursery was selected, no other student could choose it for his or her assignment, thus avoiding duplication. Using PowerPoint, each student gave an oral presentation about the enterprise in class and submitted a written report. The written report answered a previously given set of questions (Table 2).

*Various student assignments.* Students selected a diverse range of commercial farms and nurseries. Several students visited some of the larger well-known farms and nurseries such as Kauai Coffee (Figure 1), Nalo Farms, Sumida Watercress Farm, Aloun Farms, and Mari’s Gardens (Figure 2), while others went to smaller farms such as Once Again Hawaii, Metro Grow Hawaii, and Green Hands of Aloha. Students have even gone to a neighbor island to farms such as Waipoli Hydroponic Greens on Maui. In addition, students have done their assignment on farms in other countries such as Albano Ranch in the Philippines and farms on the U.S. mainland such as Lindsfors Farm in San Diego (Figure 3) and Little Acres Farm in Connecticut.

*Benefits of the virtual field trip assignment.* The virtual field trip assignment one-on-one visit allows the owner to show the student certain production areas that would be restricted in a large group tour, such as a restricted area of a greenhouse or working in an aseptic tissue culture transfer hood. This kind of visit encourages networking between the student and the farm or nursery owner, which has led to future internships and jobs for students.
The virtual field trip oral presentations in class enables students to “visit” farms and nurseries that are not near the University of Hawaii or on the island of Oahu. This includes the neighbor islands, the U.S. mainland, and foreign countries. Virtual field trips made possible students learning about many different farms and nurseries without actually having traditional field trips, which would have necessitated charging a lab fee for the course and using up some of the valuable laboratory periods (Stannard, 2010). Virtual field trips could help disabled students learn about other farms and nurseries that they could not go to on traditional field trips (Healey et al., 2002).

The pre-assigned questions that students need to answer in their written report (Table 2) necessitate them to carefully interview the owners to obtain the answers. Thus, the on-site tour is not passive but active. Students need to know how to observe the farm or nursery operation, assess the enterprise, and ask questions (Morgan and Cox, 2005).

The virtual field trip assignment let students select businesses that they were interested in learning more about. Instead of selecting some of the larger well-known farms and nurseries that were visited in other TPSS courses, students selected smaller farms and nurseries that the instructor and most of the other class members were not aware of. Seeing the diverse majors of the students who have taken TPSS 300 over the years, virtual field trips may have helped stimulate interest in these students to get a minor in TPSS or switch majors to TPSS.

The virtual field trip assignment can be used to supplement traditional field trips and not replace them. Spicer and Stratford (2001) found that students felt that virtual field trips could not and should not replace real field trips. They thought virtual field trips could be most effective in preparing for or revisiting after a real field trip. Wright et al. (2010) reported that although instructors would not intend to replace all traditional nursery field trips with virtual ones that a virtual format could supplement existing field trips.

Improvements. The deadline for the assignment could be moved up earlier than at the end of the semester. Students sometimes waited to the last minute resulting in another student already having selected their farm or nursery. On occasion, the farm or nursery did not coming through with the visit. Students need to check ahead of time with the farm or nursery if picture taking is allowed. One student found out she could not take pictures, and her assignment consisted of only one satellite photo of the farm. Allowing a pair of students to work on the assignment was not a good idea because the work was not evenly split between the two students.

Instead of just PowerPoint slides for their oral presentation, students could show a brief video they made of the enterprise while providing a narration. This narration would give the students an opportunity to improve their oral communication skills. A questionnaire was not used to determine student perception of the virtual field trip assignment or the other students’ oral presentations. This could be done in the future as there is a positive relationship between virtual field trip quality and student satisfaction (Patiar et al., 2017).
Conclusions

Using virtual field trips in TPSS 300 increased active learning and student engagement. Visiting a farm or nursery of their interest promoted direct interaction between the students and the owners and helped students gain firsthand experience on agricultural enterprises.

Acknowledgements

I am grateful to the owners of the farms and nurseries for their cooperation with the virtual field trip assignments. Special thanks to Kauahi Perez and Martha Coleman who were graduate teaching assistants for this course. Thank you to Patrick Thesken, Benjamin Robinson, and Keliikanakaole Ioane for the use of their photos.
Literature Cited


Table 1. TPSS 300 *Tropical Production Systems* course syllabus indicating the wide range of topics on tropical crop production systems. This course emphasizes high technology innovations in agriculture used in growing crops.

<table>
<thead>
<tr>
<th>Week</th>
<th>Class</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Jan. 9, T</td>
<td>Course introduction and overview. Course syllabus.</td>
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<td>2</td>
<td>1</td>
<td>Jan. 11, R</td>
<td>Systems thinking. Systems analysis.</td>
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<td>3</td>
<td>Jan. 16, T</td>
<td>Crop production systems.</td>
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<td>3</td>
<td>5</td>
<td>Jan. 18, R</td>
<td>Crop growth and development.</td>
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<tr>
<td>5</td>
<td>6</td>
<td>Jan. 25, R</td>
<td>Environmental impact on crop production.</td>
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<tr>
<td>6</td>
<td>7</td>
<td>Jan. 30, T</td>
<td>Monitoring environmental factors.</td>
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<td>7</td>
<td>8</td>
<td>Feb. 1, R</td>
<td>Crop modeling and simulation.</td>
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<td>9</td>
<td>Feb. 6, T</td>
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<td>Feb. 8, R</td>
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<td>Feb. 22, T</td>
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<td>17</td>
<td>Mar. 6, T</td>
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<td>Mar. 8, R</td>
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<td>Mar. 15, R</td>
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<td>31</td>
<td>Apr. 24, T</td>
<td>Crop sensors and equipment for monitoring plant status.</td>
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<tr>
<td>32</td>
<td>33</td>
<td>May 1, T</td>
<td>Open topics.</td>
</tr>
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</table>

*James Thesken*, Mechanical Engineering student.
Table 2. TPSS 300 *Tropical Production Systems* virtual field trip assignment which requires students to answer the following questions in their written report about their visit to a commercial farm or nursery.

Your report should include:

1. A brief description of the agricultural crop production system.

2. A diagram of the system from the **top** view (2-dimensional). Include and label:
   - The environment.
   - The boundary.
   - **Four** important entities.

3. Describe the **four** important entities. Describe **two** attributes of each entity.

4. Describe the relationship between two **similar** entities.
   
   Describe the relationship between two **dissimilar** entities.

5. Explain how **two** environmental factors influence the growth and development of the crop(s). Explain how the owner or manager attempts to control or manage these environmental factors to optimize crop production.
Figure 1. Kauai Coffee Company on the neighbor island of Kauai has over four million coffee trees growing on 3,100 acres and is the largest coffee grower in Hawaii (and the largest coffee grower in the U.S.).

Figure 2. Mari’s Gardens in Mililani is an 18-acre aquaponics and hydroponics farm located on the island of Oahu. It produces a variety of vegetables, fruits, fish, and nursery and landscape plants.
Backyard Farm in Hillcrest San Diego

Figure 3. Lindsfors Farm in San Diego is a small commercial urban backyard farm offering a variety of organic vegetables, spices, and other produce.
Abstract
The 90-min hour workshop is designed to train participants to understand the impact of character development on intrinsic motivation to learn by listening to anecdotes and transforming extrinsic motivation strategies into intrinsic motivation strategies. The premise is that as stakeholders learn differently, we behave differently.

Transferring workshop takeaways to any learning environment reveals knowledge of the student experience that we want to infuse into approaches to curriculum mastery. To facilitate character development and influence intrinsic motivation, educators invest time into getting to know students. During the first hour, this workshop takes participants on a journey that reveals an approach that works well for Jackson Education Support clients, individuals having diverse backgrounds; the firm’s 96% success rate among exam preparation and tutoring clients of all ages (PreK – 12 and adults) evidences program effectiveness. Additionally, by discussing the seven cross cultural character strengths proven to result in positive living and demonstrating differences between fixed mindset and growth mindset, participants explore ways to help learners shape their own value systems to become internally driven toward unique visions of academic success.

Jackson Education Support exists to develop more independent learners of all ages. Specialty subject areas include character strength, literacy, math, and science. The firm is available to customize this workshop for educators and provide training on the development personalized learning plans.
Workshop Outline

-----Opener (45-minutes)-----

1. Bio Sketch
   1.1. Participant Introductions
   1.2. Workshop Overview
2. Part 1 Background Info:
3. Anecdotes

Part 1. Understand the impact of character development on intrinsic motivation to learn.
1. Warm Up
   1.1. Role-playing demos (Motivated v. Unmotivated)
   1.2. Whole Group: Compare/Contrast Graphic Organizer
2. Mini-Lesson
3. Intervention Plan: whole group brainstorm

----- 5 min. BREAK before 2nd 40-min segment-----

4. Independent Work
   4.1. Demo Video of Unmotivated Learner
   4.2. Compare/Contrast Graphic Organizer
   4.3. Intervention Plan
5. Share Session
   5.1. Prize for top plan; class vote

Closer
School Violence from the Perspectives of Those on the Front Lines: The Lived Experiences of Educators
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Abstract
On Feb 14, 2018, a former student from Marjory Stoneman Douglas High School in Parkland, Florida began shooting on his campus, killing 17, including one teacher trying to protect students. On Dec 14, 2012, the son of a staff member at Sandy Hook Elementary School in Newtown, Connecticut opened fire killing 20 children and six adults. The six adults killed in this attack include a principal, a school counselor, a teacher, a substitute teacher, and two teaching aides. Going back to Columbine in 1999, in which one teacher was killed protecting students, teachers and administrators have been on the front lines of what seems to be some of the worst disasters of our time. While similar incidents of school violence around our nation involving large numbers and the use of a gun(s) or explosive device(s) are high profile, any act of school violence has an effect on teachers, counselors, administrators, and students. Schools are meant to be safe havens for our children. When violence occurs, it strikes terror in the heart of every person in the nation – parents, students, administrators, counselors, and teachers. Is it the job of the school faculty and staff, namely those administrators, counselors, and teachers who are there to teach our children, to now think of themselves as first responders along with all of the danger and responsibility inherently associated with working in our schools? Currently, there is a limited amount of research that relates to the feelings, thoughts, and perceptions of teachers, counselors, and administrators who work in our schools. This paper seeks to relate what educators are experiencing in their schools and classrooms in the wake of the seeming escalation of school violence.

Introduction/Literature Review
When violence occurs, it strikes terror for those experiencing it. When violence occurs in schools, it strikes terror in the heart of every person in the nation, especially parents, students, administrators, counselors, teachers, and support staff. Is it the job of the school faculty and staff, namely those administrators, counselors, and teachers who are there to teach our children, to now think of themselves as first responders, along with all of the danger and responsibility inherently associated with working in our schools?

Violence in schools is not a new phenomenon. Each year, approximately 234,000 teachers in the United States become victims of school-related violence (Duffy & Mooney, 2014). Most incidents are not the types of violence that make the evening
news, like school shootings, but include homicides and assaults to the teacher or to others in view of school personnel (Duffy & Mooney, 2014). School shootings have become so prevalent, that law enforcement has defined a new category of crime known as ‘targeted school shootings’ (Warnick, Johnson & Rocha, 2010, p. 371). Because victims of school violence are primarily children, these incidents seem like a senseless tragedy and raise outcry from the public looking to seek ways to stop them.

In 2018, two school shootings occurred. In February, a former student of Marjory Stoneman Douglas High School in Parkland, Florida killed 16 students and one teacher. In the final weeks of the school year, in May, a student walked into a classroom at Santa Fe High School in Santa Fe, Texas and opened fire killing eight students, two teachers, and injuring thirteen. The exact reasons for these shootings may never be known. Researchers have tried to find a reason for the escalation of such events in recent years by interviewing law enforcement officials, educators, students, and even a gunman’s mother. One thing they have discovered is that many of the shooters are drawn to the ‘Columbine subculture’ evidenced by the clothes worn by the shooter, weapon choice, and even their writing prior to the event (Fernandez, Turkewitz & Bidgood, 2018). In fact, a large body of research exists focusing on attempts to find the cause of such events, however due to the complexity of individual events, it is difficult to fit the incidents into something that is easily understood and explained (Warnick, et.al. 2010). Instead of trying to contribute to that body of research, the authors of this paper sought perspectives of educators, including teachers and support staff, counselors, and administrators, to discover how these events are changing the school climate.

**Methodology**

A survey was created by the authors with the assistance of the university’s Institutional Review Board (IRB) for question wording due to the sensitive nature of the topic. Questions related to perceptions of change in the school climate were asked as it related to faculty, staff, and students. Demographic information was obtained relating to age range of students and size of school/district. Because of the increased call for gun control measures as a way to reduce the number of school shootings, there were two questions asking whether the respondent was a member of the National Rifle Association (NRA) and if they held a conceal/carry permit. The survey was created in GoogleDocs because it allows for respondents to complete the survey anonymously. There was one question asking for voluntary offering of email addresses if the respondent would be willing to participate in a further interview on the topic.

To solicit participants, the authors used several educator-related electronic message boards, Facebook and Twitter, and emails to program graduates seeking responses to the survey. Some of the calls placed on Facebook and Twitter were shared by followers. More than 70 participants completed the survey.

One question that was not asked in the demographic section of the survey was the position of the respondent – teacher, support staff, administrator, or counselor. Based on the way respondents answered the open-ended survey questions, however, it is estimated that participants hold positions across all grade levels and positions in
schools. One respondent, estimated from the response, was even in an international school. Based on responses, student body size ranged from approximately 120 students to about 2300 students with district sizes ranging from 900 to 65,000. Faculty sizes reportedly ranged from 4 to 5,456.

In the responses, it was interesting to note the information related to school counselors. Some respondents indicated that there were no counselors in their buildings. One respondent indicated that their district had one school counselor per building and 1.5 Mental Health Agency counselors but indicated that they understood this was a unique program in their district.

Thinking that NRA membership or holding a conceal and carry license might change the way they perceived their school climate or potential solutions, we found that 90% of the respondents were not NRA members with 5% declining to answer this question. In response to the conceal and carry license question, 83% indicated they did not have such a license while 17% indicated they did hold such a license.

Discussion of Findings
The theme that came through the coding of responses that was strongest was the psychological changes noted by school personnel. This theme came through even in questions that were not specifically asking about psychological perceptions. Respondents often noted that students were more concerned about the possibility of school violence than they have been in the past. Several respondents mentioned that students were more anxious as this quote explains:

> Increased anxiety about potential danger at school, including crying, stomachaches, headaches, etc. Any announcement by our head of security over the loudspeakers causes a visible shift in the room, even if it is a routine announcement.

In the Santa Fe shooting, the fire alarm was pulled by a teacher thinking it would get students out of the building and to safety. However, in a number of school shootings, fire alarms were pulled to get students out of the building into a more open area allowing greater access to victims by the shooters. According to this teacher, anxiety over drills has changed student behavior:

> My students are more anxious. When we have a fire drill, they won't leave the room until I assure them it is a legitimate drill and they will be safe leaving the classroom. They are now absolutely silent during our lockdown drills, whereas a few years ago, I couldn't get them to be quiet. They know that their lives may depend on how quiet they are. It's not natural.

The psychological change noted by respondents cut across all grade levels. The biggest difference in responses came from those who teach young children. Many respondents teaching young children felt that their students really didn’t understand the concerns surrounding school violence because they were too young. “No, they don’t understand. I teach Kindergarten” was a common response. A few, like this kindergarten teacher, responded this way following a lockdown drill at her school:
My kindergarteners did not know anything about school shootings prior to the Florida incident. Since the Florida shootings, we have had more drills for active shooters, so I have had to explain more with respect to possible scenarios. I told them during the last drill that they were to all run out of our Kindergarten back door through the parking lot and I would be last to ensure all of them escaped safely. Several of my kindergarteners raised their hands, and the first little boy I called on asked “but, Ms. Jones [name changed], you could get shot if you’re last! What happens if you get shot?”

Safety is one of humankind’s basic needs according to Maslow (Sappington, 1984). The school environment is one of the first places where psychological and physiological changes are noted. School safety perceptions can affect academic and behavioral results (Costa, Cross Hansel, Moore, Many, Osofsky & Osofsky, 2015). While schools are generally safe places, it only takes the perception that someone could become violent to change the perceptions of teachers and students. The following quotations demonstrate that awareness.

Students are more concerned about their safety. They also are more aware of their classmates who may be struggling with emotional issues.

Students are conscientious of sound and strange behavior. There was a student in a neighboring district that brought a rifle to school and shot himself in the bathroom the week after Parkland. That affected our students more than Parkland did because it was so close and because the student managed to come to school concealing a .22 rifle in his clothing. Students here were very shaken by that and are more tuned in to what they would perceive as “odd behavior” from their peers and unknown adults.

In particular, we have a colleague whose contract was not renewed for next year. He is very unhappy about this circumstance and has become disruptive to our department. In past years concern about him doing something violent would not be on my mind (or that of my other colleagues), but it now is. So much so that even administration has given him so much power over all of us for fear of escalating his behavior if attempted to reign him in or have him fired this year. It is awful.

Teachers are highly trained in how to provide effective instruction, however receive very little training in how to respond to a crisis situation (Costa, et.al., 2015). As teacher educators themselves who train future teachers, counselors, and administrators, the authors wanted to know what types of support school personnel feel is needed. Responses covered everything from more police presence to having more counselors to having active shooter drills. Many were unsure what types of support would be needed but definitely felt that more awareness of mental health issues would be a good support measure. As for what kind of support we can offer to our teacher candidates in our educator preparation programs, most of the responses focused on the support
measures mentioned above, but the following quote recognizes the difficulty in preparing future teachers for every possible occurrence in their future positions:

I don't think educator prep programs prepare teachers emotionally for what they will be doing. So I don't think ways to combat school violence would be helpful. Violence, not school violence, is the problem. And it is society's problem. It just happens to come to school sometimes because we are a microcosm of our society. I think it is helpful to teach future school personnel about psychology, the brain, what violent people are like and why, and do other psychological development types of training similar to what we do with learning. But put into that active shooter situation, a lot of training will be forgotten.

With every new tragedy, there is renewed call for more gun control or arming teachers. Survey respondents were actually quite mixed in their response to questions asking about arming teachers.

One response in support of arming teachers:

I believe that we definitely need to address this threat in a realistic manner. I would like to see the ability for teachers (who are willing and able) to conceal carry a gun and receive the proper training for free. I would love to see more security, but those that are in education know that we don't currently have the budget for that. I think there are other ways to help as well with the new door stops that are on the market. For those teachers that aren't comfortable with carrying a gun and all rooms should have some type of door stop device. I believe once people know that there are teachers who are carrying, then schools become less of a "soft target" and it won't be as common a target.

While this respondent can see both sides of the argument:

I am on both sides of the wall here. On one hand yes, on the other no. Yes, because I can see the feeling of being ready (as far as the person that is carrying is of sound mind). No, because I don't feel that what teachers are paid to do. Teachers already have a lot on their plate and are loving, caring, giving, and nurturing individuals and to ask them to carry a gun... to me is out of the question. I understand they why, (I am retired military) but not all teachers can if not most.

This respondent understands that schools are vulnerable and that school personnel should be prepared, he is not sure what the right answer is:

I'm torn. I myself have a gun and know how to shot [sic], but I know having it and using it against a kid, a former student, is a very different thing. I also know no guns are safe guns, but I hate feeling like there could be some coming in daily w our students (no metal detectors) and we are unprepared for that risk.
Even with 17% of respondents indicating that they did have a conceal and carry license, this response seemed to sum up the most common reason for not arming teachers:

ABSOLUTELY DISAGREE. Teachers went to school to learn to teach, and gun safety/conceal carry was never part of that education. However, if a teacher wants to carry a weapon perhaps it should be allowed. That being said I have become more and more concerned with the what ifs. What if they teacher is the one who becomes disgruntled, or a student uses that very teachers [sic] gun to commit violence. It is a confusing topic full of what ifs!

Following the Parkland, Florida shooting, while the general population has again suggested that teachers begin to carry weapons at school as a prevention measure, a student movement known as March for Our Lives has taken up the crusade to decrease gun violence by calling for bans on assault weapons, universal background checks, and digitizing gun records (Alter, 2018). On March 14, 2018, nearly a million students participated in a National School Walkout to protest the epidemic of school violence. A student-led March for Our Lives demonstration was held on March 28, 2018 in all 50 states and six continents. Amazingly enough, these movements are having an effect. While they have not yet been successful at changing any legislation, support for the NRA has decreased with major companies cutting ties with the NRA (Alter, 2018).

Conclusion
During every episode of school violence, teachers have been the first to respond to the situation. Many feel it is their duty to protect their students, sometimes with their lives. In the aftermath of school violence, they are often sources of comfort to students. In May 2018, a Twitter hashtag #ifidieinaschoolshooting was formed. While many of the respondents were students, the sentiment of the teachers who have used the hashtag was that they would have died protecting their students. While the debate rages on regarding arming teachers and gun control, the one constant is that school personnel are in a unique position to try to help students deal with the aftermath of incidents while also trying to protect them, often at their own peril.

References


Title: Teaching Smarter Not Harder: Blended Learning in the Elementary Classroom
(Formerly East Meets West in Blended Learning and Assessments)

Topic Areas: Educational Technology; Elementary Education; Curriculum, Research, and Development.

Presentation Format: Poster session

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Abstract:

The improvement of student academic achievement continues to be a primary concern of educational and political agencies and has generated the recent adoption of Common Core State Standards by many states. To meet the demands of 21st-century learners and ensure academic success, educational facilities are applying new learning environments. Blended learning instructional models incorporate technology as an integral part of the students' learning experience and provide students with the ability to select their learning pathway, pace, and place where learning occurs. A blended learning environment may be more conducive to meeting the academic needs of 21st-century learners. Research from an urban school in the southwestern United States indicate that
there are significant academic gains for all elementary students in a blended learning environment. The primary research questions guided these studies: What are the measurable academic differences for students who participated in a traditional learning environment when compared to students who participated in a blended learning environment? What are the measurable academic differences for student subgroups (gender, ethnicity, and ELL) completing traditional instruction and blended instruction?

At the upper elementary level (grades 3-5), there was a significant statistical difference between mean scores on standardized summative tests (English Language Arts) of students in blended and their peers in traditional learning environments. Results from the subpopulations of ethnicity and English language learners also reflected a significant statistical difference. The results from this study reflect the benefits of a blended learning environment for elementary students.
1. Implementation of online graduate degree programs with fieldwork components: A promising practice study

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6. Abstract:

INTRODUCTION & PURPOSE

Higher education has undergone a radical transformation using technology, including offering academic courses and degree programs via an online delivery method. Institutions frequently implement innovative ideas to remain competitive in the marketplace and expand learning opportunities to a wider variety and number of students. In fact, in 2013 at least 33.5% of higher education students took at least one online course (Allen & Seaman, 2014). Some of the most frequently cited reasons for institutions to offer online courses are: 1) to remain competitive in the marketplace, 2) to expand learning opportunities to a wider range and number of potential students, and 3) to provide educational opportunities for geographically remote students or those limited in ability to attend school full-time.

However, programs with fieldwork-based components (clinical training or fieldwork), which typically include healthcare professions, face unique challenges in implementing online coursework. Fieldwork requires that students demonstrate application of classroom-learned knowledge to their field of study in conjunction with feedback through active learning. For a school to claim their fieldwork component is effective, their students must demonstrate clinical competence in real work settings demonstrated through performance of specific skills in clinical settings and utilization of instructor feedback. Due to these challenges, field-based programs have demonstrated a slower growth curve in the participation of online education. However, due to its increasing popularity, it is critical to examine this phenomenon to negate an institution’s possibility of losing highly qualified applicants to other degree programs that are able to offer more flexibility in format. Therefore, this study examined the promising practice of several
institutions that have successfully integrated innovative online methods within their clinical training using a Gap Analysis/Promising Practice Process model with the purpose of identifying factors facilitating successful implementation of fieldwork components in an online graduate degree program (Clark & Estes, 2008). For those factors perceived to facilitate implementation of quality fieldwork programs, this study discussed which promising practices could be adapted to and utilized by other institutions.

SUBJECTS
Subjects from two different graduate professions were queried, Teacher Education and Social within three different highly regarded U.S. institutions that provide online services though a common cloud-based partner using software as a service (SAAS). Data represented six stakeholders who were the program administrators or faculty members responsible for the fieldwork component at their institution and corresponding members of the common SAAS provider.

METHODS AND MATERIALS
Study design was a purposive, non-probability sample of convenience with additional subjects found via snowball sampling. Qualitative methods included a 15-item survey consisting of questions meant to illuminate assets and inhibitors to implementing online fieldwork programs and were analyzed using Qualtrics components. Follow-up telephone interviews were conducted for expanded data collection and were recorded, transcribed and subsequently coded using a priori categories of knowledge, motivation and organization as well as emergent factors that contribute to implementation of online fieldwork programs.

RESULTS
The following presumed assets of knowledge, motivation and organization were validated partially or completely: 4 of 4 in the categories of factual and conceptual knowledge, 3 of 3 in motivational categories of task value and self-efficacy with 1 emergent from interview data in expectancy outcome, and 4 of 7 in organizational categories of cultural model and setting.
CONCLUSIONS

There are several key elements required for successful implantation of an online degree program incorporating fieldwork. First, stakeholders must possess factual and conceptual knowledge about accreditation, fieldwork within the profession and interaction of these factors with adult learning theory. Second, the people chosen to implement the program should demonstrate a significant amount of motivating factors including: positive task value, self-efficacy and expectancy outcome. Lastly, the institution’s cultural model and setting is important for success. The programs that succeeded, despite skepticism of their profession about online fieldwork, all shared strong cultural support models.

CLINICAL MERIT/ SIGNIFICANCE

An understanding of the key elements required for success in implementation of an online fieldwork program is important for institutions searching for ways to become more competitive in today’s marketplace. The knowledge gained from this study can provide guidance for professional higher education programs seeking to diversify their student base and allow more flexibility for students who need to work full time or who have geographic barriers attending a brick and mortar campus. By examining innovative programs demonstrating promising practices, this study identifies factors leading to successful implementation of new online fieldwork programs and subsequently assists other programs in following in their footsteps.

RECOMMENDATIONS FOR FOLLOW-UP

It is recommended that future studies investigate a wider range of professional programs, including such professions such as nursing, occupational therapy and physical therapy.

REFERENCES


Title of Submission ID Number 139:
Nurturing our powerhouse – the brain – to optimize learning

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Abstract follows:

Abstract

Using effectively and efficiently the plastic properties of our brain is critical for learning, memory formation and consolidation. To do this we need to nurture the brain using optimal learning environments. Teachers and educators generally may create such environments where fear-based learning is largely removed and replaced with a thriving learning environment where students are keen to learn perceiving new things as “this is interesting”, “I’d like to have a go at this” – and approach-based self-talk style. This involves utilizing ideas from psychology and neuroscience as well as education (sometimes referred to as PEN principles), that include key elements such as stretch goals (and the concept of “not yet” where failure is experienced, and no put downs nor fear of failure as it provides great learning opportunities – just ask John Dyson how many vacuum cleaners he made before getting the concept to where he wanted it . . .), and nurture of our brains through key processes such as: sleep hygiene (quantity and quality of sleep and ways to achieve those), good nutrition (we must feed our brain as well as our bodies), movement (yes, we avoided the ‘e’ word – ‘exercise), management of our thoughts (some claim that ‘We are
our thoughts’), and attend to our spiritual needs (values and beliefs as well as other – who we are and how we perceive ourselves in this world). These together greatly influence our neural development and ability to have neural proliferations to create expertise, and naturally are major determinants of much of our behaviors.

In learning, we need, with purposeful conscious intent, to promote optimal, thriving learning environments and remove authoritarian fear-based learning environments that often characterize the lived experiences of too many of our students. In this session we focus on using our powerhouse – the brain – to maximize learning through examining the importance of examining the basic question of ‘What am I responsible for and what power do I have?’ giving examples of the use of Responsibility Theory in the classroom with its key precepts and language, and using movement (as an additional consideration) to further advance neural proliferations. We examine how these contribute to the goals of self-motivated and self-directed learning, higher achievement and better wellness.
Universal Design for Learning (UDL) as a Structure for Culturally Responsive Practice

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Universal Design for Learning as a Structure for Culturally Responsive Practice

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Alaska is rich with cultural and ethnic diversity. In fact, it is one of the three most diverse parts of the country. Culturally relevant practice both needed and required in Alaskan schools. Universal Design for Learning (UDL) is a framework that may assist educators in this endeavor. While UDL provides a framework for implementing instruction, the Alaska Cultural Standards for Educators tell us what best practice looks like for our diverse student population, especially our Alaska Native students. This article explores examples of implementation of the Alaska Cultural Standards for Educators within a UDL framework.

Keywords: Universal Design for Learning, Culturally Responsive Education

Introduction

Alaska is a state that is rich with cultural and ethnic diversity. In fact, the country's three most diverse census tracts are all in Anchorage, followed by a handful in New York (Basu, 2016). Culturally relevant practice is not just needed for the students being served in Alaskan school districts, it is required. According to the World Indigenous People’s Conference on Education (WIPCE, 1999):

Most all Indigenous peoples, and in particular, those who have suffered the impact and effects of colonization, have struggled to access education that acknowledges, respects and promotes the right of Indigenous peoples to be indigenous—a right that embraces Indigenous peoples’ language, culture, traditions, and spirituality (p. 1).
This statement was true in 1999 when it was written and is still true today. Educators and administrators are constantly looking for strategies to best support their diverse student population by providing systemic change in school culture and moving away from deficit models. Universal Design for Learning (UDL) is a framework that may assist educators in this endeavor (Echevarría & Graves, 2011; Hernandez Finch, 2012; Mellard & Johnson, 2008).

Universal design is a concept that comes from the field of architecture. In 1997, a working group of architects developed seven principles of design in order to guide the design process to produce usable products and environments. These seven principles were: (a) equitable use; (b) flexibility in use; (c) simple and intuitive use; (d) perceptible information; (e) tolerance for error; (f) low physical effort; and (g) size and space for approach and use (National Disability Authority, 2014). Once these principles were consistently being utilized to guide design, researchers and the public began to notice that the elements were not just benefitting those with disabilities but were improving access for everyone. For example, curb cuts were initially designed to allow those who utilize a wheelchair for mobility to move off of a curb safely. A mother pushing a stroller or a worker using a dolly also experienced an increase in accessibility. By designing environments to assist one group, others outside of that group also found improved access. This concept of Universal Design for Learning (UDL) came from architecture design work. UDL is a set of principles for curriculum
development that give all individuals equal opportunities to learn (National Center on Universal Design for Learning, 2012). UDL celebrates variability and diversity of learners and plans for reaching all students (including Indigenous student populations) from the beginning of the design process.

While Universal Design for Learning provides a framework for implementing instruction, the Alaska Cultural Standards for Educators (2012) tell us what best practice looks like for our diverse student population within Alaska, especially our Alaska Native students. These six standards have been developed by the Alaska Native Knowledge Network and adopted by the Alaska Department of Education & Early Development can be found in Table 1: *Alaska Cultural Standards for Educators* (2012).

| Standard A | Culturally-responsive educators incorporate local ways of knowing and teaching in their work. |
| Standard B | Culturally-responsive educators use the local environment and community resources on a regular basis to link what they are teaching to the everyday lives of the students. |
| Standard C | Culturally-responsive educators participate in community events and activities in appropriate and supportive ways. |
| Standard D | Culturally-responsive educators work closely with parents to achieve a high level of complementary educational expectations between home and school. |
| Standard E | Culturally-responsive educators recognize the full educational potential of each student and provide the challenges necessary for each of them to achieve that potential. |
The author wondered whether or not it is possible to implement the standards within a Universal Design for Learning framework. This paper will examine the research and attempt to answer this question by looking at the principles of UDL, multiple means of engagement, representation, and expression, and how the standards would fit into this framework.

**Multiple Means of Engagement**

In UDL, providing multiple means of engagement is one of the three principles of the framework, and, in regards to culturally relevant practice, can be considered the most important principle. The goal is for every student to have access to learning, gain persistence when challenges arise, and build self-knowledge (Meyer, Rose, & Gordon, 2014).

We know that like many Indigenous populations, Alaska Natives have faced abuse, forced assimilation, and loss of their culture with the influx of Western educational systems moving into their communities and usurping the education of their children. It is not surprising that this has left an entire population of people who are disengaged with schools and formal education in general. In Anchorage School District, Alaska’s largest, the four-year graduation rate for Alaska Native and Native American students was 63.2 percent in 2017 (Hanlon, 2017). In order to reengage students, there must be a safe learning environment with relevant instructional content that builds off of the students’ background knowledge and works to create expert learners.
Safe Learning Environment

Educators intuitively understand the neuroscience around the necessity for the learning environment to be safe. Safety comes when people connect with other people who treat them well. When the brain feels safe, it secretes a bonding hormone called oxytocin. This hormone drives the desire for humans to build relationships with the person which whom they are interacting. Building rapport is a large component of building relationships which create safe learning environments and support student engagement. The relationship building can be simple—a smile or nod from the teacher, a pat on the back or arm. All of these simple gestures stimulate the release of oxytocin (Hammond, 2015). Barnhardt researched three Athabaskan teachers in a rural Alaskan school that was, by western assessment measures, deemed successful (1981). While the researchers did not see instruction or curriculum that differed greatly from typical schools, they did notice a difference in the way the teachers engaged with students. They referred to this as “tuning-in” and noted the teachers tuning-in with the rhythm of their speech and body movements by listening to individual students. The Alaska Cultural Standards for Educators (2012) address creating rapport specifically with Alaska Native students. Standard A includes the charge that culturally responsive educators to recognize both the validity and integrity of the Alaskan Native knowledge system. One example used in the standards is for teachers to greet and address students in a similar manner that those students are greeted by parents and
elders in their community (Alaska Department of Education & Early Development, 2012). The standard is directly tied to the concept of “tuning-in” and is a critical aspect in the creation of a classroom environment where Alaska Native students feel safe and confident in their learning.

**Affirmation & Positive Reinforcement**

Affirmation and positive reinforcement are two other components of building relationships. Behavioral modification systems in today’s schools are highly individualistic and based off of the principles of Applied Behavior Analysis (ABA). ABA uses the systematic application of interventions to improve behaviors to a meaningful degree; in addition, one key aspect of ABA is to demonstrate that the chosen interventions are responsible for behavior improvement (Baer, Wolf, & Risley, 1968). Indigenous behavioral modification methods connect to the same ABA principles. The difference is in who delivers the positive reinforcement. In our current educational system, acceptable behavior is met with some type of reinforcement from the teacher. This could be a tangible reinforcer (i.e. a certificate for good behavior), a social reinforcer (i.e. praise or good grades), or an activity reinforcer (i.e. extra recess). Unacceptable or negative behavior is typically met with punishment, such as removal from class, loss of recess, expressions of disappointment from the teacher, or even poor grades.

Indigenous behavioral modification systems also employ positive reinforcement, but delivered at the community level and by more than one person.
Traditionally, the entire village was responsible for teaching and reinforcing acceptable behavior and calling out individuals on their unacceptable actions. The methods used were unique to the community. One example of this type of behavior modification is the use of dance and other public interventions in Yup’ik communities (Barker, Fienup-Riordan, & John, 2010).

Moving to community-level positive behavioral supports would be a more culturally-relevant system for many students, including those from Indigenous backgrounds. Standard C includes an example of providing affirmation specifically to Alaska Native students, advocating for culturally responsive educators to be immersed in the communities in which they teach. Within that immersion, teachers should actively engage and contribute to the community. One example used in the standard would be for educators to host community celebrations (Alaska Department of Education & Early Development, 2012).

**Engaging Families**

Finally, family engagement is another component of building a safe learning environment. Yet, communities have different ways that they demonstrate engagement. “In America, the dominant culture is individualistic, while the cultures of many African American, Latino, Pacific Islander, and Native American communities lean more toward collectivism” (Hammond, 2015, p. 25). One component of collectivist culture can be found in Standard D and is the expansion of the teacher-student relationship to include family, community, and
nature in which a culturally responsive teacher promotes active and constant interactions between the community and parents in a child’s education. The standard uses as an example an educator who engages with the community and uses that community engagement as a way to plan and engage families and community members in the educational programs in and beyond the school setting (Alaska Department of Education & Early Development, 2012). The methods used by school teams to reach out to families and engage them in school activities are only effective if they are culturally responsive to the families’ needs and considered valid by the families who they seek to engage. Methods that work for middle-class, Caucasian families in the school (e.g., emails) may not work to reach families who are not in that demographic. Okakok (1989) described parental involvement as a challenge for North Slope Borough School District in Utqiagvik, Alaska. Okakok wrote:

   Once a teacher is identified, parents do not interfere. This was often misinterpreted by educators to mean that the parents did not care about their child’s education, when, in fact, they were doing what they felt was in the best interest of the child (p. 417).

The author explained that teachers need to communicate with the parents and community that their knowledge and skills are valued as an important part of the child’s education. School was not always a positive experience for many of the
parents in the community; teachers can use positive interactions to build new relationships between parents and school (Okakok, 1989).

Nguyen (2012) found in a study of strategies to support English Language Learners with learning disabilities that having an “open-door” policy where families were welcome at any time made parents feel included in the school. It was important to encourage parents to send notes or call with questions or concerns in order to keep an open line of communication. Griner & Stewart (2012) provide educators with examples for engaging families from culturally and linguistically diverse backgrounds, including home visits and regular phone calls to gain insight into students’ lives and support systems, as well as to garner parent and family input in the decision-making process. In addition, they suggest that parents, families, and community members are invited regularly into classrooms and that school staff makes continuous, positive contact even when school is not in session, and that school staff celebrate special events in students’ lives (Griner & Stewart, 2012; James, 2017).

**Make Learning Relevant**

Making learning relevant addresses two different aspects of education. First, the education that students receive must be relevant to the world around them and serve them as they go out into their community and become citizens and leaders. Currently, our educational system defines success as making good grades, scoring high on assessments, and getting higher and higher levels of education as
evidenced by the assessment data reported on school report cards and utilized for awards such as National Blue Ribbon Schools (U.S. Department of Education, 2018). School report cards use student standardized assessment data in content areas to compare the quality of the schools by country, state, and district while the U.S. Department of Education awards schools with the title of National Blue Ribbon Schools for areas such as having the highest high school graduation rates in the state and the highest achieving students (the top 15%) in English and Mathematics, measured by state assessments (U.S. Department of Education, 2018). Even for many non-Native students, this leads to strengths and interests being overlooked and undervalued. This message tells our students whose skills lie in areas such as art, caregiving, crafting, hunting, cooking that they do not have what it takes to be successful. Instead, schools should reinforce that society needs people who have strengths in all of these areas. Not only would there be economic benefits, but it students would feel like they have a role in their community. Redefining success is one of the core principles of culturally relevant education.

Kawagley (2006) interviewed Yupiaq elders and explains that Native students are at a distinct disadvantage in the educational system because they are expected to fit into the dominant United States culture and that their own Yupiaq culture is considered primitive and useless. This devaluing by the educational system teaches students that the traditional ecological knowledge being taught by
their elders, family, and community is substandard to the instruction in schools. The students then, in turn, lose interest in learning traditional ecological knowledge and when they graduate they have no way to contribute to their village through subsistence and cultural activities. Kawagley goes on to explain that those who go on to higher education have no place in the village when they return because there is no job market. The elders said that the students should be taught both cultures. Standard E attempts to address this conflict and states that culturally responsive educators should take on the responsibility of reinforcing the student’s cultural identity and place in the world. One example provided in the standard is for educators to develop a project around comparing and contrasting leadership styles between dominant and community cultures. Specifically, Standard E states that, “Culturally responsive teachers acquaint students with the world beyond their home community in ways that expand their horizons while strengthening their own identities” (Alaska Department of Education & Early Development, 2012, p. 35).

Second, the educational content that the teacher is using on a day to day basis must be relevant to the students. Hammond (2015) explains that students are constantly being bombarded with sensory information while they are simultaneously trying to attend the instruction going on in class. Their reticular activating system (RAS) is able to filter out some of this input so the student can attend to the important aspects of the lesson. As teachers, we must make the
lesson important to the students by making it relevant and interesting. One way that curriculum can be made more relevant is to make learning based on every day and real-life experiences (Kawagley, Norris-Tull, & Norris-Tull, 1998). Real-life experiences are what elicit a strong emotional response from a student. The experiences stand out, foster engagement, and make students feel safe.

Another important way that curriculum can be made relevant is for students to be adequately represented. Ongtooguk describes the curriculum of the schools in which the author was educated as being “virtually silent about us, our society, and the many issues and challenges we faced as a people caught between two worlds” (Ongtooguk, 2017, p. 1). Alaska Native history was not taught as a part of American history. Ongtooguk returned to rural schools as a teacher to discover that although things had improved, the Alaska Native history and culture curriculum was prepared by white educators and focused mainly on traditional native crafts (Ongtooguk, 2017). The lack of relevant curriculum for Alaska Native students has been tackled by many different entities within Alaska. For example, the University of Alaska Fairbanks has developed a math curriculum based off of Alaska Native principles of measurement and calculation entitled Math in a Cultural Context (University of Alaska Fairbanks, 2017). Many school districts, such as North Slope Borough School District, have begun grass roots efforts to develop their own curriculum that meets the state standards and is also culturally relevant to the student they are serving. The difficulty with this is that
Alaska is a large state with many isolated communities, so the efforts that are being led in one area of the state may not be carried over into others as there is not one repository for all of the curriculum being designed. Another problem is that Alaska is very diverse and each community may have a different Alaska Native group living there which comes with a different set of traditions, values, and expectations.

The Alaska Cultural Standards for Educators approaches the relevance of instruction in Standard A by requiring that teachers utilize the knowledge of Elders in their instruction. One example given is that the “educator confers with and involves Elders and Culture Bearers when developing and implementing lessons in all curricular areas” (Alaska Department of Education & Early Development, 2012, p. 7). The elders in the community are vital to learning and growth. They have lived through many of the experiences that we will be going through in the future and have had many years to reflect on those experiences. They are our first and most important teachers. Kawagley and Wilson both describe the role of culture in education from their own unique perspectives in the Yupiaq and Gwitch’in cultures, respectively (Kawagley, 2006; Wilson, 1994). One idea that was central within both of their descriptions was the role of elders. Wilson interviewed Gwitch’in elders for the study *Gwitch’in Native Elders: Not Just Knowledge, but a Way of Looking at the World* (1994). The role of elders was described by the participants in terms that sound very similar to the
description of an educator. Elders that were interviewed described their role as the teacher in the community who were “responsible for passing down cultural and traditional knowledge to future generations of their people.” This knowledge included skills such as “making snowshoes, toboggans, and sleds.” The elders are also the ones who pass down the historical knowledge of their people (Wilson, 1994, p. 36). This is very similar to the role of elders within Yupiaq culture, who were responsible for providing the education, as described by Kawagley (2006).

The foremost purpose of traditional education was to ensure that the principles or rules for constructing a cognitive map for life were learned well by all people (Spradley 1980). The environment was their school and their cathedral, and reading its natural processes gave meaning to all life (p. 21).

Okakok (1989) expands upon this by describing the loss of the student’s cultural identity due to the increase in time spent in school and away from traditional activities.

Even if children are interested, rarely do they have time to sit quietly, to listen and learn from their elders. The North Slope Borough School District has addressed this by bringing elders into the schools to teach dancing, incorporating native athletics, and teaching students about issues that affect them, such as corporations (p. 407).

**Multiple Means of Representation**
Another of the three principles of UDL is providing multiple means of representation, including: options for perception, options for language, mathematical expressions, and symbols, and options for comprehension (Meyer, Rose, & Gordon, 2014). In order to provide multiple means of representation in our instruction for culturally and linguistically diverse learners, the natural learning environment can be utilized to vary our methods of instruction, and promote cross-curricular learning.

**Varying Methods of Instruction**

A variety of culturally responsive techniques exist to assist children in processing information, such as stories, song, movement, chants, rituals, etc. These techniques come from the learning traditions of oral cultures (Hammond, 2015). The Alaska Cultural Standards for Educators describe a variety of methods for learning that are specific to Alaska Native students. Standard A explains that teachers should provide multiple ways to access learning and cultural knowledge, including through observations and hands-on demonstrations. One example provided is for educators to provide opportunities that encourage the use of cultural and traditional knowledge (Alaska Department of Education & Early Development, 2012).

The types of pedagogy that we use in the educational system today are quite different that the methods that are utilized by Yupiaq elders teaching children. Kawagley (2006) describes an example of the type of pedagogy used by
elders in the story of the mother and daughter cutting fish. The daughter saw her mother cutting fish and told her that she would also like to cut fish. Her mother gave her a smaller uluaq (a knife) and a smaller fish and then continued her work of cutting fish beside her daughter with an occasional demonstration. The child is taught through the apprenticeship model of learning (Brandt, Farmer & Buckmaster, 1993) by their parents and grandparents, but at school different methods are used. The result is that the child is at a disadvantage in their learning. According to the Alaska Cultural Standards for Educators, this should not be the case in Alaska. The standards indicate that the school pedagogy should match the methods used by elders in the community.

Cross-Curricular Learning

The study of knowledge systems tells us that in Indigenous cultures all knowledge is interconnected and not segmented into subject areas as in Western culture. In traditional school settings, science is treated as a separate content area and one that is Eurocentric. In contrast, Indigenous cultures consider science to be interwoven into every part of daily life (Kawagley, et al., 1998). A cross-curricular approach would more readily support the learning of our Indigenous students. The Alaska Cultural Standards for Educators describe how this possibility in Standard B. Two indicators note that teachers could engage students in experiential learning activities in the surrounding environment and combine cultural context and history with scientific methodologies to create holistic
learning cycles to teach science. An example shared is for students to create a place-based project in cooperation with Culture Bearers that also integrates the food pyramid (Alaska Department of Education & Early Development, 2012).

In contemporary education, academic knowledge attainment is of the utmost importance. Academic knowledge is divided up into subjects such as reading, history, science, and math. Teachers specialize in one or two areas and instruction is divided across subjects. In traditional knowledge systems, all content is interconnected and grounded in experience. The difference between contemporary and traditional can cause Native student to have challenges in learning (Barnhardt & Kawagley, 2005).

**Multiple Means of Action & Expression**

Finally, the UDL principle of providing multiple means of action and expression means that we are giving students choices for how they demonstrate learning. This includes goal setting, self-monitoring strategies, and managing resources, as well as providing options for student responses based on personal needs and learning styles (Meyer, Rose, & Gordon, 2014).

Hammond (2015) describes this principle through the lens of culturally responsive education as using “place-based learning, project-based learning, or problem-based learning” as an opportunity for students to demonstrate what their understanding (p. 127). Hammond suggests that students can show what they
know through games, solving a mystery or a real-life problem, or working on long
term projects.

The Alaska Cultural Standards for Educators describe a variety of ways in
which Alaska Native students might choose to show their learning. Standard D
includes teachers learning about and building upon the cultural knowledge that
students bring with them and seeking to learn the local language and use in their
teaching through projects such as family story projects, exploring local myths and
storytelling, and the encouragement of student use of heritage language and
sharing of cultural knowledge (Alaska Department of Education & Early

**Conclusion**

After generations of inadequately serving our culturally and linguistically
diverse student population in schools, specifically our Indigenous students,
educators need strategies to best support our diverse student populations and to
create systemic changes in schools. The educational system should include access
for all people in a way that respects the epistemological and pedagogical
foundations of both indigenous and western cultural traditions (Barnhardt, 2014).
The outcome of this examination of the Alaska Cultural Standards for Educators
within a Universal Design for Learning framework is that it is not only feasible to
connect the two, but many aspects of the cultural standards are already ingrained
in the core principles of UDL. This outcome reiterates the importance of the work
by Indigenous researchers who have been calling for systemic change in our educational system in order to adequately serve all students. In addition to affecting systemic change, one outcome must be a concrete plan—and call to action—for growth among the people involved in providing education to diverse populations. District administration, teachers, and support staff need intensive and ongoing professional development to implement the Alaska Cultural Standards for Educators within a Universal Design for Learning framework with a focus on cultural pedagogy; this is in contrast to teaching culture and examining views on social justice, race, and students from disparate backgrounds (Hernandez Finch, 2012). Answering this call to action has potential to make a true difference for the education of Indigenous students.

Additional note: To Show What We Know is a video that reviews a variety of projects throughout the state of Alaska that focus on teaching science skills through traditional native knowledge and subsistence activities, examples of the confluence of Alaska Cultural Standards for Educators and constructs of UDL in action. It can be viewed here: To Show What We Know.

References


Basu, M. (2016, January 11). Most diverse place in America is not where you
america/index.html


graduation-rate-creeps-up-at-anchorage-school-district/

Hernandez Finch, M. E. (2012). Special considerations with response to intervention and instruction for students with diverse backgrounds.


Modeling and Control of a VEX Robot

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Abstract—Providing a robotic hardware and software platform on top of which students can implement and test their algorithms is an important aspect for robotic education. In this paper, we describe how one can use a commercially-available platform, the VEX robotic kit, as the robotic platform for an undergraduate course on robotic manipulator. After building a VEX robot, the robot, which typically includes a mobile base with a robotic arm on top, can be commanded to go through a sequence of “via points”. This serves well as an undergraduate project where knowledge in fundamental robotic science are expected and need to be applied. This paper describes the study of the VEX robot, including forward kinematics, inverse kinematics, and trajectory planning. Assessment results show that the project helped students to learn science and engineering principles, strengthened students’ interdisciplinary skills, and enhanced student’s capability on critical thinking. In our implementation, the robot uses integrated encoders to keep track of its own position and orientation. No additional sensors are needed other than the basic robotic kit. This allows the results to be easily reproduced at other institutions to teach concepts related to robotic manipulator.

Index Terms—Forward kinematics, inverse kinematics, trajectory generation, robotics education, VEX robotics.

I. INTRODUCTION

Providing a robotic hardware and software platform on top of which students can implement and test their algorithms is an important aspect for robotic education. This is firmly believed by researchers and educators in the robotic society who have used different robotic kits and platforms to supplement their robotic education [1]–[7]. The hardware platform used in our undergraduate robotic course is the VEX robotic kit [8]. The VEX robotic kit has been selected as the robotic platform for college-level robotic courses since it provides more flexibility in the mechanical design [9] and exposes students to various mechanical parts, electronics components, motors, and sensors. Another factor is the proper software support in true C environment. Relevant libraries are provided for controlling DC motors and reading signals from the sensors [10].

In addition to these features, the VEX robotic kit is selected for our undergraduate robotic course because the default construction yields a mobile robot with a robotic arm on top. This robotic system can be used to teach subjects related to both autonomous mobile robots (obstacle avoidance, map building, path planning) and robotic manipulator (homogeneous transformation, forward and inverse kinematics, trajectory generation). Construction of a standard robot can be achieved within several hours. This allows fairly quick assembly and dis-assembly of a robot, which happens often during a design process. The constructed robot has a good size and is solid enough to carry other components, making it possible for future extensions and expansions.

This paper documents a project used in our undergraduate robotic course, showing how a VEX robot can be used as a platform to apply the knowledge that students learned in class. The project starts by modeling a VEX robot, including selection of reference frames and obtaining of the forward kinematics. The students are then asked to perform analysis to derive the inverse kinematics. Based on the derived inverse kinematics, the objective of the project is to control the robot’s end-effector to go through a sequence of specified “via points”. Simulation is expected before implementation on the physical robot. Eventually, experiments will be conducted on the VEX robot for final demonstration and verification. Upon successful completion of the project, students will go through several key steps in solving an engineering problem, i.e., modeling, analysis, simulation, and experiment.

Our ultimate goal is to develop a sequence of projects that illustrate recent research results in the robotics society, as well as strengthen fundamental knowledge of the robotic science. All projects are tailored to the undergraduate level so that the students can conduct the projects themselves and possibly make contributions for further extensions and improvements. This can potentially lead to undergraduate research-oriented projects that occur in the classroom. The work in [11] that focused on coordination among autonomous mobile robots is our first move toward this direction. The work described in this paper aims at application of the fundamental knowledge of robotic manipulator.

The paper is organized as follows. Section II presents two different methods to model the forward kinematics of a standard VEX robot. Section III describes the derivations and results of the inverse kinematics. Simulations of the forward and inverse kinematics and trajectory generation are shown in Sec. IV. Section V presents experimental results of trajectory generation and path following, where the robot’s end-effector is controlled to go through a list of specified “via points”. Assessment results are given in Sec. VI, demonstrating the effectiveness of the project used in an undergraduate robotic course. Section VII concludes the paper.
II. FORWARD KINEMATICS

The forward kinematics of the robot can be obtained in different ways. One way is to interpret the overall robot as a three-link robotic arm installed on a mobile base (Sec. II-A). Another way is to treat the robot as an imagined “RPR” robotic manipulator (Sec. II-B).

A. Modeling the Robot as a Mobile Base with a Robotic Arm

The constructed VEX robot, as shown in Fig. 1, has a mobile base and a robotic arm installed on top. Intuitively, the forward kinematics from the end-effector to an inertial frame can be achieved by transformation from the end-effector to the base and then from the base to the inertial frame. Fig. 1 shows the selection of the reference frames, following the Denavit-Hartenberg (DH) assumption that the axis \( x_i \) is perpendicular to the axis \( z_{i-1} \) and intersects the axis \( z_{i-1} \) for \( i = 1, 2, 3 \) [12]. The frame \( \{I\} \) denotes an inertial frame. The origin of frame \( \{3\} \) denotes the position of the end-effector. The DH parameters of the three-link robotic arm that is on top of the mobile base are shown in Table I.

![Fig. 1. Modeling the robot as a mobile base with a robotic arm on top.](image)

![Table I](image)

<table>
<thead>
<tr>
<th>Link</th>
<th>( \alpha_i )</th>
<th>( \alpha_i )</th>
<th>( d_i )</th>
<th>( \theta_i )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>90°</td>
<td>( L_1 )</td>
<td>( \theta_1 )</td>
</tr>
<tr>
<td>2</td>
<td>( L_2 )</td>
<td>0</td>
<td>0</td>
<td>( \theta_2 )</td>
</tr>
<tr>
<td>3</td>
<td>( L_3 )</td>
<td>0</td>
<td>0</td>
<td>( \theta_3 )</td>
</tr>
</tbody>
</table>

The composite homogeneous transformation matrix from the tool frame to the inertial frame, i.e., \( H_3^I \), can be obtained as:

\[
H_3^I = H_0^I H_1^0 H_2^1 H_3^2,
\]  

where

\[
H_0^I = \begin{bmatrix} 1 & 0 & 0 & d_x \\ 0 & 1 & 0 & d_y \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix},
\]

\[
H_1^0 = \begin{bmatrix} \cos \theta_1 & 0 & \sin \theta_1 & 0 \\ -\sin \theta_1 & 0 & \cos \theta_1 & 0 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix},
\]

\[
H_2^1 = \begin{bmatrix} \cos \theta_2 & -\sin \theta_2 & 0 & L_2 \cos \theta_2 \\ \sin \theta_2 & \cos \theta_2 & 0 & L_2 \sin \theta_2 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix},
\]

\[
H_3^2 = \begin{bmatrix} \cos \theta_3 & -\sin \theta_3 & 0 & L_3 \cos \theta_3 \\ \sin \theta_3 & \cos \theta_3 & 0 & L_3 \sin \theta_3 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}.
\]

Here, \( d_x \) and \( d_y \) denote the translation vectors from \( O_I \) to the mobile base along the \( x_I \)-axis and the \( y_I \)-axis, respectively. Let \( P^I = [x, y, z]^T \) denote the 3D position of the end-effector in the inertial frame \( \{I\} \). \( P^I = [x, y, z]^T \) can be computed as:

\[
x = d_x + (L_2 + L_3 c_3) c_1 c_2 - L_3 s_3 c_1 s_2,
\]

\[
y = d_y + (L_2 + L_3 c_3) s_1 c_2 - L_3 s_3 s_1 s_2,
\]

\[
z = L_1 + (L_2 + L_3 c_3) s_2 + L_3 s_3 c_2,
\]

where \( c_i = \cos \theta_i \) and \( s_i = \sin \theta_i \) for \( i = 1, 2, 3 \).

B. Modeling the Robot as a “RPR” Robot

For a specified position of the end-effector, the robot can first rotate its base, translate its base to an appropriate location, and then lift its arm so that the end-effector reaches the desired position. This leads to a slightly different way of modeling the forward kinematics of the robot. That is, the robot can be imagined as an “RPR” robotic manipulator. Fig. 2 shows selections of the reference frames. Corresponding DH parameters are given in Table II.

![Fig. 2. Modeling the robot as an imagined “RPR” robotic manipulator.](image)

To distinguish between those variables used in the first modeling method (Sec. II-A, Fig. 1, Table I), here we use \( \bar{\theta}_1, \bar{d}_2, \) and \( \bar{\theta}_2 \) to denote the joint variables for this modeling method. Comparing between these two methods, one can see that the two sets of variables have the following relationship:

\[
\bar{\theta}_1 = \theta_1 + 90^\circ, \quad \bar{d}_2 = d_2, \quad \bar{\theta}_2 = \theta_2 + 90^\circ.
\]
Further, \( \theta_3 = \theta_3 \) in both methods.

The homogeneous transformation matrices between each two adjacent frames are:

\[
H_1^0 = \begin{bmatrix}
-\sin \theta_1 & 0 & \cos \theta_1 & 0 \\
\cos \theta_1 & 0 & -\sin \theta_1 & 0 \\
0 & 1 & 0 & 0 \\
0 & 0 & 0 & 1
\end{bmatrix},
\]

\[
H_2^1 = \begin{bmatrix}
0 & -1 & 0 & 0 \\
-1 & 0 & 0 & L_1 \\
0 & 1 & 0 & d_2 \\
0 & 0 & 1 & 0
\end{bmatrix},
\]

\[
H_3^2 = \begin{bmatrix}
-\sin \theta_2 & -\cos \theta_2 & 0 & -L_2 \sin \theta_2 \\
\cos \theta_2 & -\sin \theta_2 & 0 & L_2 \cos \theta_2 \\
0 & 0 & 1 & 0 \\
0 & 0 & 0 & 1
\end{bmatrix},
\]

\[
H_4^3 = \begin{bmatrix}
\cos \theta_3 & -\sin \theta_3 & 0 & L_3 \cos \theta_3 \\
\sin \theta_3 & \cos \theta_3 & 0 & L_3 \sin \theta_3 \\
0 & 0 & 1 & 0 \\
0 & 0 & 0 & 1
\end{bmatrix}.
\]

The composite homogeneous transformation from the frame \( \{4\} \) to the inertial frame \( \{0\} \) (also the frame \( \{I\} \) in Fig. 1) becomes

\[
H_4^0 = H_1^0 H_2^1 H_3^2 H_4^3.
\]

As a result, the position of the end-effector \( P^I = [x, y, z]^T \) can be computed as:

\[
x = d_2 c_1 + (L_2 + L_3 c_3) c_1 c_2 - L_3 s_3 c_1 s_2,
\]

\[
y = d_2 s_1 + (L_2 + L_3 c_3) s_1 c_2 - L_3 s_3 s_1 s_2,
\]

\[
z = L_1 + (L_2 + L_3 c_3) s_2 + L_3 s_3 c_2,
\]

where \( c_i = \cos \theta_i \) and \( s_i = \sin \theta_i \) for \( i = 1, 2, 3 \). Notice that (3) and (7) become the same when \( d_x = d_2 \cos \theta_1 \) and \( d_y = d_2 \sin \theta_1 \). Thus, the two modeling methods yield the same forward kinematics equations, under which the inverse kinematics will be derived and presented in Sec. III.

### III. Inverse Kinematics

Since (3) and (7) are essentially the same, (7) is used to derive the inverse kinematics. Given a 3D position of the end-effector in the inertial frame denoted by \( P^I = [x, y, z]^T \), the problem of inverse kinematics is to obtain possible sets of solutions for the variables \( (\theta_1, d_2, \theta_2) \). Notice that \( \theta_3 \) is a constant and is not a joint variable. Referring to (7) and denoting:

\[
k_1 = L_2 + L_3 \cos \theta_3, \quad k_2 = L_3 \sin \theta_3,
\]

\[
k_3 = z - L_1, \quad \bar{k} = k_3 / \sqrt{k_1^2 + k_2^2},
\]

we have:

\[
x = d_2 \cos \theta_1 + k_1 \cos \theta_1 \cos \theta_2 - k_2 \cos \theta_1 \sin \theta_2,
\]

\[
y = d_2 \sin \theta_1 + k_1 \sin \theta_1 \cos \theta_2 - k_2 \sin \theta_1 \sin \theta_2,
\]

\[
k_3 = k_1 \sin \theta_2 + k_2 \cos \theta_2.
\]

The third equation in (9) can be rewritten as:

\[
\bar{k} = \frac{k_3}{\sqrt{k_1^2 + k_2^2}}
\]

\[
= \frac{k_3}{\sqrt{k_1^2 + k_2^2}} \sin \theta_2 + \frac{k_3}{\sqrt{k_1^2 + k_2^2}} \cos \theta_2
\]

\[
= \sin \phi \sin \theta_2 + \cos \phi \cos \theta_2
\]

\[
= \cos(\theta_2 - \phi), \quad \phi = \tan^{-1}(k_1/k_2).
\]

Since \( \cos(\theta_2 - \phi) = \bar{k} \) and \( \sin(\theta_2 - \phi) = \pm \sqrt{1 - k^2} \), solutions of \( \theta_2 \) can be found to be:

\[
\theta_2 = \phi + \tan^{-1}\left( \frac{\pm \sqrt{1 - k^2}}{k} \right)
\]

\[
= \tan^{-1}\left( \frac{k_1}{k_2} \right) + \tan^{-1}\left( \frac{\pm \sqrt{1 - k^2}}{k} \right).
\]

Notice that there are two sets of solutions for \( \theta_2 \) due to the \( \pm \) sign in the above equation. Once \( \theta_2 \) is computed, the first two equations in (9) become:

\[
x = (d_2 + k_1 \cos \theta_2 - k_2 \sin \theta_2) \cos \theta_1,
\]

\[
y = (d_2 + k_1 \cos \theta_2 - k_2 \sin \theta_2) \sin \theta_1,
\]

leading to the following solutions for \( \theta_1 \) and \( d_2 \):

\[
\theta_1 = \tan^{-1}\left( \frac{y}{x} \right),
\]

\[
d_2 = \sqrt{x^2 + y^2 + k_2 \sin \theta_2 - k_1 \cos \theta_2}.
\]

In summary, solutions of the variables \( (\theta_1, d_2, \theta_2) \) are given below, in the order performed:

\[
\begin{cases}
\theta_1 = \tan^{-1}\left( \frac{y}{x} \right), \\
\theta_2 = \tan^{-1}\left( \frac{k_1}{k_2} \right) + \tan^{-1}\left( \frac{\pm \sqrt{1 - k^2}}{k} \right), \\
d_2 = \sqrt{x^2 + y^2 + k_2 \sin \theta_2 - k_1 \cos \theta_2},
\end{cases}
\]

where expressions of \( k_1, k_2, k_3, \) and \( \bar{k} \) are provided in (8).

### IV. MATLAB Simulation

Simulations of the forward and inverse kinematics and trajectory generation of the robot are presented in this section via three examples. The first example shows the forward and inverse kinematics when the robot is modeled as a mobile base with an arm on top. The second example shows the forward and inverse kinematics when the robot is treated as an overall “RPR” robotic manipulator. The third example demonstrates trajectory generation of the robot when the robot is commanded to go through a list of “via points” with specified positions.
A. Simulation of Forward and Inverse Kinematics

This example shows the forward and inverse kinematics of the robot when it is modeled as a mobile base with a “R” robotic arm on top. For a specified position of the end-effector, the robot will first rotate its base of angle $\theta_1$ to face the given point, translate a distance of $d_2$ to an appropriate location, and then lift its arm of angle $\theta_2$ to reach the desired position. Notice that due to the selection of the $\pm$ sign in the second equation of (14), there are two sets of solutions for the variables ($\theta_1$, $d_2$, $\theta_2$) for a given position.

Our constructed robot is measured to have the following information:

\[ L_1 \approx 0.24 \text{ (m)}, \quad L_2 \approx 0.22 \text{ (m)}, \quad L_3 \approx 0.18 \text{ (m)}, \quad \theta_3 \approx 50^\circ. \quad (15) \]

When $\theta_1 = -38.66^\circ$, $d_2 = 0.6403$ (m), and $\theta_3 = -36^\circ$, the position of the end-effector is computed to be:

\[
P'^1 = \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0.7754 \\ -0.6203 \\ 0.1542 \end{bmatrix} \text{ (m)}. \quad (16)
\]

Using the above $P'^1$ as the desired position for the end-effector, the following two sets of solutions are found according to (14):

\[
\begin{align*}
\text{1st Set of Solution} & : \\
\theta_1 &= -38.66^\circ \\
d_2 &= 0.6403 \text{ (m)} \\
\theta_2 &= -36^\circ \\
\text{2nd Set of Solution} & : \\
\theta_1 &= -38.66^\circ \\
d_2 &= 1.3456 \text{ (m)} \\
\theta_2 &= 171.34^\circ
\end{align*}
\quad (17)
\]

These two robot configurations are shown in Fig. 3:

![Fig. 3. Forward and inverse kinematics of the robot simulated using MATLAB.](image)

B. Simulation Using Robotics Toolbox for MATLAB

Forward and inverse kinematics can also be performed with the help of the Robotics Toolbox for MATLAB made by Peter Corke [13, 14]. Table III shows the code to generate a “RPR” robot using the toolbox. Notice that the last joint is actually fixed, though it is displayed as a movable revolute joint.

The Robotics Toolbox for MATLAB helps for the plotting of the imagined VEX “RPR” robot. Fig. 4 shows the two configurations of the robot where the end-effector is commanded to reach $P'^1$ as specified in (16). These two configurations correspond to the two sets of solutions of the inverse kinematics given in (17).

![Fig. 4. Forward and inverse kinematics of the robot when the robot is treated as an imagined “RPR” robot. This is implemented with the help of Robotics Toolbox for MATLAB.](image)

C. Trajectory Generation

This example shows the trajectory generation of the robot via a sequence of specified “via points” (Fig. 5). These “via points” are plotted as dots that are linked together using straight line segments. Four configurations of the robot are displayed. It can be seen that the robot’s end-effector can be commanded to reach these “via points” successfully. Details of the four “via points” and their corresponding joint variables are given in Table IV.

![Fig. 5. Trajectory generation through a sequence of specified “via points”. Details of the four “via points” and the corresponding computed joint variables are given in Table IV.](image)
TABLE IV
"Via Points" and Joint Variables for Trajectory Generation. Robot poses are shown in Fig. 5.

<table>
<thead>
<tr>
<th>Via Points</th>
<th>$\theta_1$</th>
<th>$d_2$ (m)</th>
<th>$\theta_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$[-0.9281, -0.0859, 0.3545]$</td>
<td>$-87^\circ$</td>
<td>0.5877</td>
<td>$86^\circ$</td>
</tr>
<tr>
<td>$[0.3380, -0.7990, 0.5861]$</td>
<td>$23^\circ$</td>
<td>0.9766</td>
<td>$175^\circ$</td>
</tr>
<tr>
<td>$[0.9977, 0.3834, 0.2020]$</td>
<td>$111^\circ$</td>
<td>0.7079</td>
<td>$61.6^\circ$</td>
</tr>
<tr>
<td>$[-0.2340, 1.0101, -0.0017]$</td>
<td>$-167^\circ$</td>
<td>0.7602</td>
<td>$26^\circ$</td>
</tr>
</tbody>
</table>

V. EXPERIMENTAL RESULTS

The robotic manipulator provides an experimental platform for students to verify their solutions for the forward and inverse kinematics and trajectory generation. The VEX robotic kit is selected as the hardware platform for our robotic course since it provides a combination of both mobile robot and robotic manipulator. For software, we selected RobotC [15] as the programming language due to its capacity in realizing complicated tasks. To achieve trajectory generation and path following for the robot’s end-effector in the 3D Cartesian space, the robot’s base will navigate through a sequence of waypoints, and lift its arm at appropriate angles to reach the given “via points” for its end-effector. Here we use waypoints to denote the positions of the center of the base and “via points” for the specified positions for the end-effector. The inverse kinematics provide the positions of the waypoints $(d_x, d_y) = d_2(\cos \theta_1, \sin \theta_1)$ and angles of the arm $(\theta_2)$. The robot needs to navigate through the list of waypoints and lift its arm properly.

In our current implementation, when the robot is at one waypoint (waypoint $i$) and needs to go to the next waypoint (waypoint $i+1$), the robot will first spin in place at its current location (waypoint $i$) to face the next waypoint (waypoint $i+1$). The robot translates to the next waypoint (waypoint $i+1$) and then rotates again to have the desired orientation $\theta_1$. Rotation of the base is achieved by moving the robot’s wheels on both sides in opposite directions. Translation is achieved by moving both wheels in the same direction. The right amounts of rotation and translation are ensured by the integrated encoders installed on the motors that drive the wheels.

Fig. 6 shows the experimental results, where the robot starts at origin and its end-effector needs to go through the following “via points”:

$$P'_1 = \begin{bmatrix} 0.6 \\ 0.1 \end{bmatrix}, \quad P'_2 = \begin{bmatrix} 0 \\ 0.6 \\ 0.3 \end{bmatrix}, \quad P'_3 = \begin{bmatrix} -0.6 \\ 0 \\ 0.5 \end{bmatrix}. \quad (18)$$

Simulation is first performed to verify that the desired poses are indeed reached. Then, the inverse kinematics equations are implemented on the robot using RobotC. The robot’s poses at the three desired positions are shown in Fig. 6. It can be seen that the robot’s end-effector approaches each desired position successfully.

VI. ASSESSMENT RESULTS

The project described in this paper was used in Spring 2018 at New York City College of Technology. The course CET-4952 is a technical elective for the CET major. It discusses both autonomous mobile robots and robotic manipulator. Typical students are junior and senior level students.

Motivated by the assessment method presented in [6], an assessment of the effectiveness of the project was conducted in Spring 2018 based on students’ anonymous survey. The following lists the seven survey questions asked:

1) The lecture motivated me towards the subjects of mobile robots and robotic manipulator.
2) The lecture materials helped me to understand the subjects of mobile robots and robotic manipulator.
3) The project was closely related and relevant to the topics we discussed in lectures.
4) The project helped me to learn science and engineering principles.
5) The project helped me to enhance interdisciplinary skills.
6) The project helped to enhance my capability on critical thinking.
7) Overall, the project improved my learning experience.

Among these questions, questions 4 to 7 are borrowed from [6] directly. Questions 1 and 2 are regarding the lecture materials. The rest of the questions are regarding the project. All questions have five choices: Strongly Agree (numerical value 5), Agree (numerical value 4), Somewhat Agree (numerical value 3), Disagree (numerical value 2), and Strongly Disagree (numerical value 1).

Using the numerical values to represent responses of the 20 participating students, the survey results are shown in Fig. 7. It can be seen that the lecture materials helped students to understand subjects related to mobile robots and robotic ma-
nipulator (Q2: average 4.25), the project was closely relevant to lecture materials (Q3: average 4.6), and the project helped the students to learn science and engineering principles (Q4: average 4.15), strengthened students’ interdisciplinary skills (Q5: average 4.0), and enhanced students’ capability on critical thinking (Q6: average 4.15). The overall learning experience using the project was also satisfactory (Q7: average 4.25). Clearly, the assessment results demonstrate the effectiveness of the project used in an undergraduate robotic course.

![Fig. 7. Survey results](image)

The survey results also identify one area for further improvement, i.e., on motivating the students. We would expect the students to be more motivated than what the current result indicates (average 3.7), especially when compared with the rest of the survey results (average 4.0 above). So far, the lecture materials were solely prepared by the instructors and then presented to the students. We are thinking to ask the students, possibly by groups, to choose a topic that is interesting to them and then present their findings to the whole class. Doing this way, students will be more participating.

By taking this course, the students can not only learn robotic theories, but also enhance their experience in hands-on experiments. In addition to practicing theories learned in class, students are also exposed to robot building components and programming in the true C environment. Students gradually learned to develop efficient strategies to debug and find where things went wrong. They used simulation results as guidance for implementation on the robot. Many groups did step-by-step comparisons between simulation and experimental results to accomplish the task successfully and quickly.

VII. CONCLUSION

For robotics education, providing hardware and software platforms so that students can build and program a robot is a very important aspect to facilitate students engagement and enhance their understanding. This paper studies a standard VEX robot for its forward and inverse kinematics, along with trajectory generation and path following. Both simulation and experimental results are presented.

This project, typically running eight weeks long, served as a project in an undergraduate robotic course to strengthen students’ knowledge related to robotic manipulator. We would like our students to be able to perform thorough analysis of a robotic system, built in house; use simulation to verify their derived equations, and then implement the equations and algorithms on the physical robot for final demonstration and verification. Upon completion of the project, students will go through the key steps in an engineering design process, including modeling, analysis, simulation, and experiment.

Both the selected hardware (the VEX robot) and software (RobotC) are appropriate and efficient for this project. We are also interested in expanding the functionality and capability of the VEX-based robotic system to more advanced tasks such as vision-based obstacle avoidance, visual servoing, visual tracking, and hand-in-eye configuration. These highlight directions of our future developments and efforts. Our ultimate goal is to develop a sequence of projects that illustrate both the fundamental aspects of robotic science and recent research results in the robotics society.

The work in [11] that focused on coordination among autonomous mobile robots is our first move toward this direction. This work aims at application of the fundamental knowledge of robotic manipulator. Future developments will focus on inclusion of a vision system onboard the robotic system so that students can explore real-time image processing, computer vision, and vision-based control.

REFERENCES

Title of Submission:
Empowering Pre-Service Teachers through Multicultural Education: Promoting Teacher Self-Advocacy.

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Abstract

The purpose of this proposed study is to explore ways in which to reorganize and renovate multicultural curricula to empower pre-service teachers before they enter the real world. The aim of this new multicultural curriculum is to promote teacher self-advocacy and teacher empowerment. This is significant because how can we expect pre-service teachers to empower and advocate for their future K-12 students if teachers in general are being silenced, oppressed, and marginalized by neoliberal politics (Apple, 2014; Lipman, 2011; Takata, 1991)? Thus, pre-service teachers must learn effective strategies in which to empower and advocate for themselves in school settings (Martin, 1991). One way to accomplish this is to use multiculturalism courses to empower pre-service teachers by teaching them the importance of teacher self-advocacy. This can be done by using Freire’s Adult Literacy Process and the Integrated Multicultural Instructional Design Framework. Freire’s Adult Literacy Process can create a multicultural curriculum that encourages pre-service teachers to think critically about the political forces that silence and oppress them. This can inspire pre-service teachers to use their voice as a tool to empower and advocate for themselves (Freire, 2000). The Integrated Multicultural Instructional Design Framework, on the other hand, can create self-actualized teachers who are committed to diversity, multiculturalism, and social justice for all marginalized groups in education, including students, parents, and even teachers (Higbee, Schultz, & Goff, 2010). By conversing with these two frameworks, multiculturalism courses can place more emphasis on teacher self-advocacy and teacher empowerment. This proposed study will stress the need for more research on teacher self-advocacy and teacher empowerment in the context of multicultural education. It will also benefit researchers and university faculty members because it will provide a new model in which to promote teacher self-advocacy and teacher empowerment in multiculturalism courses.
Furthermore, the findings of this proposed study can help guide and inform universities in the renovation of multicultural curricula.
Title of the Submission: Innovative Approaches to Reading Literacy Using Digital Learning Environments.

Level Up with Literacy: Writing for Games

Topic Area: Curriculum Research and Development  
Reading Education  
Secondary Education  
Educational Measurement and Evaluation  
Educational Technology

Presentation Format: We are open

Description: George Mason University-Virginia Serious Game Institute created Level Up with Literacy, an education-technology program designed to foster literacy, creativity, critical thinking and problem-solving skills in students who did not pass the SOLs in reading and writing during the previous year. The program is an innovative, engaging curriculum with personalized instruction to motivate students by connecting classroom learning with outside social activities through computer-based games. We will provide a review of pilot outcomes, including 58% of the students participating in the program passed their Reading SOLs, and the other 42% showed a significant increase during the 2016-2017 school year.

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Abstract: Technology has changed literacy and learning, presenting new challenges as well as opportunities for literacy instruction. Often technology is used only as a substitution for, rather than a complement to, the creation of new curricula to improve reading skills. Students who struggle with literacy are placed in remedial reading programs that focus on phonics and basic skills, which are often ineffective because they fail to engage students. Furthermore, this model negatively labels and marginalizes at-risk students, perpetuating low literacy achievement. To foster literacy, creativity, critical thinking and problem-solving skills in students who struggle with reading and writing, an innovative curriculum must be provided connecting classroom learning with outside social activities, in particular, Computer Games.

Mason Game and Technology Academy (MGTA) strives to be a preeminent provider of literacy education game programs for middle school students who have low literacy scores on the Virginia Standards of Learning (SOL) exams MGTA’s objective is to make measurable improvements in the lives of middle school students by improving their SOL scores through an interactive game. MGTA’s program served as a model education program for other computer-based literacy programs, by achieving excellence in effectively increasing student scores, maintaining professional standards, and operating in a financially sustainable manner with the ability to scale across the region.

MGTA’s game fully supports and reinforces the overall curriculum and lesson plans for Level Up with Literacy: Writing for Games, a curriculum that integrates STEM and Literacy for 6th, 7th, and 8th grade students. The program was the first interactive year-long digital literacy curriculum for
the Commonwealth of Virginia schools. The program is an innovative, engaging curriculum with personalized instruction to motivate students by connecting classroom learning with outside social activities through computer-based games. After a successful pilot during the 2016-17 school year our program showed improvement in SOL scores for all participants. Overall outcomes included:

- 58% of the students passed their Reading SOLs, and the other 42% showed a significant increase during the 2016-2017 school year.
- All students reported having a more positive attitude about reading books, and they had developed stronger literacy skills after taking the course; and
- The following academic year (2017-2018), high schools reported that every student had earned A’s and B’s in their English classes.
Abstract

The rate of Autism Spectrum Diagnosis (ASD) has increased rapidly over the past decade and currently affects approximately 1 in 68 children. The research base on inclusion in academics is vast, with little attention in the application of these same techniques to activities (extra-curricular, student government, etc.). Research indicates a correlation between the high school dropout rate and participation in extracurricular activities. Inclusive techniques in the area of activities are presented as follows: collaboration, coalition-building, and providing mentorship opportunities. Direct instruction for teaching social skills and the Hidden Curriculum are imperative for teaching communication skills and can be presented in unique ways reaching the entire student body. Activities (dances, lunchtime activities) are structured for success for students to participate in their way. The implementation of What if Week focuses on the entire school, effecting the school climate by embracing diversity.
1. Title of the submission.

Submission ID: 166

Submission Title: Decolonizing the Performance of Latinx Identity: Radicalizing the Classroom and Beyond

Revised Title: Decolonizing Educational Practices in the Classroom: Performing Latinx Identity in K-12 and Higher Education settings

Presentation Format: Paper Session

Topic Area: Cross-disciplinary areas of Education, Higher Education, Counselor Education, ESL/TESL, Teacher Education, Other Areas of Education

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6. Abstract

In our attempt to creatively and critically co-construct pedagogy on the disciplines of education and psychology, we explore how activism in our respective fields can be redefined in the current U.S. socio-political climate. Two case examples of performance activism in education regarding the decolonization of Latinx identity will address how performance can be used to spark dialogue, engaging classrooms and communities in critical social-emotional exchanges. The current socio-political climate in the U.S. inspired a radical re-conceptualization of how we train counselors and teachers, respectively, regarding the racism that exists (both) within and about Latinx communities. We assert the training of future counselors and teachers demands activism which involves an ‘evolution’ of the professional self, highlighting the importance of having a socio-politically informed professional identity in our current transnational context. This cross-disciplinary paper explores using performance as pedagogy in the training of counselors and
teachers where professors role-model de-colonizing practices in their higher education classrooms. This pedagogical praxis becomes a socio-political critique, exposing the insidiousness of white supremacy in both psychology and education. It de-constructs colonial narratives regarding Latinx identity to demonstrate how and why the complexities of white supremacy must be de-colonized in the professional training of psychology and education students. Using two different case examples, we intend to redefine the definition of activist/activism in psychology and education by utilizing performance as a teaching tool that inspires dynamic dialogue, engaging students to further inform their emerging counselor or teacher identity by claiming the activist role. In the first example, a Latinx professor explains how her ‘Payaso’ (clown) performance when training counselors is a form of activism with the goal of decolonizing Latinx identity and understanding internalized racism. The second example explores the complexities of the teaching methodology of ‘hot-seating’ a Latinx character from a children’s book to further perspectives of children’s literacy practices by a White professor and elucidates how performance can be used to address racism in the K-12 classroom. These are examples of how performance as pedagogy is a radicalizing act in the classroom and beyond which subverts white supremacy in psychology and education and begins to build a more just and humane world. We assert performance can be used as a tool for radicalization of the human spirit in the classroom and beyond.

Keywords: decolonial, education, Latinx, performance, activism, psychology, drama
Tortoise or the Hare: How Finish Order Relates to Performance on Exams and Quizzes

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Abstract

Our research first documented how finish order could serve as a model for prediction of performance on exams and quizzes. When our results showed that the best performers were typically finishing before more than half the students in any given class, and a bimodal relationship for the worst performers, we conducted an additional experiment to see if setting one submission time would ease any pressure from seeing the first finishers submit and thereby produce better test performance.
Every instructor makes assumptions about the performance of a student on an exam or quiz predicated on how quickly the student finishes. Teachers think, for instance, that surely the first ones done rushed and didn’t take care to do their best. Then, what do you do with those slowpokes who hand in their work in the final 60 seconds of a two-hour exam? Surely, they must have been stalling to cover up a lack of knowledge.

While all of these assumptions seem reasonable, there is limited research to confirm or negate these beliefs. In fact, most finish order research has focused on athletic performance. This study attempted to provide a starting point of research that answered the question of whether the hare or the tortoise performs better on tests in the classroom. After gathering our results, we had the opportunity to apply our conclusion in several classrooms. This produced some unexpected results that now bear further consideration.

By tracking scores based on finish order, the researchers sought to quantify how finish order correlated to performance on exams and quizzes. The goal was to use this as a first step to conducting a study that reaches across disciplines on campus. Ultimately, we hoped to see how the speed at which students finished correlated to how they performed and if there were differences by discipline.

Literature Review

Research on finish order has favored sporting contests with most researchers focusing on athletic performance (Albert, 1990; Selby & Eichner, 1996), race car drivers (Winner, 2006), and pari-mutuel wagering (U.S. Patent No. 9,652,926, 2017). Finish order as it relates to examinations has started to develop a place in research. Most of this research has focused on
finish order as a means of predicting final grades in a course or future action that a student may take based on the speed at which a test was completed.

Researchers at North Dakota State University (Hilliard, David, & Hill, 2015) attempted to determine if exam completion order is predictive of exam score and final grade in the class. In their study, four exams (3 -100 points each and 1 - 150 points) were administered to 120 undergraduate students enrolled in an introductory nutrition science course. Students completed exams in class, and the instructor maintained exams in the order in which they were submitted. Exam scores and student IDs were recorded by finish order, and final course grade was also recorded.

Hilliard, David and Hill (2015) found that finish order did not predict exam grade. Exam 2 and 3 finish orders were weakly, positively correlated with final course grade. They concluded that factors related to this correlation include: better student understanding of exam format and content leading to better student preparation, and more challenging content on exams.

A researcher in Texas (Henderson, 2003) observed the importance of speed in completing the LSAT examination and the few theoretical links between the time-pressure of completing the exam and the determination of law school entrance. The work found that time pressure correlated with a lower likelihood of completing the exam and applying to law school. The perception that a student was struggling with the exam also correlated with students demurring on application to prestigious law schools.

More recently, (Peverly et al., 2012) researchers measured how handwriting speed in taking notes could serve as a predictor of test performance. This work built off of previous research that found that handwriting speed was the only reliable predictor of note-taking, and
that note-taking was the only reliable predictor of test performance. What Peverly et al., (2012) found brought that earlier assumption into question. They did not find that same correlation.

Lewandowski, Gathje, Lovett and Gordon (2013) examined the test taking skills of college students diagnosed with ADHD and those without ADHD. College students with attention deficit hyperactivity disorder (ADHD) often request and receive extended time to complete high-stakes exams and classroom tests. This study examined the performances and behaviors of college students on computerized simulations of high-stakes exams. Thirty-five college students with ADHD were compared to 185 typical peers on measures of reading decoding, speed, vocabulary, comprehension, test strategies, time management, and test anxiety. Results indicated no differences between students with and without ADHD on various reading (decoding, speed, vocabulary, and comprehension) and test-taking variables (time utilization, navigation style, or strategy use), yet significant differences were present regarding their perceptions of, and anxiety during, test taking. It appears that students with ADHD perform similarly to peers on timed reading tests, although they think they perform less well and worry more about their performance.

Two of those researchers followed up with an examination of test-taking speed (Lovett, Lewandowski, & Potts, 2017). In their study, 253 students at two colleges completed measures of processing speed, reading fluency, and self-reports of their reading and test-taking skills, as well as a standardized paper-and-pencil reading comprehension tasks. The time taken to complete the reading comprehension task was not significantly related to students’ accuracy on the task, but it was predicted by students’ reading fluency and by their self-reports of problems with timed reading/test-taking. Students’ processing speed did not significantly predict task completion time or accuracy when reading fluency and self-reports were held constant.
Data Collection

In our study, we recorded scores on exams and quizzes based on the order of submission. The first submitted was No. 1 with following submissions assigned the next available number until the last. In the study we collected scores from a midterm, a final, and 12 quizzes conducted during the semester in a journalism fundamentals course. The scores were recorded based on finish order of the student taking the exam or quiz. Each of the exams and quizzes used in this study covered areas that we had taught and assessed in previous semesters. This had the advantage of allowing us to compare performance to previous semesters and look for any anomalies, and it afforded us the opportunity to test future groups using similar test questions. Because we had previous test data, we found that these students on the whole performed at a level consistent with their peers in previous semesters.

The study, which was seen as a pilot study for a campus-wide endeavor, was conducted during the fall 2016, spring 2017, and fall 2017 semesters. The average class size was 27 students, and all of them were majors or minors in journalism.

We initially examined the data for differences in performance between higher stake tests, the 100-point midterm and final, and lower stakes tests, the 20-point quizzes. The highest performers appeared in the first and fourth quartiles on the midterm and final (N=175). The worst performers appeared in the second and fourth quartiles. We then broke the results down into 10 percentile groups to see if there were further comparisons between the two test takers. We found the best test takers on the higher stakes offerings were submitting their exams after the first 20 percent of test takers and before the first half of the class was finished, or they were waiting and delivered their exams in the final 10 percent of submissions. The worst test takers were appearing after 30 percent of submissions were in, but before 50 percent of the class had
completed the exams, or they were waiting and submitting in the final 20 percent of the group. In fact, two of the worst scores were the final two exams submitted, but the top score on another test was also the last exam submitted.

We compared the high-stakes (N=175) and low-stakes (N=985) test results and found nearly identical performances, with the only difference being that the worst results were more diffused across the 10 percentile divisions. Combining the sample (N=1,160) we found the most successful test takers submitted their tests between the 20th and 40th percentile groups. The least-successful test takers had three peaks, with some appearing in the 20th percentile group, another batch in the 60th percentile, and the highest number of poor performances in the 80th and 90th percentiles.

Analysis and Recommendations

Our fundamental question – and the title of this research – was focused on whether the time taken for a test correlated with performance on those tests. We found that neither the hares,
the fastest test takers, nor the tortoises, the slowest test takers, were winning the race to the best grades. The best performances arrived before more than half the tests had been submitted. They tended to take some time, but not too much time relative to others in the classroom. We found that the worst test takers appeared to fit into two groups. The first ones we described as the “polite waiters.” This group did not have sufficient knowledge of the material to excel on the test, but rather than holding on to the test paper, they would wait until approximately the first quarter of test takers in the room had turned in their tests. They didn’t want to be too early to indicate that they didn’t know the material, nor did they want to ruminate until the last moment. The second group appeared to be struggling to produce the sought after answers in the allotted time, and would wait until about 80 percent of the tests had been submitted before turning in their attempts.

It was this last group that would seem to benefit from facing fewer time pressures. Based on our research and our literature review, we hypothesized that reducing time pressure by requiring students to submit exams at the same time, and not allowing anyone finishing before time was up to create additional time pressure by submitting early, we would see an overall improvement in test performance. In spring 2018, we tested this in three sections of journalism fundamentals over the course of five quizzes in the second half of the semester. A total of 61 students were tested in this fashion. We found that overall performance on the quizzes took an immediate dip, but then improved slightly. Average scores dropped 1.9 percentage points relative to the students that had submitted tests as they finished during the three semesters under study for the first two quizzes after instituting the change. However, the averages for the final quizzes were 0.3 percentage points better than the student averages in the previous three semesters.
This result has us planning to have one section take quizzes as they had prior to spring 2018 while another section will only be allowed to submit at the end of the allotted testing time so we can compare the two groups. We then plan to share our results with other disciplines on campus with the intent of expanding our data collection and ascertaining any differences that might appear relative academic discipline in the age-old race of the classroom hare and the tortoise. Ultimately, we seek to have recommendations that might help ensure greater student success in classroom test-taking environments.
References


Childrearing Challenges Custodial Fathers Face

Scott D. Wolfe

California State University Northridge

Topic Area of the Submission: Cross-disciplinary areas of Education

Presentation Format: Paper Session

This paper is about non-cohabitating fathers. It focuses on the challenges these types of fathers have and the communication impact on their children. It educates by bringing light to a growing issue in society, and these issues cross several disciplines.

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Childrearing Challenges Custodial Fathers Face:

From Loss to Building Strong Communication

Abstract

Custodial fatherhood is on the rise. This paper focuses on custodial non-cohabitating fathers, as they do not have the support structure of a cohabitating father. Custodial fathers that are not cohabitating have unique challenges in child rearing. The unique challenges that fathers experience may seem to have similar difficulties as custodial mothers but have unusual circumstances that affect children. This group of fathers experience unintentional shaming and discrimination that is very different than what other custodial parents experience. These types of fathers have different communication challenges when raising children, unlike other custodial parents. There is no support from another parent to go to for backing, advice, or to fill in the gaps in the ability or lack of ability the father has. Custodial fathers that are not cohabitating may lead a life of solitude and have a child-centered point of origin. This study will also examine the communication differences and expectations when it comes to daughters and sons. While this research concludes non-cohabitating custodial fathers face unique challenges, it does not make any conclusion regarding the impact this type of parenting has on children. Understanding the mental health of these fathers can ultimately lead to better education and resources needed to support the children during a great time of need. This is the beginning of a conversation as the dynamics of this type of family structure is becoming more prevalent.

KEYWORDS: Single fathers, widowed fathers, cancer, mother’s death, fathers, dependent children, single fathers rearing children, custodial fathers, non-cohabitating fathers.
Childrearing Challenges Custodial Fathers Face:

From Loss to Building Strong Communication

Parenthood: What does it honestly mean? Is it about men spreading their seed? Is about having you and your life partner join forces in raising your children? What happens when that relationship comes to an end? What happens when the other adult dies? The loss of a partner while raising children is not what most people will experience. In most divorces, the child does not lose one parent, but the time with each parent becomes divided. In other situations, one parent may be granted 100% custody of his or her child/ren, leaving them with only a mother or father to turn to for their needs. This type of circumstance is growing every day as the divorce rate increases.

What happens when the mother is no longer in the picture, and the father is the one raising the children? We will be taking an in-depth look at what happens when fathers become the custodial parent. Specifically, we will be focusing on custodial fathers who do not have a cohabitating partner. These fathers have to assume many roles in the life of their children. “Among divorced single parents, the majority of research has centered on single custodial mothers. However, single mothers and single fathers have different constraints placed on them, economically and socially, and their roles change in different ways following divorce,” (Hill & Hilton, 1999). As a non-cohabitating custodial father, I would like to shed light on the gaps in the research to better understand the dynamics that take place in the homes of these families. To better understand my perspective I will let you know that I became a 100% custodial father when my daughter was eleven years old, and my son was seven years old. I have been in this role for
nine years now. We will be examining what happens to many custodial fathers following a
divorce or loss of their partner and the type of communication that takes place between custodial
fathers and their children. We will be able to see that the loss of the traditional family structure
has many aspects that influence the communication between custodial fathers and their children.

The goal of this paper is to open the conversation and to educate the reader about the
unique needs of children of custodial fathers. This paper is going to cross disciplines as it brings
a better understanding, in the fields of Health, Communication Studies, and psychology, as it
explores the role of the “do it alone” father.

Custodial Fathers on the Rise

“Single-custodial father families” are defined as those “which fathers have primary
responsibility for rearing their children,” (Bronte-Tinkew, Scott, & Lilja, 2010). Single custodial
fathers in 1970, “were 10% of single parents; by 2003 they were 18%, increasing their numbers
from less than 400,000 in 1970 to 2.3 million in 2003 (U.S. Census Bureau, 2006),” (Hook &
Chakasani, 2008). “In 1970 although 1.1% of children under age 18 lived in a single-custodial-
father home, this number had climbed to 4.8% by 2005,” (Bronte-Tinkew, Scott, & Lilja, 2010).
The rise in custodial fathers continues to increase. According to the 2010 Census data, “single-
mother families increased from 3 million in 1970 to nearly 10 million in 2010. During the same
period, single-father families grew from 393,000 to about 2 million,” (U.S. Census Bureau,
2011b).

“Despite the rise in single parenthood, single fathers remain perhaps the least understood
group of parents,” (Goldscheider, Scott, Lilja, & Bronte-Tinkew, 2013). Two million custodial
fathers in 2010 are significant. However, ten million mothers doing the custodial parenthood alone are significantly more. There is no specific data that was discovered on the number of custodial fathers that are non-cohabitating, only insight into the types of relationships fathers have with their children that reflect cohabitating versus non-cohabitating fathers. We can assume that 50% of the fathers are cohabitating and relying on the cohabitating partner for support and child-rearing duties. That would leave approximately one million fathers doing sole parenting. Because of the small number of custodial fathers, we will be examining differences that fathers and mothers have at being the custodial parent. We will also be looking at what external and internal events affect the communication with the children and their custodial father.

**Effects of Losing the Co-Parent**

As life changes because of the death of a spouse or divorce, one finds themselves moving into a different realm of parenthood. “When children are involved, these losses are compounded, and the surviving parent not only loses the role of a spouse but gains the role of single parent,” (Hill & Hilton, 1999). The loss of a parental companion introduces a host of new roles and burdens that may lead to signs of depression in the remaining parental figure. “However, single mothers and single fathers have different constraints placed on them, economic and socially, their roles change in different ways following divorce, so it is expected that they may or may not experience depression, or they may experience depression differently depending on their circumstances,” (Hill & Hilton, 1999). After my divorce, I assumed the custodial role of two young children, which had a profound effect on who I was. In the beginning, I felt like a superhero and nothing affected me. I was distracted by work and my children, so I had no time
to be depressed or reflect upon the loss of my parental partner. I was determined that I was
going to be different from other divorcees and not get lost in my head and feelings. Before I
knew it, I was depressed just like the rest of them.

As I look back on my divorce, I can see that was only the first cause of my depression.
The fact of feeling the loss economically with only having one income made me have to stop and
think do I really need that and is it more important to get the things my child/children need
before I purchase something that I want and is not a necessity. I was also confronted with having
to move from the family home, the only home my children ever knew. “Following divorce, the
single parent loses resources that were provided by the former spouse, including income and
assistance with parenting and daily activities,” (Hill & Hilton, 1999). My world and lifestyle
were forever changed. “These changes disrupt the single parent’s role set which is defined as the
network of individuals who interact with one another in sets of complementary roles such as
wife-husband, parent-child, or worker-supervisor,” (Hill & Hilton, 1999). The reality of these
changes quietly settled in with me, and I was not even aware of them. “Pearlin (1989). reports
that problems within the role set are associated with depression,” (Hill & Hilton, 1999).

Another effect of divorce that I experienced is referred to as “role overload,” (Hill &
Hilton, 1999). The demands that were placed on me to provide financially and effectively parent
became too much, and I would sit on my bed and feel a sense of profound confusion. As a
man/father, I was not to show emotion because men are conditioned to be tough by society and
never be seen crying. “Though socially constructed and variable across history, time and place,
the embodiment of hegemonic masculinity is always synonymous with power, resource, and
authority,” (Oliffe, Kelly, Bottorff, Johnson, & Wong, 2011). The perception and teaching men
that we are supposed to be masculine the single non-cohabitating father is responsible for tasks and roles that are considered feminine. These new roles can and do become overwhelming.

“When the demand on single parents to be a housekeeper, caretaker, disciplinarian, and nurturers pass their capacities; they may experience role overload. Lack of role satisfaction and depression may be the outcome when the various roles of the single parent are overwhelming or incompatible,” (Hill & Hilton, 1999).

Between filling the role as sole financial provider for the family and increasing my involvement in my children’s lives, I had little time for anything else. I believed I could keep my mind off the divorce by immersing myself in work and my family’s well-being. This was an attempt to distract my depression so that I could avoid it. My behavior is very male type behavior; men are taught to fix things and issues versus listening and talking about them. “In the context of men’s depression, men’s reactions and actions are often influenced by their alignment to hegemonic masculinity,” (Oliffe, Kelly, Bottorff, Johnson, & Wong, 2011).

Ignoring my depression had the exact opposite effect on my mental health than my desired outcome; I was and felt trapped in the new role of parenthood. This behavior is referred to as “role captivity,” (Hill & Hilton, 1999). “Role captivity is another dimension of roles that may contribute to depression in single parents,” (Hill & Hilton, 1999). The time restriction caused by my new role profoundly limited my ability to maintain relationships with other adults, which further exacerbated the depression. “Role captivity may be an issue in the demands of the role mean that the parent has difficulty in pursuing relationships with other adults,” (Hill & Hilton, 1999).
Unintentional Shaming of Custodial Fathers

Today I was in the grocery store picking up something to make for dinner for my son Riley and I. While waiting in line to pay; I struck up a conversation with a woman next to me who also happened to be a single parent. She had two children that were approximately ten to twelve years old. She was telling me how hard it was to be a single parent. I explained to her that it gets easier over time and she immediately said to me that you would not understand because your children’s mother is the one who has had to deal with the children fulltime. I explained to her that I had raised my children alone and their biological mother has taken a back seat to their upbringing. So I could understand her frustration. Her comment to me was, Wow impressive and rare for dads to take over full time. The sentiment was expressed with a tone of sympathy and disbelief. I then gave her my usual response; I am man enough to admit that I have to be a mom most of the time. “Single fathers perceived a lack of social approval and confronted strong negative attitudes, even among teachers and family professionals, that only mothers are proper primary caregivers,” (Hook & Chakasani, 2008).

Fathers are faced with not only have to act as a male, simultaneously act as a female. This is the fine line that has to be balanced, by this group of fathers as expectations to be motherly. I have always found it to be insulting in some fashion, that the perception of single fathers has been one that I need to be more like a mother to raise my children. Last I looked I am still a man and a father. I had to look to answers of how I have to behave in Performance Studies, “the performance of everyday life,” (Jacobson, 1994). This made me realize that I had to play many roles and one of them was of a nurturer, more motherly. There are many roles each of us plays in our daily life; I am a business owner and employer, I am a friend, I am a father, I am
a mother, and I am many things every day. There are times I have to be more attentive and affectionate, and this can be regarded as the typical feminine role that is perceived as “motherly.” Fathers will instinctively be a different type of parent, “as individual approach suggest that sex differences in personalities or bodies create stable differences in parenting,” (Hook & Chakasani, 2008). As a single father, we are constantly compared to mothers and that our behavior has to mimic mothers. “Thus, even in identical structural positions, we can expect behavior to diverge by gender precisely because the structure position is incongruent with gender norms. There are contradictory forces simultaneously pushing single fathers toward and away from ‘mothering,’” (Hook & Chakasani, 2008).

**Discrimination of Custodial Fathers**

Since 1970 custodial fathers have pushed to even the playing field and stop the discrimination that exists.

The courts, social services and a large section of American society have set a “standards for care while defining primary male caregivers as insufficient, influences who cares for small children and shapes involvement of noncustodial mothers. The ideology extols a certain kind of mothering wherein maternal care is natural, necessary, and the more time-consuming, the better. Deviation from this is perceived as substandard parenting,” (Hook & Chakasani, 2008).

When I have approached this topic as discrimination, I have been pushed aside and told I do not understand what discrimination is. Even the courts have an “ideology of intensive mothering is also evident in the ‘tender years doctrine,’ which refers to the legal preference for awarding
custody of small children to mothers,” (Hook & Chakasani, 2008). We can also look to other parts of the government that look at custodial fathers as second-class parents and not worthy of assistance. “Low-income fathers describe how the welfare system and current policies try to limit their role to that of the economic provider,” (Heath, 1999). The same group of fathers state, “the tension between a welfare system intent on securing financial support from fathers and many ways fathers feel sabotaged by this system as they try to serve multidimensional father role,” (Heath, 1999). This is a direct presence of discrimination, “for community agencies and professionals such as teachers, judges, social workers, and doctors to be successful in providing services for single father families; it is critical that they first understand them,” (Currie & Sider, 2013). We must also remember that forgotten discrimination may come from custodial fathers employers. When custodial fathers “need a more flexible work schedule, but employers are not as sensitive to them as they are to single mothers. Employers as more accustomed to single mothers having to leave early, arrive late or miss work because of responsibilities with the children rather than single fathers,” (Hill & Hilton, 1999).

**Communication Challenges of Custodial Fathers**

We have examined the significant challenges custodial fathers face that are different then custodial mothers. As a custodial father, I have experienced these challenges from the day my spouse decided we were better apart then we were together. “Of all life stresses, loss of a spouse through death or divorce has been considered the most profound,” (Williams & Siegel, 1989). When you are a custodial father, you have very little time to deal with life stressors because you have your children to think about. Beyond the children and dealing with the male work
environment custodial fathers have very little time to grieve the loss of a parental partner. Men are not supposed to feel emotion, but we all know they do. Men tend to put on a strong front as to not let it be known that they have deep-rooted feeling and need to deal with them. This false front can best be described as “there is no crying in baseball,” (A League of Their Own).

The custodial father needs to be attentive to the children and their grieving process; “the manner in which a child progresses through the bereavement process and adapts to the loss of a parent is greatly influenced by the nature and quality of the relationship with the surviving parent,” (Grief, 1985). Because fathers have a much more difficult time dealing with their emotions, it becomes more challenging to have a child with positive psychological health. “Evidence has established a correlation between a parent’s emotional availability and parenting style, and the bereaved child’s psychological health,” (Grief, 1985). If the custodial father can have an open line of communication with the children, it will lead to less anxiety and depression. The communication needs to be child-centered to have the best possible outcome. “Specifically, children who report having open communication with their surviving parent experience less depression and anxiety. Additionally, preliminary evidence suggests that a child-centered parenting approach on the part of the surviving parent is associated with the child’s improved adjustment,” (Grief, 1985).

As a custodial father, I had to constantly try and be positive and reassure the children that everything was going to be all right. I needed to provide them a safe and loving attachment and environment. I would spend hours on the couch in the evening with the children snuggled under a blanket and watch the ridiculous television shows so they would feel dad is there for them. Even though I was always there for my children, I still had to be the disciplinarian. The
alternative was to let them walk all over me, effectively undermining my disciplinary role. I watched many parents that shared custody do the very thing because of the guilt associated with not being with the children more often. “Fewer mental health problems and greater psychological resilience in parentally bereaved children are positively related to surviving parents provision of emotional warmth (e.g., acceptance, praise, empathy) and consistent discipline,” (Grief, 1985). There are few differences between the roles and burdens of divorced custodial fathers and that of custodial fathers’ whose spouses have passed away. It was challenging to talk about my children’s mother in a positive light. I tended to be negative because of personal feeling. I did understand that I needed to let the children express their feelings good or bad about their mother. They had some very harsh things to say about her. I always attempted to give their mother a charitable reading and turn it into a positive.

“Maintaining children’s emotional connection to the deceased parent can be fostered by the surviving parents’ willingness to openly discuss with their children their remembrance and feelings of the mother or father,” (Grief, 1985).

The hardest part of being a single custodial parent was dealing with my anger, love, depression and still maintaining a positive outlook for my children. I will tell you the obvious, I was not the perfect parent, but I was a parent that was willing to try my best at keeping my emotions separated and not letting it affect my relationship with my children. There were many times that I was not able to mask my emotions, and my children were able to see them clearly. I knew that I needed to do my best because my children’s wellbeing was dependent on my emotional availability and state of mind. “The degree to which a surviving father is emotionally available to his children and attentive to their psychosocial needs is, in large part, dependent on his psychological well-being following the death of his spouse,” (Grief, 1985).
Daughter and Custodial Fathers Communication

As the father of a daughter and son, I had to maintain similar constructs, but they had to bend because of the age difference of three and a half years and the gender of each child. No matter how I tried to treat them equally, it was not possible. Someone that is not a parent might claim that gender should never determine actions and decisions but the reality is they do, this can be explained that girls mature faster than boys. In one of the few studies conducted in this area of research, Currie and Sider (2013). Interviewed three women who were raised by custodial fathers. A common thread of these fathers and was similar to my personal experiences is as a father I always need to be, “firm or strict, but also fair,” (Currie & Sider, 2013). Another issue that I had in communication with my daughter and is common with custodial fathers is dating and boys. I found this conversation to be difficult, as I want to protect my daughter and spare her from any and all negative feeling that come with relationships. This was an unrealistic expectation on my part. As “females got older they reported that their fathers were somewhat uncomfortable with them dating and with having boys in the house,” (Currie & Sider, 2013). The most important thing that I express with my daughter is education. As a father raising a daughter alone, I desired to make sure that no matter what happened in my daughter’s future she would get an education to fall back on. I wanted to make sure that she would never have to be dependent on a spouse or partner to survive financially. “School was of importance to their fathers, and their fathers were involved in their overall educational experience,” (Currie & Sider, 2013).

With my daughter, I placed great importance on extracurricular activities. I felt that no matter how much communication and openness I had with my daughter there was going to be
areas I would obviously not be able to fill. I looked to the equestrian world to help fill that gap in her life. There were several women at an equestrian facility that took her under their wing and gave her the female perspective that I could not. The desire of custodial fathers to give what they cannot is important, “being involved in the educational experiences of their child, all of the fathers were involved in the extracurricular activities that their child participated,” (Currie & Sider, 2013). Another area of keeping the lines of communication open with my daughter was being involved with her circle of friends. Our house was the house that all her friends would gather and spend the night. At times it was difficult, there was always extra children at our home for dinner, but it was important to be involved in my daughter's personal life. “Fathers were somewhat involved in their daughter’s personal life, knowledgeable about their friends,” (Currie & Sider, 2013). One of the issues that arose with my daughter was the “balance of being strict, but recognizing the daughters’ independence and ability to make her own decisions,” (Currie & Sider, 2013).

Other than verbal communication with my daughter some expectations allowed the relationship to move in a positive direction. I did the majority of the cleaning, cooking, groceries. You would think it would be the exact opposite when raising a daughter with a custodial father. Currie and Sider (2013) found this to be more of the norm than the exception. What I did expect from my daughter was, “in the absence of her mother her older sister took on the role of being a “mom” occasionally,” This meant that I would ask her to look after her younger brother from time to time.

The household that I tried to maintain and I feel I accomplished was a “family relationship of trust and respect,” (Currie & Sider, 2013). To build this relationship I needed to
be honest with my children. When the children asked a question or had a problem, I did not
dance around the topic. I had, difficult decisions without a partner or spouse to bounce it off of,
so I had to be honest and open with the reasoning of my decisions. It was challenging as a father
because instinctively I want to protect my child, emotionally and physically. “Safety is
traditionally understood to be free from harm or danger, and is a basic requirement for happiness
and thriving,” (Wright, Smith, Oka, & Karakurt, 2012).

I do know that not having a mother in the house made it difficult for my daughter. That
was an area that I could not provide the comfort or knowledge. I had to turn to female friends
for guidance with “situations such as choosing clothes, dealing with make-up, and responding to
some relationship issues,” (Currie & Sider, 2013). In some aspect, it made our family stronger.
“Without her mom, the family needed to work more as a team,” (Currie & Sider, 2013). Even
while raising a daughter as a single custodial father, these can lead to a daughter having, “trouble
communicating emotions to people,” (Currie & Sider, 2013).

Son and Custodial Fathers Communication

My expectations for my son are no different than they are for my daughter. I expect my
son to achieve in school. I am very involved with his education process. The educational staff
knows me on a first name basis because I am the parent that does not give up on their children
and keeps pushing for his success. No different then what I did with my daughter. I support his
extracurricular activities but can help him in very different ways then I did with my daughter.
My son's extracurricular activities are more in line with the events and activities I experienced
while growing up.
“Men’s and Boy’s relationships with their fathers might be among the most influential and socially significant same-sex relationship that they form in the life course,” (Floyd & Morman, 2003). The type of communication with my son is different; one can say more male pattern communication. “Communication has been found to be strongly associated with relational satisfaction and to be a critical component of relational maintenance in many significant relationships,” (Floyd & Morman, 2003).

The difference in the relationship is, as my son has grown older the amount of physical affection has changed. “Sociocultural proscription against overt male-male affection being influencing the communication patterns of father-son pairs when the sons reach adolescence and continue to mitigate against affection exchange in the relationship as the son grow into adulthood,” (Floyd & Morman, 2003). This is one area as a father I have struggled with because I am more affectionate with my daughter. I try not to be that way with my son and sometimes I have gone overboard. “Both fathers and sons value the expression of affection in their relationship,” (Floyd & Morman, 2003). I attempt to be more affectionate with my son; I feel our communication is stronger and that we have a closer bond. “Affectionate communication is strongly associated with both fathers’ and sons’ feelings of closeness to each other and their satisfaction with their relationship and with their communication,” (Floyd & Morman, 2003). I feel I get more of a benefit from it then my son does. One day if he has a son he will understand how important affection is. “Affectionate touch is very important to fathers and sons in their relationships, although more so for fathers,” (Floyd & Morman, 2003).

Throughout this research, a pattern has emerged that fatherhood is changing. Fathers are becoming more involved than they were in previous generations. “Fatherhood is conceptualized,
and the expectations that are placed on fathers have shifted significantly. Chief among those changes is the increased expectations that fathers should be more nurturant, more loving, and more involved in the raising of their children than fathers previously have been,” (Floyd & Morman, 2003). I will confess that I am much more affectionate and involved then my biological father ever was. The advantage that I had that has assisted me in navigating this with my son is the step-father that showed me as a young child it was okay to hug and be affectionate. I can say that I am much closer to my children than I am with my own extended family. I will have a relationship with my son that is very different, and then I have or will ever have with my biological father. “Greater relational involvement, satisfaction, and closeness with their sons than with their own fathers,” (Floyd & Morman, 2003).

As the amount of physical contact has decreased support for each other has moved into a different form of communication, one of supportive activities or communication. “Fathers and sons tend to express their affection toward each other more through supportive activities, such as doing favors for each other or helping each other with projects, than through direct verbal statements (e.g., saying ‘I love you’),” (Floyd & Morman, 2003). Society has set a pattern of norms for male-male relationships it may be wrong or right I do not know the answer to it other than it exists. Which may be considered problematic, “expressing affection or intimacy through activities rather than through overt verbal or nonverbal displays is a common pattern in male-male relationships, in which concern for avoiding potentially sexual interpretations of affectionate behavior appears to be stronger than it is in female-female or opposite-sex relationships,” (Floyd & Morman, 2003).
Discussion

As the amount of custodial fathers that are not cohabitating keeps increasing we need to have further discussions between these fathers and their children. We should not assume that mothers are going to be primary caregivers and that fathers are going to take the step back, fathers can be primary caregivers. There are many reasons why there is an upward trend of custodial fathers, but that is irrelevant. The reality is it is happening and that we need to keep making changes to accommodate it.

The effects and emotions on custodial fathers due to the loss of the other parental partner have to be acknowledged. Depression in custodial fathers is real and needs to be confronted by society as a whole. Hill and Hilton (1999) Suggest that this can ultimately affect the emotional health of the child that require the custodial parent's attention. Grief in children is addressed differently, and the parent needs to be emotionally available to help the children cope.

As custodial fathers navigate their own emotions and assist their children they have another hurdle to push through that is different from any other custodial parent. The hurdle is the unintentional shaming and discrimination that is placed on custodial fathers. Hook and Chakasani (2008), suggest that society looks down upon custodial fathers as if it was a stigma and an injustice to the child. My experiences with women that I have discussed my family situation have expressed a sentiment of sympathy and disbelief that a father can be the primary and possible only caregiver for children; as if the male species is not capable of providing nurture to a child. If the majority of women are directly asked the question, they will state men can do the tasks a mother can, but the actions and nonverbal cues send a much different message. They say one thing and believe another, especially when it comes to a father raising a daughter.
The custodial father acts and perceives parenthood differently than custodial mothers or cohabitating parenting. Research shows that custodial fathers tend to be more strict and easy going all at the same time. I have personally found myself in this paradigm, and through research, it has shown me that I am not that different. I have allowed my children the ability to have control over many aspects of their life (food choices, extracurricular activities, friends, and individual thoughts). Hook and Chakasani (2008) suggest that custodial fathers are less involved. Because the custodial father is less involved, it can be concluded that their children are more independent. Custodial fathers have more difficulty than other custodial parents when it comes to emotional communication. Floyd and Morman (2003) Suggest that is because male communication is verbal and more focused on and around specific activities. Custodial fathers do have day-to-day communication abilities; however, lack the construct of emotional and physical communication.

Custodial fathers place more direct emphasis on education than other custodial parents. This is an attempt to make their children more financially secure if they face the position of having to raise children on their own. Heath (1999) Has pointed out that social programs are not readily available for single fathers. Even though custodial fathers are raising daughters, they do not want them to have to rely on social assistance.

Expectations of a custodial father are that each member of the house share in the household responsibilities. This has to do with male pattern behavior which is activity based. Floyd and Morman (2003) Point out that task-oriented practice is more prevalent in male patterns of communication. The participation in household activities is a reflection of the heightened maturity level of children raised by custodial fathers.
A strong attribute to custodial fathers is respect and trust that is instilled in their children. Children raised by custodial fathers rely on participation, cooperation, and flexibility within the household structure. Because custodial fathers have higher exceptions, then other custodial parents, children have risen to the tasks at hand. These higher expectations can be accomplished if there are involvement and mutual trust within the family structure.

Conclusions

With the rise in custodial fathers, it has to be acknowledged that they have a difficult struggle that is very different from other custodial parents. This research begins with the struggle that custodial fathers have, as they may be similar to other custodial parents they are entirely different and unique. I recognize that there has been very little research done on this topic due to the limited number of custodial fathers that are not cohabitating. However, due to the limitations of the available research, it was necessary to rely on other disciplines of Psychology, Sociology, Family Studies, Marriage and Family Studies. The communications aspects of custodial fathers were expressed through male pattern behavior, and this had become apparent even though there are many cross disciplines involved. I recognize that this research is limited and further research needs to be accomplished. There is a need to better understand the communication patterns placed on custodial fathers. This is a field of study that needs to be further examined and explored in greater depth.
References


Submission to Book of Conference Proceedings

Title of the submission: Improving Preservice Teacher Learning Outcomes: A Service Learning Project at a Homeless Shelter

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Introduction to Issues

Each night in the United States, approximately 1.5 million children do not have a home to call their own (National Center on Family Homelessness, 2012). In the past few years, the number of children and families experiencing homelessness and extreme poverty has increased significantly across the nation. For homeless children, residence instability, frequent school changes, excessive absenteeism, and transportation issues present major educational challenges beyond those experienced by housed peers (Books, 2004; Powers-Costello & Swick, 2011; Sinatra, 2007). Rubin et al. (1996) documented that 75% of U.S. homeless children performed below grade level in reading and teachers may not have the necessary experience, attitudes, and beliefs to teach these students, thereby further delaying their academic achievement (Books, 2004).

Subsequently, Powers-Costello and Swick (2011) reported teachers can have a profound and positive effect on both the daily lives and the futures of homeless children. They maintained teachers’ perceptions—positive or negative—influence their interactions with children and their families and can have dramatic and long-lasting effects on the lives of the homeless children. Milenkiewicz (2005) found teachers’ perceptions about homelessness—student abilities and the importance parents place on education—were based on experience. Milenkiewicz reported, in most cases, negative perceptions—influenced by stereotypical images (e.g. homeless children being low functioning and having behavior problems and parents being lazy and irresponsible)—are the direct result of lack of experience working with homeless families. However, when pre-service teachers have the opportunity to work with homeless children and their families during a university-supervised and mentored internship, they develop the necessary skills, attitudes, and beliefs to teach homeless children (Sinatra, 2007).

Thus, teacher education programs should provide pre-service teachers with coursework in specialized academic interventions, an authentic field experience, and a supportive university mentorship so they can develop specialized skills and optimistic perceptions of children and families who face homelessness and extreme hardship (Books, 2004; Powers-Costello & Swick, 2011; Sinatra, 2007; Steinke & Fitch, 2014). This article addresses how the perceptions of elementary education pre-service teachers was transformed after enrolling in literacy tutoring internships for kindergarten through fifth grade students at a homeless shelter.

Purpose of Study

Service-learning is not a contemporary idea. John Dewey (1938) stated that education and learning are a social and interactive process, so educational institutions are the framework through which social reform can and should take place. In addition, he believed that students thrive in learning environments where they experience and apply the curriculum. He argued that the purpose of education should not revolve around the acquisition of a pre-determined set of
skills but rather the realization of one’s full potential and the ability to use those skills for the greater good. Dewey’s work influenced the implementation of present-day service-learning, an approach that connects traditional classroom experience with real-life lessons that come through service to the community.

A great deal of research has highlighted the benefits of integrating relevant service-learning opportunities with university coursework (Arrington, 2014; McDonald & Dominguez, 2015; Peterson & Bruster, 2014; Steinke & Fitch, 2014). Unfortunately, Smagorinsky, Cook, Moore, Jackson, and Fry (2004) found, for many pre-service teachers, an apparent great divide exists between their university preparation and what they experience in the classroom after graduation. For this reason, teacher-preparation programs must provide undergraduate education majors with university coursework and relevant service-learning field experiences that provide them opportunity to grow in knowledge, character, problem-solving skills, and understanding of civic responsibility—the foundation of an effective teacher (McDonald & Dominguez, 2015; Powers-Castello & Swick, 2011; Sinatra, 2007; Steinke & Fitch, 2014).

A thorough review of research revealed limited investigation of the issue of teacher preparation in working with children and families experiencing homelessness and extreme hardship and stress. The present study addresses this gap by presenting qualitative data concerning how providing (a) an authentic service-learning field experience at a homeless shelter, (b) on-site mentorship by university faculty, and (c) relevant coursework in assessment and research-based intervention strategies helped to transform the perceptions, attitudes, and beliefs of pre-service teachers.

**Theoretical Framework**

Reconstructing pre-service teacher perceptions, attitudes, and beliefs about homeless children and their families is grounded in legitimate peripheral participation theory (Lave & Wenger, 1991). Lave and Wenger (1991) based this theory on the belief that learning is social in nature, so it must be integrated into a community of practice for learning to occur. This theory is based on case studies of how novice practitioners learn in various occupational groups not characterized by formal training. Instead, training occurs within the learning situation (e.g. butchers in grocery stores). However, by comparison, legitimate peripheral participation theory is broader and more complex than the structure of the usual apprenticeship. It is a transitory concept—a bridge—through which concepts are taught in a formal learning environment (university classroom) and then applied in the context of a real-world situation (field experience internship). One of the principal effects of this theory is that it facilitates a transfer of learning to new situations in the context of a deeper understanding. This transfer occurs as the novice practitioners begin to understand the broader conditions to which their own efforts contribute (Lave & Wenger, 1991).

In this study, pre-service teachers tutored kindergarten through fifth grade struggling at-risk children at a city’s homeless shelter for families. The pre-service teachers enrolled in Corrections of Reading Problems were to student teach the following semester in one of the three public schools that serve the children living at the shelter. The knowledge and experience gained from interacting with others concerning this experience—peers, the university mentor, the staff at the shelter, the children, and their parents—as well as the learning gained through reflection on this experience enabled reconstruction of unfounded beliefs and perceptions to redefine the pre-service teachers’ identities as student teachers and future teachers of homeless children.

**Methodology**
Participants and the Service-Learning Field Experience

The pre-service teachers in this study were undergraduate elementary education students at a private liberal arts university in the Midwest. Students were enrolled in a one-semester, three-credit lecture course—Correction of Reading Problems—and a corresponding one-credit internship. These two 16-week courses are taught by the same university professor and are taken concurrently the semester before student teaching. Over a period of six semesters, data detailing the perceptions of 148 pre-service teachers were collected. Of the 148 pre-service teachers, 129 were female, and 19 were male; one of the pre-service teachers was African-American, one was Hispanic, and the remaining 146 were Caucasian.

The purpose of the Correction of Reading Problems Internship is to provide pre-service teachers with an opportunity to administer reading assessments, develop a reading intervention plan, and provide research-based reading intervention strategies to K-5 readers. Previously, the internship was held at the university education lab site, which served children of the university faculty and students. However, for this study, this service-learning field experience occurred at the city’s homeless shelter for families. During this study, pre-service teachers met the same course requirements as students interning at the education lab; in addition, they gained experience working with children and families experiencing homelessness, extreme poverty, and stress. While improving the reading achievement of the homeless children was welcomed, it was not the purpose of this study. Therefore, data concerning children’s reading levels were not collected for this study.

Immediately before the internship began, the pre-service teachers and university professor toured the homeless shelter and met with the director. Flyers informing parents about the tutoring program were distributed at the shelter. Parents registered their children for the tutoring program and received “fresh start points” for each session their child attended. “Fresh start points” are allocated by the shelter coordinator each time parents attended a workshop offered at the shelter. Parents then redeemed the points for household items once permanent housing was secured.

During the first four weeks, pre-service teachers received instruction on administering various formal and informal reading assessments and creating individualized reading intervention plans based on the analyses of assessment data. In addition, pre-service teachers explored how to select and administer research-based reading intervention strategies based on children’s individual strengths and instructional needs in relation to the five elements of reading instruction: phonemic awareness, phonics, fluency, vocabulary, and comprehension. The 5th week of the semester, pre-service teachers, accompanied by their university professor, began the internship tutoring children at the homeless shelter. This service-learning field experience project was held on Tuesdays and Thursdays from 6:00 p.m. to 7:00 p.m.

Data Collection and Analysis

Data for this study were collected from analyses of preprogram and postprogram anonymous evaluations written by the pre-service teachers regarding their semester-long work tutoring homeless children. The purpose of the evaluations was to gather information regarding the pre-service teachers’ (a) perceptions, attitudes, and beliefs about homeless children and their families and (b) whether the perceptions, attitudes, and beliefs changed (either positively or negatively) after the experience of working with the homeless. Written evaluations were collected the first and last weeks of the semester. In addition, the university professor kept a journal of anecdotal notes taken during each tutoring session at the shelter, as well as the questions and comments pre-service teachers made during on-campus lectures.
Course requirements for all pre-service teachers included case-study portfolios documenting their internship experiences tutoring a homeless child or a small group of homeless children. One section of this portfolio contained the pre-service teacher’s personal reflections on each tutoring session. At the end of the semester, these data, along with the preprogram and postprogram anonymous evaluations, and the professor's journal were analyzed and coded to identify common themes.

Results: Pre-Service Teachers Perceptions, Attitudes, and Beliefs

Prior to the Service-Learning Experience

None of the pre-service teachers involved in this study reported personally knowing anyone who had experienced homelessness. In addition, they revealed that they had little awareness of homeless shelters. Surprisingly, most were unaware that the homeless shelter for families was three blocks from campus and, at full capacity, could house 105 families. In general, the pre-service teachers indicated they were interested in helping children in need; however, most of them expressed concern that the tutoring would take place in the evening at the homeless shelter. A few of them also expressed a concern about the facilities being clean and safe.

The pre-service teachers noted they were unsure that they would be able to make personal connections with their respective homeless students, and they doubted their ability to help the students improve their reading skills because these children were experiencing extreme stress and hardship. In addition, a few of the pre-service teachers admitted they believed the homeless children may have limited cognitive abilities and efforts to improve their literacy development was unlikely. Overall, the pre-service teachers were interested in helping at-risk children; however, they were also apprehensive that tutoring children at the homeless shelter would be a successful experience.

During the Service-Learning Experience

Throughout the semester, following each tutoring session after the children had left the room, the pre-service teachers reviewed the evening—sharing successes and concerns with their peers and the university professor. In addition, the first 15 minutes of each on-campus lecture class was devoted to specific topics, questions, and concerns generated during the previous tutoring session. Both times were intended to be informal in nature and to allow pre-service teachers the opportunity to ask questions about various topics (i.e., instructional strategies; issues related to behavior, health, social-emotional well-being; and so on.).

Pre-service teachers were also encouraged to meet with the university professor privately with confidential concerns regarding their tutoring experiences. On one such occasion, a concern of child endangerment was shared with the professor, who then filed a report with the shelter and the department of social services. This concern was substantiated, and a family intervention plan was implemented by the family’s social worker. During the six semesters of data collection, this was the only incident of concern.

Regarding lesson planning, the pre-service teachers provided a detailed reading-intervention lesson plan to the university professor a week in advance of each tutoring session. Lesson plans reviewed the prior skills taught, materials used, and new skills introduced, as well as a detailed reflection on each tutoring session. All pre-service teachers completed this requirement, making for a rich and meaningful analysis of their perceptions, attitudes, and beliefs during this stage of data collection.
After the Service-Learning Experience

Upon completion of the tutoring experience, all but one pre-service teacher expressed sincere gratitude for the experience of working at the homeless shelter. The pre-service teacher who did not enjoy the experience stated she felt uncomfortable because parents were seated around the perimeter of the room where the tutoring took place. They could listen to her instruction, a situation she found uncomfortable and caused her distress. The other 147 pre-service teachers stated a desire to continue to work with children at the shelter because of the connection they made with their students and the many positive experiences they shared.

At the end of the course, pre-service teachers were asked to discuss their experiences working at the homeless shelter and whether they believed this was a valuable experience that should continue to be offered to all pre-service teachers. Students were given the opportunity to share any comment or information regarding their experiences during this internship.

The data, collected in the form of anonymous written statements, conveyed the pre-service teachers' thoughts:

Even though the practicum was tough, I felt that it was a very worthwhile experience. It took us out of our comfort zone and showed us the harsh reality some students face. It was often uncomfortable, but sometimes we need discomfort to help us to grow. Every education major should have this experience!

I liked the shelter experience. Actually, I loved it. I felt that it was a great opportunity for the children, but I also felt that it was very beneficial to me. It gave me an opportunity to see that the kids that live at the shelter are just kids. I also feel that we need experiences working with the students that don’t have the “typical” home life so that we are better prepared to have these children in our classrooms.

Another unanticipated finding came in a thank-you note from a social worker employed at the homeless shelter.

Most of the adults in this environment have interactions only with other adults in the same situation, which perpetuates their despair and feelings of helplessness. However, since some of the undergraduate students were adult (nontraditional) college students; as a result, they saw other adults—with families and challenges—making positive changes in their lives. Your students were great role models for both the children and their parents. Thank you for your work!

Limitations

Several limitations of this study should be considered when interpreting and applying the results. First, although this course is offered as an undergraduate course, it is not open to all undergraduate students. The undergraduate students enrolled in this course are pre-service teachers. Therefore, these demographics may skew the results of the study because the undergraduate candidates who enrolled in the course—Corrections of Reading Problems—already had a desire to work with and help at-risk students. If undergraduate participants not studying teacher education had participated, the pre-tutoring and post-tutoring feedback and overall experiences of the undergraduate participants may have been different. Second, the small number of participants in this study does not allow conclusions to be generalized across all tutoring situations.

Third, all the data collected from the undergraduate participants were self-reported. No data were collected regarding the homeless children’s achievement post-tutoring, so conclusions regarding the effectiveness of this study is based solely on the self-reports of pre-service teachers.
concerning changes in their perceptions, attitudes, and beliefs about working with homeless children. Tracking the reading achievement of the homeless children was not the purpose of this study. Finally, the author of this article served as both the instructor and faculty mentor for this course; therefore, the researcher’s status and enthusiasm for this project may have influenced changes in the participants’ beliefs and perceptions. However, the data collected from the undergraduate participants were in the form of anonymous self-reporting, so this last issue is not considered a major limitation.

Discussion and Implications

The purpose of this research was twofold. First, it was to determine whether and how pre-service teachers’ perceptions, attitudes, and beliefs about homeless children and families changed after tutoring K-5th grade struggling readers at a homeless shelter. Second, it was to use these findings to develop suggestions about how teacher educators can facilitate pre-service teachers’ learning by incorporating nontraditional service-learning field experiences to better prepare them for the challenges they will face when working with children and families experiencing homelessness and extreme hardship and stress.

Implications for Pre-Service Teachers

The data collected from the self-reported anonymous surveys and reflections indicated the pre-service teachers in this study changed their perceptions, attitudes, and beliefs about working with homeless children and their families. These beliefs changed as a direct result of this tutoring experience. At the beginning of this study, some of the pre-service teachers expressed concern about their ability to help homeless children make progress in reading. Some were also concerned with their ability to make personal connections with the homeless children and their families. Similar to the participants in a study by Friedland and Truscott (2005), pre-service teachers believed developing personal connections with students and their families was equally as important as teaching children reading skills.

Regardless of their initial concerns, however, the pre-service teachers in this study reported seeing positive changes in their students over time. Collectively, they also revealed that being part of the learning process and working with homeless children was a valuable learning experience. Data also indicated these pre-service teachers embraced working with the parents and felt as though the parents appreciated their efforts to help the children. Some pre-service teachers found it surprising that the parents expressed a sincere concern about their children’s academic progress and asked for advice on how they could support their children’s development.

Implications for Teacher Educators

According to the findings of this research, as well as related research (Arrington, 2014; McDonald & Dominguez, 2015; Peterson & Bruster, 2014; Powers-Castello & Swick, 2011; Sinatra, 2007; Steinke & Fitch, 2014), pre-service teachers experience many benefits from working in a service-learning field experience project. Teacher educators, as well as coordinators of teacher education programs, need to be aware of these benefits and implement service-learning in university field experiences. Given the research and my own experiences working with pre-service teachers, I suggest that service-learning field experiences should: (1) occur early and often within the teacher preparation program; (2) focus on both formal and informal learning; and (3) allow pre-service teachers to work closely with struggling at-risk students.

Service-learning field experiences should occur early and often within the teacher preparation program. When developing outlines for programs, in general, and courses, specifically, teacher educators and program coordinators should plan for pre-service teachers to
have service-learning field experiences with students early in the program (i.e., when entering
teacher education) and early in each methods course (i.e., reading, language arts, math, science).
That is, the field experience should focus on the application of the content of the course.
Whether the instruction is with a whole class, with a small group, or one-on-one, pre-service
teachers will be able immediately to apply the knowledge they have acquired in the university
classroom to their work with students, helping to reinforce and enhance their developing skills.

Further, by beginning service-learning experiences early in their program, pre-service
teachers will have more opportunities to make connections with students. In addition, they will
become aware of and acquire new teaching and behavior-management skills and become more
confident in those skills (Allor, Cheek Jr., Smith, & Schorzman, 2006; Arrington, 2014). All of
these were concerns the pre-service teachers reported at the beginning of this study.

Service-learning experiences should focus on both formal and informal learning.
Formal learning experiences—those in which the pre-service teachers have a specific task to
perform, such as implementing a reading assessment, monitored by a university supervisor or
cooperating teacher—are important because they offer the experience of applying the knowledge
presented in their university coursework. Such formal experiences may increase the pre-service
teachers’ confidence in carrying out the responsibilities of a teacher (Arrington, 2014; Steinke &
Fitch, 2014).

Informal learning experiences—those in which the focus is on the pre-service teacher
observing and spending time interacting with students and sometimes the classroom teacher—
may offer many of the same benefits as formal learning experiences. In addition, these types of
experiences offer pre-service teachers the chance to make personal connections with students.
Pre-service teachers in this study voiced concerns about making connections with students.
Teacher educators should acknowledge and address this concern by arranging experiences that
can serve to alleviate it. Only when this concern is addressed should university instruction focus
on acquiring and refining teaching skills. When pre-service teachers are engaged in early
service-learning field experiences, they have the opportunity to become more comfortable
interacting with students before assuming the role of teacher.

Service-learning experiences should allow pre-service teachers to work closely with
struggling at-risk students. In working with pre-service teachers at various stages in their
teacher preparation programs, I have noticed they are often unaware of their responsibility to
work with struggling at-risk students. They often think there is someone else (i.e., a special
education teacher, a school counselor, or a social worker) who is responsible for these students.
Often, pre-service teachers do not understand students in their classrooms will be working at
different levels and the teachers are responsible for the students’ instruction. However, when
pre-service teachers have the opportunity to work with struggling at-risk students, they begin to
take responsibility for the students’ success, thus helping to build the pre-service teachers’
confidence.

References
Arrington, N. M. (2014). Enriching teaching and learning in a teacher education course through a
field experience choice assignment in service-learning. *Journal of Education and Human
Development, 3*(2), 991–1016.
Erlbaum.


Submission to Book of Conference Proceedings

Title of the submission: Giving Kids with ADHD an Equal Opportunity to Learn
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Abstract and/or full paper:

Abstract

In the United States, approximately 11% of children 4-17 years of age (6.4 million) had a diagnoses of Attention-Deficit/Hyperactivity Disorder (ADHD) in 2012. Research suggests that rates have increased by approximately 30% since the late 1990s. Due to this prevalence, teachers will come into contact with students with ADHD. Therefore, teachers must know about effective interventions to alleviate some of the challenges students with ADHD may present in the classroom.

Introduction

The characteristics of ADHD include persistent inattention or hyperactivity-impulsivity that negatively impacts academic functioning (American Psychiatric Association, 2013). Researchers suggest children with ADHD are more likely to face social rejection than their peers are (Zentall, Kuester, & Craig, 2011). There are three subtypes of ADHD: predominately inattentive, predominately hyperactive-impulsive, and combined.

Predominately inattentive type. Students may experience difficulties in paying attention to details, making careless mistakes, listening when someone speaks, following instructions, finishing tasks, organizing tasks and activities, sustaining mental effort, keeping track of necessary supplies, avoiding distractions, and remembering daily activities (American Psychiatric Association, 2013).

Predominately hyperactive-impulsive type. Students may experience difficulties in keeping hands and feet still, staying seated, participating quietly in leisure activities, talking excessively, blurt out answers prematurely, waiting for a turn, and interrupting others (American Psychiatric Association, 2013).

Combined type. Students who have features of both inattention and hyperactive-impulsivity (American Psychiatric Association, 2013). This is the prevailing type of ADHD.

Recent studies have revealed many students are occasionally inattentive, shout out answers, and are disorganized. Evidently, the symptoms of ADHD occur on a continuum of risk, and therefore teachers may have students with undiagnosed, but moderate, signs of ADHD (Martinussen, Tannock, & Chaban, 2011). School-based ADHD interventions are effective at managing symptoms, but they are often individualized and time-intensive, and the teacher must sustain them. Consequently, teachers may not implement these interventions with a high degree of fidelity, and therefore the interventions may prove ineffective (Volpe, DuPaul, Jitendra, & Tresco, 2009).

Conversely, class-wide interventions can be more efficient than individualized interventions because they benefit the performance of all the students (Cole, Waldron, & Majd, 2004). Additionally, a class-wide application allows the individual student to remain anonymous,
since only the teacher knows which student’s behavior prompted the intervention. Unfortunately, new teachers may not be familiar with effective class-wide interventions for ADHD.

The UDL School Environmental Supports and Instructional Strategies for ADHD

In the ideal classroom, there are clearly defined classroom rules and expectations, an organized environment, and structured routines. Teachers should not isolate children with ADHD symptoms in the classroom, but they should give such children preferential seating at the front and center near the teacher. Peers who are good behavioral role models should sit nearby. All students should use a quiet study area throughout the day. Activities should be stimulating, interesting, meaningful, and involve many hands-on projects rather than seat work or lectures. Careful attention to schedules and routines is necessary to ensure fluctuations in energy levels. In other words, teachers should provide an adequate balance of low- and high-energy activities throughout the day.

Classroom organization/procedures/rules. Good classroom organization benefits all students and is essential for students with ADHD. Teachers should establish clearly marked locations for students to store materials. Sometimes color-coding those areas can help students to remember where materials belong. Minimizing the clutter in a classroom can reduce student confusion. Teachers should clearly explain classroom procedures and rules at the beginning of the year and periodically review them (DuPaul & Weyandt, 2006). Teachers should stick to a few procedures and rules, phrase them in a positive manner; telling students what to do rather than what not to do. Procedures and rules should be posted clearly in full view of all students. Furthermore, teachers should express appreciation when students follow classroom procedures and rules. Students with ADHD may need copies affixed to their work folders or to their desks, and they should receive more frequent praise when following the rules (Piffner, Barkley, & DuPaul, 2006).

Instruction. Teachers should give directions clearly, concisely, and in multiple ways. For instance, the teacher should clearly state the directions as well as posting written or pictorial directions. They may need to simplify or repeat complex directions. Teachers should make sure students understand the directions before beginning the task by asking them to repeat the directions. The focus should be on errorless learning rather than trial-and-error learning. Errorless learning seeks to reduce incorrect responding as the student gains mastery over learning the new skill (Mueller, Palkovic, & Maynard, 2007). The theory is that learning without mistakes is more effective and lasts longer. With trial-and-error learning, students may learn something that is wrong or learn to do something incorrectly; they then have to unlearn and relearn the correct information or process, which is especially challenging for students with ADHD. Errorless learning is not always totally errorless, but, more often than not, is error reducing.

Assignments. Teachers should give students task choices for classwork projects. They should allow students to choose from several options such as a choice of assignments to complete, a sequence of steps within an assignment, or individual versus partnering for a project. The various options should all lead to similar outcomes and use the same specific skills (Kennelly, Flannery, Considine, Doherty, & Hynes, 2014). Research shows that increasing rates of active, accurate student responding increases learning rates. Because students choose their assigned tasks, there is a clear impact on students’ on-task behaviors and, consequently, their learning rates (Johns, Skinner, & Nail, 2000). Students with ADHD may require modifications in the length or content of assignments. As students demonstrate success with shorter assignments,
teachers can gradually increase the length of assignments, thereby shaping task-related behavior to match classroom norms. This strategy, paired with teacher praise on task completion, is effective for these students (DuPaul & Stoner, 2003). Teachers should provide a record of assignments to go home. Often, families of students with ADHD need to help the student follow through at home.

**Student self-monitoring.** Students with ADHD can often participate in the evaluation, improvement, and monitoring of their own behavior. This process allows them to take ownership of change and to gain pride in accomplishing improvements (Fitzpatrick & Knowlton, 2009). With student input, teachers should select one behavior, agree on the nature of the problem, and agree on what would characterize improvement. Together, teachers and students should develop a rating scale to evaluate behavior and document improvement. The teacher should teach the student to use the rating scale by verbalizing aloud while practicing the decision-making process (Fitzpatrick & Knowlton, 2009). Technology can help students to self-monitor their behavior. Clear evidence exists that self-monitoring one’s performance can improve such performance (Falkenberg & Barbetta, 2013). Widely available technologies, such as tablet computers or smartphones, can make tracking easier. Bedesem and Dieker (2014) demonstrated that technology supports can enable students to do for themselves what others previously had to do for them—track their academic and behavioral performance.

**Student self-reinforcement.** In self-reinforcement, students with ADHD award themselves a reinforcement if they determine they have met the criterion for the targeted behavior (Reid, Trout, & Schwartz, 2005). Reinforcers are usually tokens or points. Evidence indicates that self-determined contingencies may be more effective than teacher-determined contingencies (Agran, Wehmeyer, Cavin, & Palmer, 2010). Self-determined contingencies may include having students select their own reinforcers, having students set the criteria for earning reinforcers, or both. To implement self-reinforcement, Agran et al. (2010) recommend allowing the students to determine any or all of the following: (a) the criterion for reinforcement, (b) the nature of the reinforcer, and (c) the amount of reinforcement to be earned. Because students with ADHD tend to set lenient self-reinforcement contingencies, students may need to be guided to set higher standards, especially when self-reinforcement is being used for academic performance.

**Computer technology and classroom peers.** Academic interventions can be effectively delivered through computer technology and classroom peers. Several studies have shown that computer assisted instruction in reading (McClanahan, Williams, Kennedy, & Tate, 2012; Volpe, Burns, DuBois, & Zaslofsky, 2011) and math (Bryant, Bryant, Gersten, Scammacca, Chavez, 2008; Carr, 2012) leads to significant improvements in on-task behavior and academic performance for students with ADHD relative to written seatwork conditions. Similarly, class wide peer tutoring can be used to enhance task engagement and academic performance for all students, not just those with ADHD (Ling, Hawkins, & Weber, 2011). As our society and students become more and more diverse, it will be essential to use a variety of approaches. The combination of academic intervention and self-monitoring and self-regulation strategies may promote academic skills gains beyond teacher-, computer-, or peer mediated interventions alone.

**Conclusions**

Although this discussion is not exhaustive, it introduces new teachers to the essential features of a UDL environment for addressing the needs of students with ADHD. It is important to realize that many still view individualized interventions for students with ADHD favorably
and they are valuable options for teachers. However, the use of UDL interventions has a distinct advantage, because they can benefit all of the students in the classroom and not just those with ADHD.

References


“Speaking with Conviction: Diminishing Student Anxiety to Increase Class Participation”

**Topic Area:** Communication Education  
**Presentation Format:** Workshop  
**Presenters:** Scott D. Wolfe and Monique Gevorkian of California State University Northridge Communication Studies Department  
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Specializing in Communication Studies and education, this 90-minute workshop will aid educators worldwide in increasing student participation in class discussions and as well as confidence during presentations. About 3-4 activities will be presented that instructors can utilize in their classrooms, focusing mainly on (1) diminishing the fears that hold students back from participating and (2) creating more confident and refined speakers. During the workshop, attendees will get their feet wet with run-throughs of each activity.
To the program directors at the 2019 Hawaii International Conference on Education:

We’d first like to thank you in taking the time to review our submission and working hard to put together an amazing conference for educators everywhere to prosper in their goals. Our goal with this 90-minute workshop is to refine and build the student’s ability to communicate interpersonally within the classroom. As you may already know, public speaking is ranked as the number one fear in the United States—this ranking is higher than the fear of death itself. As educators and scholars within the Communication Studies discipline, we can attest that students that are more comfortable in themselves and their classmates are more likely to grow as people and take in more from the lesson plans. An uncomfortable classroom can stunt the growth of students, limiting their potential to become involved in class activities and classroom discussion/interaction.

A number of students regardless of discipline will avoid interaction with classmates, resorting to using their phones, creating an even more avoidant classroom environment, rather a thriving environment that fosters growth. Students’ social anxiety has potential to rob students of cultivating into the individuals who are the future of our world. With this workshop, we will provide educators activities they can use in order to create a comfortable classroom environment that students look forward to entering. Our workshops will focus on students reducing self-consciousness, becoming more relaxed in sharing their ideas in class discussions and presentations, as well as teaching students how to present information with confidence and powerful delivery. Each activity will be demonstrated and by having participants interact in our activity demonstrations, they will be able to better remember and understand how the activity works.

Throughout our time teaching Public Speaking, Scott and I have had numerous students report to us how we have become more confidence people, diminished or at least greatly reduced the fear of getting up in front of the class, and how they looked forward to coming to class each day. This workshop can help instructors add to their teaching tool box things they can employ in their own teaching methods to add dynamism, enjoyment for students, and greatly ease the dreaded social anxiety that comes with unfamiliar faces in the classroom. Students will be more excited to learn, feel more comfortable speaking their minds, as well as articulating themselves in a powerful and dynamic way.

We look forward to chatting with you about this further and hope to see you soon at the upcoming convention. Have an amazing day and do not hesitate to email us with any questions or comments!

Warm regards,

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Developing Early Literacy Skills with Bilingual Families

Topic: Early Childhood Education

Presentation Format:
Poster Session

This presentation focuses on the importance of developing early literacy skills in the first five years of life. It also demonstrates how parents, family members, educators, and the community can help children grow and develop these skills through various strategies.

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The first five years of a child’s life is very important in terms of learning and developing key skills that will help them in the future. It is due to this importance that parents and family members play an important role in the development of these skills, in particular early literacy skills, or the precursors to reading and writing that will allow them to be successful as time goes on in school. For Latino families, these early literacy skills come into play in two languages, otherwise known as biliteracy. Because children growing up in Latino households are considered emergent bilinguals, or children with the potential of learning two languages, the need for resources, strategies, and tools for parents and teachers to support their growth and development is necessary. Through the research, it has been noted that parents have so much to provide to the education of their children, through their funds of knowledge, as well as that their involvement leads to academic success (Moll, Amanti, Neff, & González, 1992; Lefevre & Shaw, 2012; Durand, 2011). As children grow and develop their biliteracy, it is necessary that parents, family members, and teachers know how to support them on this quest, as it is one that is dynamic and complex from child to child (Reyes, 2006). For this reason, this presentation seeks to help Latino families and teachers in developing their children’s early literacy skills, as well as their biliteracy skills and bilingualism.
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Skills Students Need When Entering Kindergarten

It's a month into school. Everyone around me is holding their pencil and making motions. These motions end up in their name, we've been tracing it over and over in class, but today it is just a paper, no tracing. I grab my pencil and move it up and down, but I can only create lines, it doesn't come out the way the others have it. Until school started, I never grabbed a pencil, I never saw my name in writing...this is just one challenge. We move on to the carpet and the teacher brings out the letters, some of the other students are screaming out names, but those letters mean nothing to me. We go onto math.... the teacher starts counting 1, 2, 3, and gives us teddy bears to count with, it is my turn to count... 1, 2, 5... that's all I know, so I stay quiet. The kids around me are counting to 10, but I just can't so I start to cry. Why can't I do it? My teacher says to practice, but how?

The population of Latino students in schools has increased over the past couple of years. According to the United States Census Bureau (2017), 57.5 million people are of Hispanic descent, making it one of the largest minority groups in the country, and of that, 15.3 million reside in California alone as of 2016. Of these 57.5 million, 24.7% are students enrolled in school grades K-12. Students of Latino descent, who are also growing up as emergent bilinguals, not only are growing up with two languages, but also with a series of obstacles that stem from their Socio-economic background, SES. As these children grow up, many times their family members and parents do not know how the educational system work, or know the language, or how to involve themselves in their child’s education to help them along the way (Orr & Rogers, 2011). Aside from these obstacles, parents of Latino students many times work long hours and do not speak the language of the school, but they hold education at a high priority (Pstross, Rodríguez, Knopf, & Paris, 2016). Latino parents
and family members want to see their children succeed, and it is because of this that it is necessary to empower them and lead them to develop the correct strategies to help their children succeed. As parents, family members, and teachers there is an immeasurable amount of knowledge and resources that can be used to help our children succeed.

In the past, Latino parents have shied away from the school environment, not only because of their lack of knowledge, but also because of the barriers that schools themselves have erected. This marginalization of Latino families begins with the lack of cultural representation in schools, which form a distinctive barrier between the school majority and minority groups. Latino families find themselves in an educational setting where English is the primary language, and many times their culture is not represented leading them to feel a disconnect, which is intensified by the attitudes that schools tend to have towards them (Orr & Rogers, 2011). Because Latino families typically work long hours, they are unable to attend important meetings or school events, which typically are held in English, rather than in a language that is relevant and understandable for them. Not only does this create a disconnect, but when Latino families are able to approach schools based on concerns they have about their children, they are looked at as problematic, and this feeling further distances them from the school (Orr & Rogers, 2011).

Due to a lack of understanding of what Latino families need to involve themselves in school, community organizations have begun to pave the way to make Latino families feel welcome, while supporting and empowering them. Some examples of organizations at school are the PTA, Padres en Acción, and Padres Poderosos. These are organizations prevalent in the Santa Ana Unified School District, each targeted at empowering parents. The PTA allows for parents to become a part of the school setting, organizing school events,
participating in school policies, and raising funds for the school. The program Padres en Accion, also allows for parents to be a part of the school setting, but in an effort to provide better opportunities for students. They organize enriching activities to perform with students during their recess time, whether it is organized sports, or reading with the students, this allows for them to be close to their children and be seen in the school. Lastly, the new workshop series Padres Poderosos, aims to target parents of children from birth to five years of age to provide them with the skills necessary to build literacy, nutrition, and mathematical skills early on. Because parents, family members and teachers want their students to succeed, it is necessary to provide them with the tools necessary to make this a possibility early on.

Through the work conducted by Pstross et al. (2014) and Jasis and Ordañez-Jasis (2005) the effects that empowering parents and family members with the correct tools is apparent, as all of these parents and family members were able to take a stand, have a voice, and help their children reach their educational goals after they were given the information and resources necessary. This empowerment of course began from the information and resources that educators gave the parents, but later became self-empowerment as parents began to act of their own accord to support their children in their areas of need. Once self-empowerment occurred, parents and family members encouraged others to join in the organization for the betterment of their children and were able to speak for their cause. This empowerment stems from their access to information that they never knew or understood before as well as their involvement in school, whether this be through parenting, communicating, volunteering, learning at home, decision making, or collaborating with the community (Epstein, 2011). Therefore, understanding that parents
and family members have a key role in the development of student learning, given the tools and resources, the following is a sample entry level assessment into kindergarten with helpful strategies to lead children into successful mastery.

**Vignette #3 Exclusion of Latino Families**

*Lucia’s teacher has been calling me for a couple of days now and sending notes home, but I do not understand what she is saying. I cannot speak English, and when she calls I am working. I want the calls to stop, and I want to understand what’s going on, but I don’t know what to say or where to go. I need to ask for a day off of work, but I don’t know if my boss will give it to me. I’ve tried to go after work, but the school is closed by then, so the calls keep coming.*

*I had to excuse myself from work for a day because I am sick, so I have decided to go with Lucia to school. She walks with me through the school, and I am completely lost. There is no familiar face or my language here. Everyone is talking and interacting in their own world, and I am just trying to follow my daughter and get to the bottom of these calls. We finally get to Lucia’s classroom, and her teacher greets me in English. I only know the basics so I say “hello.” Her teacher then proceeds to talk to me so quickly I can only pay attention to her motions. She turns her back to me as she finishes writing something on the board, and then asks me, “Do you have any questions?” I understand the word questions and say, “No” to which she says, “Thank you,” and motions to the door. The meeting is over and I didn’t understand what she said, but I do not want to look bad in front of the teacher so I say goodbye to Lucia and walk away...unknowing of this world of school my child is in.*

**Reflection**
1. How do the language differences between home and school affect the exchanging of information?

2. How do these differences, then affect the development of a relationship between home and school?

3. How does a lack of understanding of home life affect this interaction?

4. What can be done by schools and teachers to make this interaction better for parents?

5. Is this something commonly seen and sometimes unnoticed in your schools?

6. What can be done to support emergent bilingual family partnerships?

**Vignette #4 Inclusion of Latino Families**

There’s a meeting today at my daughter’s school. The school has been sending flyers about closing the campus down because of their concern for school safety. The school has notified all parents through letters and phone calls for the past two weeks. These letters and phone calls are luckily translated, or else I wouldn’t know what they said. I work mornings, so I usually can’t attend the meetings that are held at school, but this meeting is actually being offered twice. One in the morning and another in the afternoon at 5pm making this the perfect time for me to attend.

As I walk into the school, I am able to say hello and greet my neighbors that are also attending the meeting. There are signs around the school in English and in Spanish. As I wait for the meeting to get started I notice my daughter’s teacher on the side of the room and decide to approach her. She smiles at me in recognition, we’ve only met once, but she has made sure to let me know of any concerns over the phone after work, knowing my work schedule. She doesn’t speak Spanish very well, but she tries, just as I try to understand her
English. As the meeting begins, it is presented in both languages so that we all understand, and we are able to ask questions about the new campus safety measures the school wants to take. I leave the meeting with a better understanding the issues the school has and knowing that I was a part of the decision process.

Reflection

1. How does this story compare to Vignette #3?
2. What makes it possible to have a relationship between home and school possible in this story?
3. How has the school made sure that they are keeping families informed and involved?
4. What knowledge of language and culture of the community has the school acquired to become successful in communicating with parents?
5. What model does your school setting follow? Is it helping or hindering parent interaction?

Based on the need for parent and family member interaction and their importance to early child development, it is important to begin with what is expected of children as they begin school. The following is a sample entry level assessment for kindergarten. As young children come into school, it is hoped that their mastery of these areas has been accomplished or at least practiced at home. For this reason, the attached assessment is provided so parents and family members can not only test the knowledge of their young children, but also practice these skills through the strategies provided.
**Kindergarten Entry Level Assessment**

*Evaluación de entrada a Kinder*

Name/Nombre_________ Date/Fecha_____

1. Can write name/Escribe su nombre

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Developing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Si</td>
<td>No</td>
<td></td>
<td>En desarrollo</td>
</tr>
</tbody>
</table>

2. Recognizes and names letters in the alphabet/Reconoce y nombra letras del alfabeto

Upper Case/Mayúsculas____/26 Lower Case/Minusúsculas____/26

<table>
<thead>
<tr>
<th></th>
<th>Aa</th>
<th>Bb</th>
<th>Cc</th>
<th>Dd</th>
<th>Ee</th>
<th>Ff</th>
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<tr>
<td></td>
<td>Gg</td>
<td>Hh</td>
<td>Ii</td>
<td>Jj</td>
<td>Kk</td>
<td>Ll</td>
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<td></td>
<td>Mm</td>
<td>Nn</td>
<td>Oo</td>
<td>Pp</td>
<td>Qq</td>
<td>Rr</td>
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<tr>
<td></td>
<td>Ss</td>
<td>Tt</td>
<td>Uu</td>
<td>Vv</td>
<td>Ww</td>
<td>Xx</td>
</tr>
<tr>
<td></td>
<td>Yy</td>
<td>Zz</td>
<td></td>
<td></td>
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</tbody>
</table>

3. Can count to 10/Puede contar hasta 10

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
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</table>

4. Recognizes numbers/Reconoce numero

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</tr>
</thead>
</table>

5. Recognizes shapes/Reconoce las figuras

<p>| | | | |</p>
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</thead>
</table>

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1. Begin by writing your child’s name, naming all the letters in their name. This can be done at any age beginning at a few months to a year old so that they can see print.

   Empiece por escribir el nombre de su hijo/a, y nombre las letras. Esto se puede hacer a cualquier edad empezando de algunos meses a un año para que empiece a ver la letra imprenta.

2. Develop a song for your child based on their name so that they know what letters are in their name. This can start from birth. Hagan una simple canción con el nombre de su hijo/a para que sepan las letras del nombre.

   a. example/ejemplo: J-E-S-S-I-C-A Jessica, Jessica! /Cómo te llamas, cómo te llamas, Jessica, Jessica, cuales son las letras, cuales son las letras, J-E-S-S-I-C-A, Jessica!
3. With finger food you can start forming the letters of your child’s name first, and then encouraging your child to form them as well and naming the letter. *Con comida simple puede empezar a formar las letras del nombre de su hijo/a primero, y después tratar de que su hijo/a las forme también, mientras nombran la letra.*

**Letter Recognition/ Reconocimientos de letras**

![Alphabet Board](image)

1. Sing the Alphabet song, show the video, point to the letters on an alphabet board while singing the song. *https://youtu.be/75p-N9YKqNo Cante la canción del alfabeto, enseñe el video, y apunte a las letras del alfabeto mientras canto con su hijo/a. https://youtu.be/MO3xvPyBzmw*
2. With finger food you can start forming the letters in the alphabet just as you did with their name, and then encouraging your child to form them as well and naming the letter. Con comida simple puede empezar a formar las letras del alfabeto como lo hizo con el nombre de su hijo/a primero, y después tratar de que su hijo/a las forme también, mientras nombran la letra.

3. Starting at age 2-3 you can start forming letters with a variety of means.

-Beans, pasta, whipped cream, water, chalk, crayons, markers, pom poms, paper, playdough etc.

One letter a week, while also pointing out different items that start with the letter of the week. For example, the letter A, you can eat apples during that week, while pointing out airplanes, ants, animals, acorns, astronaut etc.

Empezando a los 2-3 años puede empezar a formar letras con una variedad de cosas.

-Frijoles, pasta, crema batida, agua, giz, crayones, marcadores, pom poms, papeles, playdough etc.

Una letra a la semana, mientras también nombra cosas diferentes que empiezan con la letra de la semana. Por ejemplo la letra A, puede comer arroz, mientras nombra cosas como avión, araña, árboles, arco iris, anillos, abeja y etc.
Numbers/Numeros

1. As children are growing up simply counting with them begins to reinforce a sense of number recognition. So as parents and family members start counting from 1-3, then 1-5, and finally 1-10, as they are able to count correctly. *Al crecer, simplemente contando con ellos refuerza un reconocimiento de números. Como padres y familiares empiezan a contar primero del 1-3, después del 1-5, y finalmente del 1-10, al tiempo que los niños puedan contar correctamente.*

2. Start counting items around the house and outside, anything that your child finds interesting, and have them repeat after you count. *Empiece a contar objetos en casa y afuera, lo cual le interese a sus hijos, y que ellos repitan después de ustedes.*

3. Use a daily calendar to go over the number of the day and count to that number during the day and try to find it in daily life through objects and numbers. *Usen un calendario para repasar el número del día y contar hasta ese número al día, y intenten de encontrarlo en objetos de la vida diaria y en números.*
4. Finally, the most important strategy to learn numbers is to discuss numbers and numerical equations in daily life with your child. For example, if you look at a garden and you see a group of flowers growing, you can count the number of flowers growing and their petals, as well as create a number sentence, such as 2 red flowers + 1 white flower = 3 flowers. These simple math discussions will help your children as they enter Kinder and builds their language.

Finalmente, la estrategia más importante para aprender de los números es hablar sobre ellos y hacer oraciones numéricas en la vida diaria. Por ejemplo si ven un jardín y ven un grupo de flores creciendo, pueden contar el número de flores y sus pétalos y también pueden crear una oración numérica, como 2 flores rojas + 1 flor blanco = 3 flores. Estas discusiones le ayudarán a sus hijos en matemáticas cuando entren a Kinder y también ayuda con su lenguaje.

**Shapes/ Figuras**
1. Pick a shape to concentrate on for the week, and show your child how to make it, noting the strokes it takes. Create the shape using those strokes through different means such as beans, sand, markers, play dough, whipped cream, and anything else that is tactile. Escoja una figura para concentrarse para la semana, y enséñele a su hijo/a como hacerlo, notando los pasos para construirlo. Crea la figura usando los pasos con diferentes medios como frijoles, tierra, marcadores, play dough, crema batida y cualquier otra cosa que sea tactil.

2. Find objects in real life that match the shape of the week in household items and toys. Encuentre objetos en la vida real que sean la figura de la semana en la casa y en los juguetes.

3. Outside the home identify the shape of the week in different places such as parks, supermarkets, as your driving, and anywhere else you might see a shape. Fuera de casa identifica la figura de la semana en diferentes lugares como parques, supermercados, cuando manejen y donde quiera que puedan ver figuras.
Biliteracy Development in the Home
Importance of Parent/Family Involvement

The first five years of a child’s life are crucial to development, as it is in these five years that key learning takes place that are precursors to academic and language success (NAEYC, 2017). During these first five years, parents and family members become a child’s first teachers, therefore it is necessary to understand what an important role this is, as their involvement has been proven to lead not only to literacy success, but academic success as well. Parents and family members play an important role in a child’s education, as first teachers, they set the precedence as to what a child will learn as well as their perceptions on learning are able to form. In involving parents and family members in this learning process at a young age it is important to note that there are different types of involvement according to Epstein (2011): parenting, communicating, volunteering, learning at home, decision making, and collaborating with the community. Any of these forms of involvement make it possible not only for learning to take place, but also for the parental and family presence to be felt. When this involvement takes place, the likelihood of the development of early literacy skills, also known as a child’s early understanding of pre-reading and writing before the fact, rises which are also tied to future reading and writing success in school (Huisman, 2012).

The development of these early literacy skills is done through meaningful opportunities in the day to day life of a child through play, talk, songs, reading and writing. These opportunities for growth and learning make it possible for students’ brains to develop the literacy skills they need to be successful in their future school years. Therefore, parental and family involvement encourages the development of these key skills, which
have been proven to be linked to motivation and success in school (Izzo et al. 1999; Huisman, 2012, 398; Louie & Davis-Welton, 2016; Cummins, 2011; Lefevre & Shaw, 2012; Durand, 2011). The following video does a great job of expressing the importance of family interaction in early childhood development, which in turn has an effect on a child's literacy.

https://youtu.be/x1Vk2kLPDi0

Effects of Involvement Through the Years

Academically

As noted previously, there is a strong correlation between involvement and academic success. Through their involvement, parents and family members can help their children learn the key skills they need for school and lead them to become successful (Lefevre & Shaw, 2012). Englund, Luckner, Whaley, & Egeland (2004) looked into involvement in the early years and discovered it to be a predictor of achievement in third grade if it occurred early on. Involvement in the early years of school, kindergarten and first grade, as well as at home participation, is found to have a positive effect on children and leads their overall reading, writing, and language skills to develop at a level that does not compete with those students with parents that are not involved.

In low economic families, involvement has also proven to be a predictor of academic success in literacy skills. Izzo et al. (1999) was able to reach the same conclusion as Englund et al. (2004) finding that involvement early on led to academic success in each school year and reaching literacy success by third grade, even with students who began kinder struggling. Involvement, therefore is a strong factor that parents and family members have control over, whether it is attending conferences, informational meetings, to parenting and learning at home.
Aside from having a positive effect academically, involvement also leads to better social behaviors. When parents and family members are a part of the educational well-being of a child they are less likely to have aggressive or aversive behaviors presented in school settings (Hoglund et al, 2015). With parents and family members becoming a part of a child’s education, not only do their academic skills develop, but their social behaviors decrease and they are able to feel better about themselves knowing someone is there caring about them (Hoglund et al, 2015).

Because of its effects on academics, parental and family involvement needs to be encouraged in home and school settings, especially as children begin to grow and develop. This involvement is crucial to develop their understanding of literacy skills as well as their ideas of learning, which later on prove to be helpful as they go through the different grade levels.

<table>
<thead>
<tr>
<th>Family Literacy Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Trips to the Library</td>
</tr>
<tr>
<td>Through trips to the library, the exposure to all different types of texts is possible. Not only is there exposure, but children and parents are able to look into books of their interest and learn together about the content.</td>
</tr>
<tr>
<td>Family Book Bags</td>
</tr>
<tr>
<td>Families can create, weekly or monthly book bags in which they include books of their interest to share with their children at any time, or for their children to look through on their own.</td>
</tr>
<tr>
<td>Family Journaling after Reading</td>
</tr>
<tr>
<td>The exposure and connection of words to print is very important in the development of literacy skills. Children are already exposed to print through texts, but after reading, families can interact even more with their children through journaling activities about the texts they have read. They can ask their children to explain the story and write it down for them and then can have children draw a picture about what they have said. Doing this early on, exposes children to what they will be doing later on in school.</td>
</tr>
<tr>
<td>Creating Shopping Lists</td>
</tr>
<tr>
<td>By creating shopping lists together, children are able to see that there is a connection between words and the real world, especially when...</td>
</tr>
</tbody>
</table>
Interacting with Letters and Sounds

Showing children at a young age the letters of the alphabet and the sounds they make is beneficial to encourage reading and writing during school.

Bilingual Development

Involvement not only affects academics and behaviors, but it also affects the way that bilingual students develop languages. In developing bilingual students, that is students that are able to communicate, write and read two languages at any given level the need for parental and family involvement is crucial, not only in fostering the early literacy skills aforementioned, but also in forming the language perspectives in a child. As children begin learning two sets of literacy skills they begin forming their biliteracy, which simply means literacy in two languages at varying degrees for different audiences (Dworin, 2003).

Students that are growing up in bilingual households have the potential of developing two languages, if their literacy skills are fostered and the language perspectives are formed in a positive way. Biliteracy development is a complex process that is different from child to child (Reyes, 2012). It is able to be developed through an interaction with family members, peers, and communities (Reyes, 2012). Through this interaction and exposure to language children are able to develop two languages, as long as they are given equal and apt amounts of opportunities to practice them. By immersing students in bilingual environments, students have the opportunity to use language in different contexts, making language development possible, as well as being able to tranlanguage, that is switch from one language to the other based on a particular situation (Reyes, 2006). By allowing students, not only to be immersed in bilingual environments, but also to use both languages to communicate and understand the world, biliteracy skills and metacognitive skills are
able to be developed in a way that monolingual children, or students with only one language, lack (Reyes & Azuara, 2008).

Because language begins to develop off of the interactions with family members and parents, it is important to note the effects that these adults have on the portrayal and perspectives of language. From a young age, children who have been exposed to bilingual settings, are able to differentiate between languages. Reyes and Azuara (2008) found that at a young age, children begin to understand that there are differences between the sounds of languages, in this case Spanish and English, and the way they are written. Not only can they differentiate between differences in the sounds and writing, but they are also able to perceive the perspectives held by parental or family members (Martinez-Roldan & Malave, 2004). If for example, parents avoid speaking a language, or discourage the speaking of a certain language, children are quick to understand that this language is not appropriate.

For children growing up as emergent bilinguals, with the potential of learning two languages, this is something that parents, family members, teachers, and the community must avoid. These key people in the formation of language perspectives must put equal weight on both languages so that these emergent bilinguals grow up favoring both equally and do not diminish one for the other (Martinez-Roldan & Malave, 2004).

In order to help emergent bilinguals, become bilingual members of society, there is a need to establish and promote programs, resources and strategies that allow two languages to flourish. Because many schools are English only, the potential for bilingualism in children can go unnoticed (Soto Huerta & Riojas-Cortez, 2014; Delbridge & Helman, 2015). The majority of emergent bilinguals are enrolled in schools such as these that do not offer them the chance to develop their bilingualism, therefore hindering their potential. For
this reason, it is necessary to use parents and family members as the first line of resource for biliteracy and bilingualism to form as children begin to grow.

Encouraging the Development of Two Languages

<table>
<thead>
<tr>
<th>Bilingual/Dual Programs</th>
<th>Programs that encourage the fostering of two languages are extremely beneficial for children to be exposed to the target languages and develop them side by side.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spanish and English Workshops</td>
<td>Resources such as workshops provided in the home language are important to include family members that might not necessarily speak English. Providing these workshops at different times of day is also key to encourage parent participation.</td>
</tr>
<tr>
<td>Bilingual Texts</td>
<td>Using texts that are in the targeted languages exposes children to the differences in print language, while also demonstrating to them that both are valued at home.</td>
</tr>
<tr>
<td>Bilingual Settings</td>
<td>At home, encouraging the idea of a bilingual household where both languages are valued equally has a strong effect in the development of biliteracy and bilingualism.</td>
</tr>
<tr>
<td>Visual Aids</td>
<td>Showing children pictures and labels to objects in both languages increases their vocabulary development.</td>
</tr>
<tr>
<td>Vocabulary Bridges</td>
<td>Just as visual aids encourage vocabulary development visually, vocabulary bridges allows print in both languages to go side by side to increase their vocabulary.</td>
</tr>
<tr>
<td>Translanguaging</td>
<td>Lastly, allowing students to jump from one language to the other in order to explain information or make sense of it, is important and should be encouraged.</td>
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</tbody>
</table>

Translanguaging

Using a funds of knowledge perspective inside the classroom is a beneficial way for children, parents and teacher to connect to one another’s cultural and language backgrounds (Moll and Gonzalez, 1994). However, it is not the only tool to promote and foster biliteracy and bilingual development, as there is also the use of translanguaging. Translanguaging is a valuable tool for the continuous development of two languages.
Translanguaging is the use of two languages to communicate simultaneously (Garcia, 2009). When using translanguaging in the classroom and the home the best practice is to be in a bilingual setting where the use of two languages is welcomed. Reyes (2006) found that children who grow in bilingual environments, that is, environments that expose children to two languages, are able to perform various tasks across the languages, such as reading a book in Spanish, but explaining it in English or vice versa. This translanguaging allows children to communicate through the languages they feel comfortable in, which allows both of them to develop simultaneously.

Through translanguaging, children not only learn to develop two languages, but their understanding of language and bilingualism grows as they begin to decipher the language types they will use with the different people around them (Reyes, 2006). This is also due to the fact that developing bilingualism is a bidirectional process, meaning that it happens simultaneously from one language to another (Dworin, 2003). Developing bilingualism is a complex process that is different from child to child, and for this reason their development of both languages can be very different (Dworin, 2003; Reyes, 2006). At one point, the line between first and second language blurs as their proficiency in each language changes prominence (Dworin, 2003).

Due to the complex and dynamic nature of bilingual acquisition and development, using translanguaging at home and in the classroom, leads to beneficial effects on students. This allows for students not be held back from learning or speaking a language due to a lack of vocabulary knowledge or skill. Translanguaging allows students to use all of their knowledge in any particular language and deliver it simultaneously switching back and
forth at any given time or with any given concept. The use of translanguaging gives children
the power to choose their own language and develop it at their own pace.

Example of Translanguaging in the classroom: Gigi, a native English speaker works
on a Spanish picture matching game on an iPad. She needs to be able to match a picture
being shown to the correct word but is stuck on the picture of the whale.

Gigi: Mrs. Amado que es in Spanish? (Mrs. Amado what is this in
Spanish?)

T: Tu que piensas que es? (What do you think it is?)

Gigi: Es un whale, que es Spanish? (It’s a whale, but what is in Spanish?)

*She then proceeds to ask her peers for help*

Que es Spanish?

Peer: Una ballena. (A whale.)

Gigi: Un este(Ballena) eats a mantarraya. (A this (whale) eats a stingray.)

T: De veras? (Really?)

Gigi: Si, I watch that in movie, and he ripped the mantarraya. (Yes, I
watch that in movie, and he ripped the stingray.)

T: Oh, una ballena se come los mantarrayas. (Oh, a whale eats stingrays.)

Gigi: Si, un ballena come mantaraya like this. *Opens her mouth to
demonstrates how* (Yes, a whale eats the stingray like this.)

In this example, Gigi was able to move from one language to the other, while explaining
information that she knew about whales and stingrays, based on her prior knowledge. This
is something that should be encouraged, either at home or in school, in order for children
to develop their two languages.
Parents/Family Members as Resources

Parents and family members are children’s first teachers. They are also responsible for the language and learning perspectives that children will have as they grow and develop into the school years and as they become members of society. For this reason, it is necessary to look into the hidden and many times overlooked resources that parents and family members have to offer, which is their funds of knowledge. Funds of knowledge, a term coined by Moll and Gonzalez (1994), that refers to the knowledge that is developed over time by family members, bringing with it cultural and language skills that are valuable for children learning two languages. The funds of knowledge that parents and family members bring to the education and well-being of their children is many times not taken into consideration as something of importance for teachers or parents. Many parents of Latino descent, in low economic areas, choose to believe that they have nothing to offer their children, which needs to be rectified as they have much to offer them.

As mentioned before, simply by constantly being involved in their child’s education and motivating them to succeed, leads children to performing better academically. Now if parents and family members used their strengths to teach and engage with children about what they know, their children would soon become successful in terms of academics, socially, and language development. Through everyday activities, parents and family members are able to engage children in topics of conversation that they are knowledgeable about such as cooking, gardening, housewares, construction, or any jobs that they have, which can increase not only language but vocabulary and life skills as well. Using funds of knowledge allows children to learn in a way that is easy and engaging, as well as supports parents’ and family members’ knowledge base, as it takes from what they know and brings
it forward, validating it and incorporating it into learning. Reyes et al. (2016) noticed that the use of funds of knowledge places an important role in the literary skills that are developed early on inside the home through oral storytelling and children’s songs. For example, biliteracy development can take place when telling children stories or having them tell the stories about their day. By parents and family members sharing stories in two languages either separately or simultaneously, children are able to pick up on the language types that can be used to story tell, which can lead to them also explaining their stories through the language of their choosing (Reyes, 2006; Reyes, 2012). This transfer from language to language is known as translanguaging and should be encouraged both in the home and in school as a means of developing both languages (García, 2009; Reyes, 2006; Reyes & Azuara, 2008). Because these funds of knowledge can come in either Spanish or English, the development of biliteracy and bilingualism is possible. Parents family members, as well as teachers can encourage the singing of songs that are already available in both languages for children to hear different language examples, such as The Itsy-Bitsy Spider which has La Araña Pequeñita counterpart as well as Twinkle, Twinkle Little Star/Estrellita Donde Estás. Using songs and storytelling are valid ways to promote and encourage bilingual language use at home and in the classroom. Validating what parents and family members have to offer to their children is a crucial part of bilingual development as they are the first teachers in their child’s lives.

For example, if parents and family members were teaching children to identify body parts, through either books or oral stories, in any language, or in both, they could reinforce the vocabulary through song. A popular song for body parts is Head, Shoulders, Knees and Toes, which is translated to many languages. Using this song and doing the movements
with them, reinforces both languages taught, as well as the content. Following is a bilingual example of the song and the movements. https://youtu.be/nUklGzMrHQg
Authentic Strategies for Biliteracy
Development in the Home and Community

Estrategias auténticas para el desarrollo de la biliteracidad en la casa y la comunidad

In order to be able to develop two languages and their literacy skills, or biliteracy in that respect, parents and family members must be exposed to the strategies that they can use with their children at home to support them. Many of the strategies that they can use, integrate the translanguaging idea, in order for children to easily switch from one language to the other, as they are immersing themselves in conversation, play, or interactions (García, 2009). Exposure to both targeted languages is key for biliteracy and bilingual development. It is through exposure to the targeted language that children are able to see, hear, and use the target language and therefore develop their own understanding and usage of it. By giving parents the information to make this exposure possible, we can help them guide their children into a biliteracy and bilingual future. The following are some strategies that can be used inside the home and community to promote the development of both languages.

1. Allow for translanguaging practices to take place inside and outside the home. For example, communicate with children in whichever language you feel comfortable with at the time, and explain information as best you can. The key is to promote and encourage language and to expose children to as much vocabulary and information as possible. Haga posible que las prácticas de trans lenguaje puedan ser usadas adentro y afuera de la casa. Por ejemplo, comuníquese con su hijo/a en cualquier lenguaje que se les haga lo más fácil en el momento y explique información lo mejor
que pueda. La meta es que promuevan y motiven el uso de los dos lenguajes y
exponerlos a mucho vocabulario y información para desarrollar los dos lenguajes.

a. If parents are not fluent in a language, they can always assign a sibling to
speak to the child in that language. Si los padres no tienen fluidez en un
lenguaje, ellos pueden asignarles este trabajo a sus hijos mayores que ya lo
saben hablar.

2. Use a bilingual perspective throughout the day. Parents and family members can
flow between languages throughout the day translating as much information in both
languages, in order to provide children with twice the information and letting them
take this in whichever form they feel more comfortable with. Establecer una
perspectiva bilingüe durante todo el día. Padres y familiares pueden moverse entre los
dos lenguajes durante el día, traduciendo cualquier información para ofrecerles a los
niños con doble la información y dejarlos comprenderla en cualquier de los idiomas
que se sientan cómodos.

3. Choose topics to discuss in a certain language and have children try to explain it in
the opposite or in both languages. For example, if a parent is knowledgeable in any
specific area, such as cooking, they can use this time as a learning opportunity and
conduct it in a specific language, that way the child knows the vocabulary in that
language for that content area, while also promoting the development of the
opposite language in the activity by having the child interact and explain in both
languages. Escoja temas para hablar en ciertos lenguajes y denle a sus hijos
oportunidades de hablar y explicar la información en los dos lenguajes. Por ejemplo si
un padre tiene mucha capacidad en una área, como la cocina, pueden usar este tiempo
como una oportunidad para enseñar en un lenguaje para que el niño/a pueda aprender el vocabulario de esa área, mientras el niño/a la explica y interactúa en el idioma o los idiomas que se sienta cómodo.

4. Label things around the house in both languages so that children can see the differences in the way the two languages are written. *Etiquetas los objetos de la casa en los dos lenguajes para que los niños puedan ver la diferencia de los lenguajes escritos.*

5. Have the TV, and iPad or Tablet games in both languages, so that both languages are acknowledged and perceived equally. *Necesitan tener la televisión, iPad y juegos de tableta en los dos idiomas para asegurarse de que los dos idiomas sean conocidos y percibidos igualmente.*

6. Experience cultural events where children will be exposed to the target language, in case parents cannot speak it or simply to show value to the language. *Asistir a eventos culturales donde los niños sean expuestos a los idiomas deseados, en caso que los padres no lo puedan hablar o simplemente para dar importancia a ese lenguaje.*

7. Engage children in conversations or play in either or both languages to allow for their development. *Tenga conversaciones y jueguen con sus hijos en uno o los dos lenguajes para motivar el desarrollo de los idiomas.*

8. Expose child to targeted languages through bilingual texts. *Exponer a los niños a los dos idiomas a medida de los libros bilingües.*

9. Expose students to music in both languages. *Exponer a los niños a música en ambos idiomas.*
Biliteracy Development In and Out of the Classroom
A Funds of Knowledge Perspective

As children grow older, their first teachers, their parents, are joined by another educational power, which are the adults in the school and community. Through this new incorporation the classroom teacher becomes another source of knowledge. Classroom teachers have the capability of influencing children in their language preferences and literacy development, as well as have so much to offer their students in academic knowledge. With the amount of influence that teachers have with children who have the potential of becoming bilinguals in the future, it is important to give equal importance to both languages, whether they are spoken at school or in the home. As teachers, we need to expose our students to different cultures and languages in the school setting to make it a point that differences are welcomed, rather than alienate a particular culture or language.

Although teachers knowledgeable, they are not the only ones that have knowledge to give their students, and many times the knowledge that comes from parents and family members is overlooked and not taken into consideration in the classroom setting. For this very reason, it is important to take into consideration the funds of knowledge that parents and family members have to offer so that the culture of home and language are able to merge into the classroom (Moll, Amanti, Neff, & Gonzalez, 1992). Not only this, but when the funds of knowledge are taken into consideration and brought into the classroom setting learning becomes more meaningful to children as they are able to connect to the content being presented. By using the funds of knowledge perspective, children are able to learn in a way that is easy and engaging, while supporting home and cultural knowledge.
Finding out what parents and family members have to offer, however, is a challenge in itself, as many times teachers are preoccupied trying to learn about their new students, that parents and family members are nowhere in mind. Despite, their preoccupation, teachers need to take the time to learn about the parents and family members of their students as this is an extension of who they are and a big influence in their education. For this reason, a parent interest and leadership skills worksheet is provided to hand out at the beginning of the school year to learn more about the families of students. Attached is also a questionnaire about prior involvement in the educational setting.

**Strategies to Use Inside and Out of the Classroom**

*Estrategias para usar dentro y fuera del salón*

*The following strategies have been adapted from several resources and experts and have been transformed into authentic strategies that have been implemented in my own classroom. Each of the strategies that has been implemented is then followed by pictures of the work that has been conducted in my classroom to meet the needs of my bilingual students, which can be used in a variety of ways throughout the school year*

1. **Visual Aids** (Fishkin, 2010; Cummins, 2011; Huisman, 2012) are a great way to present information to students learning two languages, as the information is visually there and allows the student to make sense of it through any language that they may feel comfortable with. These visual aids can be used in any subject of interest to students or important content area. These can be easily created or reproduced from online sources.

*At home, this strategy could also be used with anything visual such as billboards, magazines, grocery advertisements or family pictures or videos.*

2. **Hands-On Activities** (Fishkin, 2010; Huisman, 2012) are anything that lets students
work with the content at hand and at their own pace. These activities, again, can be used in any content area and they pride themselves with being activities that promote social interaction with peers, as well as teachers, enforcing language development.

*At home this can be achieved by allowing children to help out during everyday activities such as cooking, grocery shopping, laundry sorting, or helping fix things around the house.*

3. Modeling (Fishkin, 2010; Cummins, 2011; Huisman, 2012) is an essential part of teaching students, but is also crucial in teaching a second language. Modeling provides a great way for students to be aware of what is expected of them, demonstrate correct literacy skills, as well as language constructs that leads to its development.

*At home this can be accomplished by providing children with the behaviors you want them to express, read to them to focus on literacy, and speak to them using correct language structure.*

4. Student Interactions/Playful Dialogues (Reyes & Azuara, 2008; Fishkin, 2010; Soto Huerta & Riojas-Cortez, 2014) play a role in the language development as students need opportunities to develop and use language with their peers. It is through the practice of language that their development occurs and therefore throughout their day in the classroom this should be promoted, whether it is through the content presented or through play. There should be structured and unstructured ways for students to express themselves with one another in the classroom and outside setting, letting them decide their language preference and use.
*Providing children with opportunities to interact with others their age at home is very important. It can be through organized play dates, or simply taking them to settings such as the park where they will be able to see, talk to, and play with other children.*

5. Language Rich Conversations (Reyes & Azuara, 2008; Fishkin, 2010; Cummins, 2011; Huisman, 2012; Soto-Huerta & Riojas-Cortez, 2014) much like the opportunity to interact with peers through play and content conversation is much needed. Language rich conversations provide the modeling aspect of the correct way of expressing oneself, while also being filled with content language necessary for student learning to take place. Language rich conversations work well when it is on a topic that is of interest for students that allows them to interact and voice their thoughts on topics.

*At home this can be done on topics of interest to students or parents, if the knowledge is there. It can also be opportunities to learn together and go to the library to check out books on certain topics.*

6. Collaborative Writing (Delbridge & Helman, 2015; Louie & Davis-Welton, 2016) whether with peers or with adults, allows students to interact and share ideas with others, as well as flow from one language to the other as deemed fit to understand and produce content. This also becomes a learning opportunity for language development and writing formats.
SUMMARY

Emergent bilinguals, that is children with the potential of developing their bilingualism in two languages, make up a large part of the U.S. population (Fry & Gonzales, 2008; Garcia, 2009; California Department of Education, 2017). Due to this, there is a need for strategies, tools, and support for bilingual families to support biliteracy and bilingualism. Although there are some schools that provide dual language programs, often emergent bilinguals are placed in schools that hinder their bilingual development, as they are English only (Soto Huerta & Riojas-Cortez, 2014; Delbridge & Helman, 2015). As emergent bilinguals begin life with the exposure to two languages, it is important that from an early start they begin to learn literacy skills, and biliteracy skills, that will help them develop their bilingualism in the future.

With the understanding that Early Literacy Skills are a precursor to academic success, it is to be noted that from the beginning Latino students begin school at a disadvantage from English only majority groups (Tang, Dearing, & Weiss, 2011). Latino parents many times are unfamiliar with the educational school system, have a language barrier, as well as experience a lack of cultural appreciation in school environments, that their involvement in school and knowledge of literacy skills tends to be minimal (Jasis & Ordoñez-Jasis, 2005; Pstross et al., 2016). As family involvement plays an important role in the development of literacy skills and future academic success, the promotion of Latino, bilingual, families into the school setting as well as the home environment of their children is a necessary step for schools to take in order to support all students (Izzo, 1999; Durand, 2011; Lefevre & Shaw, 2012; Reyes & Azuara, 2008; Reyes et al., 2016).

Many researchers have come to the conclusion that if parents and family members are involved in a child’s life and education at an early stage they are more likely to perform better
academically. The involvement in a child’s life does not necessarily have to be done in the formal sense, but can be done through any of the six forms of involvement described by Epstein (2011). It is through this involvement that it is possible to bridge the gap between high and low socio-economic classes (Dearing et al., 2006). Involvement also grows if students have bilingual teachers, as the language barrier between parents and school disappears (Tang et al. 2012). As parents and family members play such an important role in a child's life, and on the development of literacy skills, it is important to note what they bring to the table in regards to knowledge and skills. Moll (1992) described the knowledge that parents and family members bring to the table as the “funds of knowledge”, and it is by using these funds of knowledge could essentially bridge the gap between home life and school life, leading to the value of families in the education of their children.

By recognizing that parents and family members have knowledge to provide their children, and then using it in the classroom allows for content to become more meaningful, as it takes into account what children have seen or heard at home. In using this strategy in the classroom, teachers are able to bridge the gap between home and school life (Reyes, Da Silva Iddings, & Feller, 2016). In promoting a funds of knowledge perspective in the classroom, an important strategy is being use to aid emergent bilinguals in understanding the content of school life, but this is not the only strategy that could be used for children growing up with two languages.

In order to understand and promote the development of biliteracy and in turn bilingualism, one must first understand that becoming bilingual is a dynamic and complex process that occurs simultaneously (Reyes, 2006; Reyes, 2012). The process of becoming bilingual changes from child to child, and because of this it is necessary that parents, family members, and teachers
create environments in which both targeted languages are promoted, encouraged, and spoken, as to make the development possible. From an early age children are able to notice the differences not only in the way that language is spoken, but also in how it is written, and it is through social interactions with family members and play that the differences and abilities to speak it develop (Reyes & Azuara, 2008).

It is through an exposure to language that children are able to understand and develop it. For this reason, the need to have programs, resources, and strategies that make it possible for two languages to flourish is great (Martinez-Roldan & Malave, 2004). These programs, resources, and strategies must demonstrate to students the value that both languages have to offer them, rather than concentrate on just one language, as mentioned previously. By presenting the value of both languages in both home and classroom environments, through a funds of knowledge perspective, as well as allowing for students to express themselves in both languages simultaneously, translanguaging, the development of biliteracy skills and bilingualism is more likely (Garcia, 2009; Reyes, 2012; Delbridge & Helman, 2015).

It is for this reason that this handbook aims to support bilingual families, by providing them with information and strategies that can be implemented with their children at home to develop and master early literacy skills, and in turn biliteracy skills, that will prepare them for Kindergarten and their future educational career. This handbook gives families, as well as teachers authentic strategies that can be used not only to develop biliteracy in the home, but also in the classroom and community. It provides them with examples of strategies, and is translated into Spanish for the Latino audience it seeks to reach. Furthermore, it gives Latino parents and teachers the tools and strategies needed for them to support this new generation of emergent bilinguals.
References


and Social-Emotional Adjustment on Parental Involvement in Inner-City Schools.

Journal of Educational Psychology, 107(2), 517-532.


Childhood Education, 88(6), 398-399.


Little Wigwam. Little Wigwam Alphabet Chart. Retrieved from

https://amzn.to/2r7X6wM


Reading Rockets. (2014, May 9). Becoming Aware of Print. Retrieved from https://youtu.be/x1Vk2kLPDi0


Integrating Sociocultural Theory in the Information Literacy Classroom:
A Review and Analysis of the Pertinent Literature

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Abstract

This companion paper to the Hawai'i International Conference on Education (HICE) 2019 presentation titled *Integrating Sociocultural Theory in the Information Literacy Classroom: A Review and Analysis of the Pertinent Literature* introduces the reader to the seminal research revolving around the integration of sociocultural theory into the information literacy classroom. While primarily aimed at librarians who teach information literacy sessions in one-shot, workshop, or multi-session course format, any instructor (and especially those in the ESL/TESOL fields) are likely to benefit from engaging with the literature reviewed in this paper.
Integrating Sociocultural Theory in the Information Literacy Classroom:
A Review and Analysis of the Pertinent Literature

Introduction

This companion paper to the Hawai'i International Conference on Education (HICE) 2019 presentation titled Integrating Sociocultural Theory in the Information Literacy Classroom: A Review and Analysis of the Pertinent Literature introduces the reader to the seminal research revolving around the integration of sociocultural theory into the information literacy classroom. While primarily aimed at librarians who teach information literacy sessions in one-shot, workshop, or multi-session course format, any instructor (and especially those in the ESL/TESOL fields) are likely to benefit from engaging with the literature reviewed in this paper.

Literature Review

Li Wang’s 2007 research article Sociocultural Learning Theories and Information Literacy Teaching Activities in Higher Education introduces the reader to collaborative learning models that originate in sociocultural learning theories, and provides practical examples for how these might be applied to library information literacy sessions. Wang, who was a Learning Service Manager at the University of Auckland Library at the time the article was published in the peer-reviewed journal Research & User Services Quarterly, states that the application of sociocultural learning theories to library instruction remains a fairly new, and little-used concept for academic librarians. To introduce the reader to the topic, Wang includes an extensive literature review on both the status quo of information literacy and the trend towards inclusion of sociocultural learning theories in information literacy classroom sessions. To deepen the reader’s understanding, Wang, focusing primarily on the work of Vygotsky, provides brief overviews of
sociocultural learning theories, collaboration and collaborative learning, and collaborative learning environments, placing each in the context of sociocultural theories.

The remainder of Wang’s research article revolves around the application of sociocultural theories to the information literacy classroom. Wang details four collaborative learning models: the Jigsaw Model, the Reciprocal Model, and, in the category of collaborative peer groups, the Problem-based Learning Model and the Resource-based Learning Model. The discussion of each model includes background information on applicable sociocultural learning theories, application-to-the-classroom examples, and a brief summary of the benefits of taking the approaches described. The article is rounded out with a brief portrait of the information literacy community of learners, and a conclusion that is a call to action for librarians to shift their teaching focus from classroom manager to co-learner.

For the researcher who, after having read Wang’s Sociocultural Learning Theories and Information Literacy Teaching Activities in Higher Education, has developed an interest in learning more about the practical application of sociocultural learning theories in the library information literacy environment, Wang, Bruce, & Hughes’ Sociocultural Theories and Their Application in Information Literacy Research and Education provides an avenue for deeper exploration. Published in 2011 in the peer-reviewed journal Australian Academic & Research Libraries, the article summarizes and discusses the study Li Wang conducted for her unpublished 2010 PhD thesis, Integrating Information Literacy Into Higher Education Curricula - an IL Curricular Integration Model.

Prior to detailing the study, the research article introduces the reader to pertinent information literacy theories, and provides substantial background information on sociocultural theories, the latter ranging from a brief, general overview to an in-depth discussion on
Vygotsky’s work, including its relation to “four aspects of human cognitive development, namely mind, tools, Zone of Proximal Development (ZPD), and community of practice” (Wang, Bruce, & Hughes, 2011, p. 298).

The discussion of Wang’s study is divided into two main sections. The first section, revolving around the application of sociocultural theories to research in information literacy (IL) and the development of a community of practice, sets the stage by providing background on the study, as well as the key principles applied. The study’s primary aim was to investigate “how IL can be systematically integrated across academic curricula in higher education” (Wang, Bruce, & Hughes, 2011, p. 299). In order to achieve set research goals, an interview phase and subsequent development phase, were devised and implemented. Throughout the study, three key principles were applied in order to develop a “community of practice focused on information literacy integration:” 1. “Knowledge is socially constructed [...]”; 2. “Tools play an important role” [...] and 3. “Internalization can serve as a powerful model when data is generated and analysed using this research approach [...]” (Wang, Bruce, & Hughes, 2011, p. 300).

The second section of the paper summarizes and analyzes four benefits the study saw in terms of utilizing sociocultural theories in IL research and curriculum development: 1. Co-construction of research data by researchers and participants; 2. Formation of a community of IL integration practice for knowledge-sharing and improved student support; 3. “Development of IL tools in IL integration practice;” and 4. Creation of student-centric IL design and delivery approaches (Wang, Bruce, & Hughes, 2011, p. 302-304).

Wang, Bruce, & Hughes’ paper concludes with a summary of the main points of the study, focusing on the study’s outcome and achievements, as well as on the learning experiences of all parties involved.
Holliday and Roger’s *Talking About Information Literacy: The Mediating Role of Discourse in a College Writing Classroom* provides insight into why student learning outcomes may not be as expected after the integration of aspects of sociocultural theories into the information literacy (IL) classroom. Published in 2013 in the peer-reviewed journal *Libraries and the Academy*, the authors describe their experiences in a college writing class co-taught by an English instructor and a librarian. Holliday, a librarian, and Rogers, an Associate Professor for English, undertook a semester-length study that examined “how information literacy was situated in a university-level writing course” (Holliday & Rogers, 2013, p. 259). The principal method of investigation consisted of classroom observation; conducting interviews with the teaching faculty and holding focus groups with the students supplemented the effort.

Over the course of the study, four main themes emerged, each presenting a facet of the overarching theme of students’ experiencing difficulties with the successful completion of the course’s research assignments: 1. “Sources as objects” explains how information is contextualized as a container rather than something to learn about; 2. “The ‘right’ number of sources” points out how assignment parameters lead students to focus on finding the assigned number of scholarly resources, regardless of content; 3. “The ‘right kind’ of sources” details the restrictions these assignment parameters place on students’ ability to find appropriate resources; and 4. “‘Finding sources’ vs ‘learning about’” discusses the tension that arises from the majority of students’ focusing their research efforts on finding the required resources rather than learning about their chosen topic (Holliday & Rogers, 2013, p. 261-267).

The authors’ conclusion takes the form of a summative analysis, stating as one of the study’s main conclusions the fact that regardless of effort to include aspects of sociocultural theories into the classroom, if limitations on the classroom discourse of a relevant matter persist,
students are likely to exhibit limitations in behavior related to the matter. When students are being instructed about the right types and right amount of sources, it “potentially diverts attention away from the content of the sources themselves. Likewise, a discourse of ‘learning about’ directs attention to the content of sources” (Holliday & Rogers, 2013, p. 267).

In addition to analyzing the study’s findings, the conclusion calls for a shift from teaching about “finding sources” to “learning about;” briefly touches on issues of plagiarism other than “outright cheating and laziness;” and makes recommendations for librarians on how to step away from tutorials, demonstrations and lectures and move towards creating learning activities that further student engagement with and comprehension of research materials in a holistic way (Holliday & Rogers, 2013, p. 268).

For the academic librarian or teaching faculty seeking to include aspects of sociocultural theory into the information literacy-centered classroom will find Project Information Literacy (PIL) worth consulting. This exhaustive online resource is the result of an ongoing academic study, which was first incepted in 2008. Led by Dr. Alison J. Head, a Research Affiliate at Harvard, and PIL’s Executive Director and principal investigator, the long-term, multi-institutional project, is, according to the information provided by PIL, an “academic study about how early adults conceptualize and operationalize information tasks in the digital age” (Project Information Literacy, 2018).

The extensive website is divided into subsections with the headings of Publications, Videos, Smart Talks, and Practical PIL. Additionally, an About section details the study, its research team, research populations, aims, goals, and achievements. Each section contains research materials presented multi-modally. To give an example, under Publications, research
reports; peer-reviewed articles; conferences proceedings; opinions and editorials; Podcasts, Webcasts and interviews; and selected pieces of media coverage can be accessed free of charge.

Probably the most interesting aspect of PIL’s content is the Practical PIL section. Here, those seeking to begin (or further) the conversation with faculty about information literacy, as well as those looking for ways to improve their work with students and/or faculty, will find hands-on advice, guides, workshops, best practices for creating handouts (with examples), and many more related materials, all of which will facilitate engagement with faculty and students. Due to the fact that the materials included in Practical PIL section are based on PIL’s research findings of what students need and seek, many of the questions librarians or classroom instructors may have in regards to teaching/incorporating information literacy in such a way as to be beneficial and interesting to students, have already been answered. This will alleviate concerns of selecting appropriate materials and leave more time for the modification of the available materials to the individual’s curriculum. As is the case with the multi-modal research publications being made available by PIL, the practical resources presented under Practical PIL are freely available, and can be reused with proper credit and adherence to intellectual/copyright restrictions.

Two major drawbacks that invariably arise from an exhaustive resource such as Project Information Literacy (PIL) are the wealth of the information provided, and the lack of a deeper level of organization of the materials included. The latter could present significant restrictions to finding what is wanted/needed, and especially so for those seeking to incorporate sociocultural theories into their curricula. However, those investing the time going through the website will be rewarded with the rich variety of helpful, useful, free-of-charge offerings.
Literature Review Analysis and Commentary

When read in the order presented above, the four scholarly works reviewed provide step-by-step guidance for information literacy professionals and teaching faculty seeking to learn about incorporating aspects of sociocultural theories in the information literacy-centered classroom/session. Wang (2007) provides an introductory overview of the topic that is supplemented with theoretical examples for application. Wang, Bruce, & Hughes (2011) delve deeper by presenting findings of Wang’s 2010 study, which in turn refers back to and builds on Wang’s 2007 article. Holliday and Rogers (2013) insert caution by revealing important reasons for why student learning outcomes may not turn out as expected, even when measures are taken to maximize student exposure to the materials to be learned. Finally, Project Information Literacy (2018) facilitates the transition from theory to praxis by providing a plethora of learning and teaching materials.

The thread that connects the four publications lies in the belief that the application of sociocultural theories to the information literacy-centered classroom will increase student engagement with the course content and subsequently improve student learning outcomes. Each of the four resources focuses to a large degree on models of collaboration between students, as well as between teaching faculty and librarians. The authors believe that the application of collaborative models has the potential to change restrictive classroom environments where instructors function as hierarchical managers, knowledge gatekeepers, and at-will disseminators of information, to collaborative spaces where instructors and students participate in the learning process as co-creators and disseminators.

What sets the four resources apart from similar works is their emphasis on practical application and the high degree of readability and comprehensibility. Based on the experience of
this assignment's author, reading articles that supplement theory with equally theoretical examples of application is not uncommon. In fact, these types of research papers are oftentimes the result of calls for publications that specifically ask for discussions on the practical application of theoretical constructs. It is thus refreshing to see that the four papers reviewed above describe in detail a variety of practical applications that were either utilized or observed by the authors themselves. Not only does this create a more interesting and accessible reading experience, it also enriches the research presented with lived experiences. As mentioned previously, the four articles reviewed also stand out in terms of accessibility. Patricia Nelson Limerick, in her book chapter *Dancing with Professors: The Trouble with Academic Prose*, laments the fact that professors’ jargon-riddled, “horrible writing” with its focus on high theory expressed in convoluted prose, continues to disenfranchise the community they seek to reach: students (Nelson Limerick, 1998). The same may be said for readers on the peer level of these “horrible writers;” they too are likely to be put off by highly theoretical content delivered in in such a way as to obscure meaning. It is thus encouraging to see that the authors of the four articles achieved the balance between delivering high-level academic writing and maintaining accessibility to a wide range of readers without sacrificing content or style.

While each of the four articles reviewed have much of interest to give to the reader, for the author of this assignment, Holliday and Roger’s *Talking About Information Literacy: the Mediating Role of Discourse in a College Writing Classroom* stood out. Library and information science professionals, over the course of decades, have taken numerous approaches to teaching students how to efficiently and effectively query, retrieve, and evaluate information. Yet, in 2018, librarians and teaching faculty bemoan the fact that not only are there more students than
ever before who know less, but that these students are also unwilling or unable to change their status quo.

Holliday and Rogers provide insight into why librarians and teaching faculty may not see the results they wish to see: changes to teaching approaches — even those that are collaborative — are unlikely to succeed if the dominant discourse remains unchanged. James Paul Gee’s chapter *What is Literacy?* provides insight into the reluctance, even resistance, of the dominant group to change their established discourse in order to improve communication with their target audience. From experience, the author of this assignment can attest to the fact that the five points on discourse detailed by Gee apply to librarianship: 1. “Discourses are inherently ‘ideological;”’ 2. “Discourses are resistant to internal criticism and self-scrutiny [...]”; 3. Discourse-defined positions transcend from the internal to the external to take on the role of standpoints to be taken up and defended; 4. Discourses “put forward certain concepts, viewpoints and values at the expense of others;” and 5. “Discourses are intimately related to distributions of power [...]” (Gee, 1998, pp. 52-53). The reluctance to change the dominant discourse is at the core of Holliday and Roger’s classroom observations: students were instructed in innovative, collaborative settings, yet taught with the use of age-old jargon and methodologies. Nelson Limerick points out that the instructors’ set ways of teaching students how to interact with complex research resources leads, over time, to predictable, repeatable patterns that eventually fossilize. Conditioned thus, students are ultimately preventing themselves from stepping outside the known and into exploratory territory (Nelson Limerick, 1998). Those having read Holliday and Roger’s *Talking About Information Literacy: the Mediating Role of Discourse in a College Writing Classroom* will see that what the two authors observed mirrors Gee’s and Nelson Limerick’s discussions on discourse about and interaction with research resources.
Before concluding the analysis and commentary of the four articles reviewed, one more important issue raised in Holliday and Roger’s article must be given attention. Albeit brief, the authors’ discussion on their belief that most incidents of plagiarism are less the result of “outright cheating or laziness,” and more related to a “lack of engagement and understanding of the source material,” should not be overlooked (Holliday & Rogers, 2013, p. 268). Alastair Pennycook, in Borrowing Others’ Words: Text, Ownership, Memory and Plagiarism, engages in a deep discussion of plagiarism and raises awareness of the different cultural views of ownership of text, the differences in citation rules and styles across the world, and the difficulties faced by research paper writers attempting to insert their own voice while simultaneously trying to avoid committing the “crime of plagiarism” (Pennycook, 1998). If and when information literacy professionals and teaching faculty decide to include sociocultural theories in their teaching/learning environments, addressing plagiarism should be included in the discussion, planning, and implementation of changes to the classroom, and especially so if said changes include collaborative efforts by the students. As stated by Holliday and Rogers, the discourse on plagiarism should, for the most part, eliminate stern lectures about the severe consequences of being caught plagiarizing, and insert methodologies that allow students to informally explore topics of interest in lieu of being required to right off the bat find and analyze the right number and right type of sources to learn from.

Conclusion

The aim of this companion paper to the Hawai‘i International Conference on Education (HICE) 2019 presentation titled Integrating Sociocultural Theory in the Information Literacy Classroom: A Review and Analysis of the Pertinent Literature was to introduce the reader to the
concept of integrating aspects of sociocultural theories into the library information literacy classroom and beyond.

The paper reviewed the seminal research on the subject, and provided concise summaries and in-depth analysis of the topics discussed. While primarily aimed at a librarian audience, it is this author's belief that any instructor, and especially those teaching in the International/ESL/TESOL classroom, will benefit from perusing and engaging with the literature reviewed.
References


Reinvigorating University Instruction Using the Principles of Agile Scrum:

A Case Study

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Abstract

No Child Left Behind (NCLB) legislation ushered in an era of “right-answer” based reforms. Teachers, students, parents as well as community and corporate leaders lament the legislation’s negative impact on critical and creative thinking skills. Recent educational reform proposals focus on reversing the NCLB trends. The change is propelling instructors at all levels to consider making contextually relevant pedagogical modifications. Business entities’ increasing resolve to adopt Agile Scrum principles offers educators an intriguing, authentic teamwork learning strategy. This paper presents a case study encapsulating a business professor’s journey from content-driven to Agile Scrum’s context-embracing classroom instruction. Results from this action research affirm Agile Scrum principles that suggest engagement is increased when individuals are provided flexibility and fast-paced opportunities to absorb content.

Keywords: collaborative; engagement; experiential learning; real life applications; case studies
INTRODUCTION

“Children are the world’s most valuable resource and its best hope for the future”

(John F. Kennedy: July 1963)

The United States’ desire to provide each child, adolescent, and young adult a world-class education presents many challenges. Curriculum, buildings, staff and faculty are costly. California’s 2017 PK-university budget can be used to illustrate the scope of state government commitment to educate children. Total budgeted dollars were just under $73 million which represented 36.5 percent of the total approved state budget (downloaded on May 17, 2017 from http://www.ebudget.ca.gov/budget/2018-19MR/#/BudgetDetail). Despite the large investment teachers are relentlessly advocating for additional content-based reading materials, instructional technology (hardware and software), as well as salaries commensurate with the hours invested in planning and assessing engaging lessons. The voiced concerns propel many parents and businesses as well as local and federal governments to secure schools additional sources of income.

Investment also comes with an expectation of positive returns. The intertwined responsibilities of teachers, parents, and students make verifying the return on the vast educational investment problematic. A brief historical analysis of accountability directives reveals a slow transition from an input to an output focus. To illustrate, early 20th century educational leaders adopted input strategies that centered on instituting teacher certification requirements. Advocates hoped that regulating teacher qualifications would produce a workforce prepared and committed to meeting all student learning needs. Unanticipated geopolitical threats such as the Russian launch of Sputnik drew attention to achievement gaps between U.S. and
international students. Fear nudged U.S. policy makers in the 1970s and 80s to re-focus their attention on mandates that required schools to provide rigorous curricula such as Advanced Placement courses. Disparities between enrollment in rigorous courses and high school graduation/university admission rates propelled another change in accountability effort foci. New plans lead to the federal government’s 2001 adoption of the No Child Left Behind (NCLB). Under this plan, correct answers on standardized tests became the approved output measure to ascertain rewards and punishments. Fear that absolute outcomes inhibit critical and creative thinking skills is propelling efforts to revisit accountability policies. Knowing the needs of today’s students exceeds current pedagogical practices and makes waiting for change unacceptable. This paper will explore a pedagogical option that promises to nurture twenty-first century skills regardless of the ultimate outcome of current accountability debates.

**Unpacking the Unintended Consequences of Accountability Reform**

The passage of NCLB was a cultural paradox. U.S. society’s competitive predisposition made it easy to embrace quantifiable test score data as a means of determining winners and losers. Additionally, the concept of self-reliant effort was embedded into the legislation’s adoption of reliable and validate multiple choice tests. Careful coordination between test items and PK-12 curricula offered the perception that conscientious instructional practices would guarantee each child’s success and simultaneously produce a ‘winning’ score’. Use of the assembly-line nature of PK-12 grade level education maintained the linear, simple-to-complex developmental traits long found within America’s educational adoption of scientific management theories. Comfort found within the reform measures coupled with improving test scores and
graduation and university acceptance rates led many to conclude that the right educational
reform was finally found.

Despite this apparent comfort, dissonance has been hiding beneath the enthusiastic,
mainstream rhetoric. Constitutional scholars persistently probed NCLB’s legality citing the U.S.
Constitution’s 10th amendment guarantee to provide states educational practice autonomy. Many
teachers, parents, and educational scholars have emphasized that standardized, multiple choice
tests tend to narrow the curricula into a series of memorization activities. University admissions
personnel lament decreasing retention rates while university professors bemoan growing
numbers of students who possess limited ability to engage in critical thinking exercises.
Corporate frustration spotlights new workers unprepared to navigate the dynamic, quickly
changing realities of an ever-evolving technological era.

In response to these issues, the Policy Research Center (2010) began the development of
a more modern curriculum. A team of business leaders, politicians, university personnel, and
PK-12 teachers were assembled and agreed that technological innovations such as the wide-
spread accessibility of the internet necessitated replacing NCLB’s fundamental declarative and
procedural knowledge foci. The result was the creation of the 21st Century Skills Curriculum
Framework. Central to the framework was an emphasis on knowledge in action. New
pedagogical expectations emerged such as guiding collaborative student teams to use
technological resources to access needed but never-seen-before information, evaluating the
trustworthiness of the gathered information, synthesizing the gathered information against their
own background knowledge, and finally using the gathered/analyzed information to accomplish
a specific authentic task.
The 21\textsuperscript{st} Century Skills Curriculum Framework supports the current Common Core and STEM reform movements. Enthusiasts have postulated that the curricular modifications not only prepare each child for career and college demands but also address each student’s holistic, developmental needs. The commitment to problem-based pedagogical practices offers teachers opportunities to mentor each child as they navigate the ‘real-world’ integrated aspects of content knowledge foundations, pragmatic skill applications, as well as value-beliefs and ethics-embedded dispositions. Advocates maintain that successful implementation will make certain each child is nurtured to be a “responsible, resourceful, [and] persistent critical thinker who knows how to learn, work well with others, is a problem solver, communicates well, and manages time and work effectively…. [and] is also open to possible failure at times, can weigh sources for importance and credibility, and is open to and utilizes critical feedback” (Larmer, 2016, p. 66).

Adoption of the various 21\textsuperscript{st} century curricula reform options, however, is inconsistent. Stories of renewed teacher enthusiasm and heightened levels of student motivation are surfacing but only to be matched by accounts of confusion and frustration among teachers, parents, and students. In the midst of the conflicting accounts, the uninspiring impact of 21\textsuperscript{st} century curricula on standardized test scores and graduation rates remain largely hidden from the general population. Goodwin, Gibson, Lewis, and Rouleau (2018) suggest the less than stellar rollout of the 21\textsuperscript{st} century curriculum reforms might actually be a pretext for optimism. Their position rests on the historic tendency for educational reforms to provide initial success only to be followed by a plateauing of student learning outcomes. Goodwin et.al, indicate that the reason appears to be linked to the vast complexity embedded within learning environments. Reflecting on their
Australian research, Goodwin et.al, submit that leaving an achievement plateau and resuming patterns of academic growth occurs when educational leaders are willing to modify rather than replace reform efforts. The key component of their approach is a commitment to use inquiry learning and professional coaching protocols.

**The Essence of Inquiry Pedagogy**

Implementing pedagogical inquiry practices requires resolving the linear (learning flows from facts to case studies to authentic application) versus spiral (learning emerges as authentic problems are slowly resolved through consistent return to factual considerations) debate. Hattie and Donoghue’s (2016) model of learning offers a resolution. The model is built on three critical, interacting brain function components. One component is “skill:” the aggregation of an individual’s academic and practical knowledge. The second, “will,” is a conviction an individual holds regarding the value and importance of learning content. The third, “thrill,” is an individual’s tangible realization that persistence eventually generates new learning. The three intertwined functions requires the teacher explicitly link new learning to each learner’s past, present, and future.

Adopting the ‘skill-will-thrill’ model magnifies the importance of environmental context. Elementary classrooms consist of young learners with limited life-experiences. It is proposed that elementary aged children may benefit from instruction that uses ‘thrill’ to expand ‘skill’ acquisition. High school classrooms where adolescents use past ‘thrill’ results to select preferred ‘skill’ learning environments may benefit from teachers who cultivate a connection between career opportunities and ‘will.’ University professors who honor and nurture the interaction
among the three components, ‘skill-will-thrill,’ afford students learning experiences that replicate the realities of contemporary career demands.

**Four Cognitive Spheres**

Sternberg, Jarvin, and Grugorenkio (2009) submit that honoring the vast array of individual classroom environments does not necessitate discovering, developing, and implementing exclusive, context-specific pedagogy. Rather, Sternberg et.al (2009), maintain that nurturing each learner’s ‘skill-will-thrill’ inclinations can be achieved by combining individual/community background proficiencies with activities that come from four cognitive processing spheres. These spheres include: (a) academic-the knowledge and skills associated with traditional educational practices; (b) practical-the ability to confront and navigate challenges found in the environments that extend beyond classroom walls; (c) creative-the proclivity to envision alternative stratagems to typical episodes; and (d) wisdom-the capacity to apply skills from the other spheres to discern apposite thoughts and actions. Sternberg et.al (2009), caution against a linear developmental view of the spheres. Instead, they recommend that teachers at all levels integrate the four spheres in a manner that provides each learner opportunities to authentically contribute to their community.

**Application of the Four Cognitive Spheres**

Designing instructional practices that integrate the academic, practical, creative, and wisdom spheres is challenging. Hattie and Donoghue (2016) suggest, in part, that the issue is establishing reliable measures. It is the link between ‘skill-will’ aspects and each individual’s cognitive script or ‘thrill’ where the challenges lie. Nurturing motivation and excitement
involves providing each individual student space within a pedagogical plan to synthesize perceptions of expertise, relevance and future-oriented ambition with course-required outcomes.

The personal facets of learning requires an emphasis on context. Goodwin (2017) contends success is achieved when an instructor moves from uniform to flexible learning experiences. Four attributes shape Goodwin’s idea of flexibility. The first is using data to ascertain distinct profiles for each student. The second is honoring each student’s unique profile by expanding the range of acceptable learning-outcome artifacts. The third is accepting that each learning event refines and/or reshapes an individual’s cognitive script. The last is offering space for individual and group content processing to meet humanity’s need for personal and collective learning experiences.

Adopting Goodwin’s (2017) call to personalize learning necessitates an expansion of the mastery-learning definition. Wiggins (2013/14) suggests that a better explanation should focus on a student’s ability to effectively transfer learning into authentic and worthy performance. This idea is not new. Dewy (1916) described the approach as experiential learning and suggested linking pragmatic formal education with occupational preparedness. An intriguing approach to experiential learning is the Scrum process. Finding its roots in rugby, the Scrum process uses formative assessment to leverage experience throughout decision making activities. The Scrum process’ iterative, incremental approach allows leaders to optimize the predictability of achieving a desired outcome by controlling the risk of failure.

**Academic Sphere**

A Scrum committed teacher utilizes curriculum aspects such as syllabus construction, daily instructional plans, and course assessments to define desired academic outcomes. Once
defined, the teacher establishes a series of hard deadlines called “time-boxing” that include class activity time constraints, module completion dates, and traditional text/quiz assessments. Each deadline includes a deliverable that allows the teacher an opportunity to provide formative feedback. Summative evaluation is postponed until the final course product is submitted.

Cohort and/or class demographics makes the ability to predict student mastery difficult. Accordingly, flexible student-responsive pedagogy replaces uniformed lesson plans. The Scrum process approaches flexibility through the use of a “sprint” activity. The process starts with the teacher organizing a whole class, common sprint that must be completed within a “time-boxed” frame. The initial “sprint” carefully divides the ‘skill’ content into a manageable chunk of information that generates baseline data. Retrospection helps leverage the data into subsequent sprints.

**Practical Sphere**

The semester’s collective ‘sprints’ allow learners to experience the “just in time” corporate practices that seek to reduce number of errors by minimizing bodies of knowledge to task-specific content. Using an experiential structure moves the learning from an individual pursuit of an acceptable course grade to a collaborative learning encounter focused on discovery. In essence, scrum focuses on team autonomy or the “you get to do” opportunities. The authentic nature of the configuration systematically leverages individual ‘skills’ throughout the team’s journey. Properly implemented, team success will translate into increases in corporate as well as individual ‘will.’ There are four pillars that uphold the implementation ‘sprints’; transparency, inspection, adaptation, and fall.
The first pillar, transparency, stresses the importance of crafting a class essential question. This question provides a common understanding of content learning outcomes, pedagogical activities, and ‘real-world’ links. Transparency materializes as instructors intentionally articulate expectations related to tangible submissions, short ‘sprint’ cycles, collaborative expectations, common protocols, and the importance of normalizing mistakes. Transparency accelerates accomplishment through tracking concrete data related to each student’s engagement in learning. Transparency allows for resources to be optimally allocated so that tasks are done correctly and on time.

The second pillar, inspection, allows participants to detect undesirable variances from relevant essential question responses. Transparency works with inspection as the learning outcome data is made known and evaluated. Inspection should not consume resources such that the schedule is compromised, however, when performance variation is seen at the time that work is being done corrections are deployed in near real time which optimizes classroom effectiveness.

The third pillar, adaptation, provides flexibility. When performance deviates from its acceptable limits, adjustments are made that bring the student into synchronization with a class essential question. Adaptation is the culmination of transparency and inspection as transformational decisions are made and deployed to improve overall performance.

The last pillar, fall, refers to the dynamic flexible release process that allows for rapid feedback. Frequent releases allow for the ability to correct all potential accumulating student misunderstandings. The goal is to nurture within each student a growth mindset. Dweck (2006) notes that growth mindset permits individuals to proactively respond to frustrations. The result is improved levels of motivation i.e., ‘will.’ The ultimate impact is a ‘thrill’ perspective rooted
in awareness that there is no dichotomy between classroom activities and ‘real-world’
expectations.

Creative Sphere

Scrum’s commitment to provide students “you get to do” tasks coupled with the requisite
flexibility to properly implement ‘fall’ activities can cause fear. It is this very fear that links
scrum pedagogy with contemporary business practices. One of the biggest challenges current
business leaders face is the need to continuously learn faster than the environment demands. If
the pace is not sufficient then the business/person will soon become irrelevant. Corporate leaders
often use the term Agile to describe making adjustments within a reality where evaluation
happens in increments rather than at the end.

Synthesizing agile with scrum pedagogy replicates the fast-paced reality of the business
environment by asking teams to continuously evaluate and adopt communication techniques,
planning activities, and the assignment of team roles. Effectively managing interpersonal
dynamics, threats, and opportunities helps teams uncover insights that may challenge initial ideas,
but will likely drive design change ideas beyond the original plan. Cszikszentmihalyi (1997)
defines this process as flow. Flow focuses on the manner in which quality experiences includes
providing tasks that require risk/efforts that stretch one beyond one’s comfort zone by requiring
novelty and discovery. Each learner’s innate curiosity and hunger for information unleashes a
creative disposition. Joy materializes from the realization that classroom learning is explicitly
linked to real-world applications.

Wisdom Sphere
When the above three Agile Scrum parts are active learning transfers beyond the classroom and takes on meaning. Content knowledge becomes a tool for rather than the conclusion of learning (Dewey, 1916; McTighe, 2010). Teachers and students become co-learners who are persistent in responding to setbacks, resilient in coping with uncertainty, and skilled in using inquiry as an everyday undertaking (Bryk, Harding, & Greenberg, 2012).

The aim of academic activities is to embrace the idea that inspirational introspection begins with the chaos accompanying multiple solutions and concludes with an innovative resolution that is realistically conceivable. The co-learners rebuff the notion of an either-or world and welcomes the challenge of devising both-and resolutions. Transferring beliefs into action entails rejecting the preservation of innocuous hierarchical classroom structures and the sponsorship of collaborative and noncompetitive milieus. Students are not viewed as receptacles of knowledge but distinct individuals participating in a journey driven by a desire to discover life’s personal meaning and purpose. Succinctly stated, inquiry becomes the means of uncovering the types of changes that will make the world a better place (Dewey, 1916; Palmer, 1998; 2000).

Ultimately inquiry changes learning outcomes from a uniformed body of material to a personal, fluid, amalgamation of concepts, skills, and abilities. The transformative power of comprehensive inquiry is a realization that authenticity is found in the midst of communal relationships. Teaching moves from formulaic behaviors to analytic skills that allow a merging of curriculum demands with student demands (Palmer, 1998). Proficiency is measured by the ability to look at material never seen before and effectively use the materials to solve a problem. Feelings of vulnerability typically connected to a novel state of affairs are confronted with
confidence. Status quo educational practice is supplanted with an ever evolving set of routines that are culturally relevant (Dede, 2010). In essence, agile scrum seeks to unleash each individual’s creativity in a manner that enriches daily life and brings all involved true happiness (Silvia, Beaty, Nusbaum, Eddington, Levin-Aspenson, & Kwapis, 2014).

**Using the Principles of Agile Scrum: A Case Study**

Adopting a wisdom inspired view of teaching/learning diminishes the belief in unaltered pedagogical model replicability. However, a careful examination of an individual’s planning, implementing, and reflecting conventions can provide a schema for independent application. Confidence in the premise that cognitive conceptualization can be a preliminary step towards pedagogical change warrants the use of a case study illustration. Accordingly, the following case study encapsulates a recently appointed business professor’s (lead author) journey from content-driven to context-embracing teaching/learning.

The reader’s preliminary impressions could easily pigeonhole this case study as being irrelevant to non-business professors as well as P-12 settings. Initial arguments would likely highlight the ease of teaching students whose highly motivated, mature traits result in self-selecting continued educational opportunities. An additional case study dismissal rational might emphasize the easily identified, real-world attributes of a university business degree. It is at this point of disagreement that one should remember the relationship between ‘skill-will-thrill’ proclivities and instructional design choices. Specifically, examining this case study should not focus on ‘what’ is occurring but rather ‘why’ and ‘how’ the professor’s decisions are impacting the teaching/learning environment.
The lead author’s journey began with a growing, intuitive awareness of student fixation on grades over learning. Reflection gravitated toward a realization that most students were coming from P-12 environments that were still implementing the quantifiable aspects of NCLB. Thus, right answers were being viewed as competence while speed in completing assignments/tests were being deemed as mastery. In essence, students were associating quality education as the professor’s ability to design course materials that allowed one to earn high assignment/course grades with minimal effort. The result was disengaged and apathetic students with cognitive scripts that dichotomized ‘skill-will’ with academia and ‘thrill’ with life after graduation.

Appreciating Sousa’s (2017) theoretical cognitive construct that asserts a significant and positive relationship between meaningful learning (‘will’ and ‘thrill’) and transfer into and out of long term memory (‘skill’) motivated the lead author to disrupt his students’ learning environment expectations. A review of contemporary business practices lead to an encounter with the Agile Scrum process. Therefore, this case study illustration will use four sub questions to exploring the following overarching question: Given that each student is starting from a different knowledge base and given that the learning objectives are made clear and are the same for the cohort, to what extent can a student influence the roadmap taken to achieve the goal of the class?

Question #1: What is the impact of Scrum on declarative and procedural knowledge?

The class was given an interactive worksheet that showed how the balance sheet at the beginning and end of the year related to the statement of cash, statement of retained earnings, and the income statement. The objective of the class was to optimize the statements by making
business choices. These choices would be reflected in the associated performance ratios as shown in Figure 1. Students worked in groups to change the numbers in the cells that are not shaded. The shaded cells include formulas and thus could not be manipulated. As the teams started to work on the optimization the statements, questions were raised about the relational aspects of the statements and the formulas. The lead author was able to explain the isolated questions with the student teams and was able to address the entire class where there were questions shared by most of the groups. For example, as this was an MBA class there was a controller as a student. The ratios used in her company were slightly different than the formulas used in the interactive sheet. This was easily explained to her individually during the exercise without confusing the class.

**Figure 1: Interactive Statements Exercise**

Once the questions were answered the teams were able to continue to optimize the statements. When the time had expired, the teams were able to describe what they did to
influence the success of the company and relate their actions to the resultant financial results. On the other hand, there was also a mechanical engineer that had very little knowledge of financial statements. He was able to work with his team and acquire significant knowledge without disrupting the class. Furthermore, some recent accounting graduates were asking about the possibility of more detail on the statements and they needed feedback from the teacher to say that a constraint in the exercise includes the simplicity of the statements.

In order to optimize an activity, assumptions should be made in an informed manner to provide the best remedy. Questions help the teacher execute an effective experience with students interested in achieving optimal learning outcomes (e.g., what are the educational purposes for the interactive activity? In what situations does the interactive activity mirror contemporary business practices? Or, in what areas may this class of students struggle with the interactive activity?).

The evidence of the student achievement is then described. Data suggesting that student learning may be heading in the wrong direction is not discarded. Instead, evidence of student achievement is collected, prioritized, tested, and clearly described. Only when there is no evidence of new learning are data discarded. As the teams shared their changes to the statements, other groups were thinking about their decisions and comparing them with the presenters. Each team provided a demonstration that reflected its thought process which was evaluated by all the other teams that participated in the same activity.

*Question #2: How does Scrum impact a teacher’s use of feedback?*

An assessment can be leveraged to assess the level of understanding of the topics to be covered in the course. This can be accomplished in minutes. A list of the relevant topics can be
presented in a table at the front of the classroom. Each student has four votes of the following values; 3, 5, 8, and 13. These vote values are a part of the Fibonacci sequence and are helpful to expose areas of interest or concern. Students place a vote, with the associated value, on the topic that is concerning to them, using 13 to represent the most concerning topic. This process allows the teacher to identify and close the perceived gap between knowledge and interest. Ultimately, it directs the energy of the learning facilitator, or teacher.

Towards the end of the Sprint the teacher can use the same method to assess the comfort level of the students with the topics discussed to see if the level of concern has changed. In this case a 13 would mean that the student is very comfortable with their knowledge on the topic. A sample User Story in this case could be, “I have no difficulty understanding Balance Statements.” Value is created when capability is achieved that did not previously exist. A last opportunity is then available to the teacher to close any gaps before progressing along the Epoch roadmap as described in figure 2 below.

![Figure 2: The Scrum-Based Descriptions of Time from Task to the Degree-Based Curriculum](image)

The output from the collection of data reflecting the comfort level of topics to be covered in the class is shown below in figure 3. In this case the class is the most comfortable with the ideas of the balance sheet and the income statement. They are least comfortable with the ideas
behind ration analysis, the statement of retained earnings, and the statement of cash. These data inform the teacher of which topics students require deeper understanding. This assessment can also be compared against a subsequent assessment at the end of the class period to determine whether comfort level has changed.

![Image of a bar chart showing topic comfort level]

**Figure 3: The Concern Level of Understanding for the Topics in Finance after the Sprint**

**Question #3: What is scrum’s impact on instructor creativity?**

An Epic is a group of Sprints as indicated in figure 2 above. Each Sprint may consume a class or a week. An Epic is a module like Economics in a Fundamentals of Business course. In the event that such an Epoch has several modules (e.g. Finance, Economics, Law, Operations) the class can be assessed for its interest in each of these areas. This gives the teacher the ability to understand the interest levels of each student in each of the modules. The results of an interest poll can be expressed in a 3-D chart like the one in Figure 4. This figure indicates that there is a strong interest in Operations for a particular group of students while there is a group of students that have very little interest in the topic. The challenge to the teacher will be to accommodate the
interest levels that are different across the class. At the same time, there are a number of students that are quite uncomfortable with accounting. This is evident in the Finance row and should be concerning in an MBA program.

![Figure 4: Interest in Fundamentals of Management Topics](image)

Figure 5 shows that Operations has a strong interest among the students of the class, however, there are a few that expressed a slight disinterest in the topic. Another simpler way to look at this is through an average votes or total votes lens as shown in the graph below. Even though there was a cluster of people that gave Operations a high value from their votes, there clearly is a high general interest when considering the overall average voting weight. Law has the least amount of interest among the students. The teacher is thus challenged to make the topic relevant and interesting. Although the teacher will need to cater to the interests of the students but at the same time, the topic of law is relevant to the course and should be promoted as such.
The same exercise can be accomplished for Economics topics planned within the associated Sprints. The visualization of these votes indicates that there is a keen interest in price and demand but the figure shows that this is not true for all students. Employment is a theme of continued interest within this cohort as most of the students who voted for it showed a strong interest. Figure 6 shows that there is moderate interest in micro-economics, macro-economics, and supply and demand but little interest in the business life cycle. When a teacher thinks that this topic is relevant then interest will need to be generated around a topic.
Figure 6: Interest Levels within Economics Related Topics

Similarly for the law Epic, Figure 7, the interest is in employment law. Noticeably, there is very little interest in common law. This will be a challenge for the teacher to show that this topic is relevant to business. A mediocre response is clearly seen in other topic areas. When the teacher knows the interest levels of the students they can adjust the areas of focus, the stories, the activities, and the types of content to bring into the class activities.
Figure 7: Interest Levels within Law Related Topics

Question #4: To what extent does Scrum link theory to practice?

The LEAN aspect of LEAN UX suggests that a team must arrive at the Minimum Viable Product (MVP). This is imperative. In this case the MVP was the financial statements that were demonstrated in front of the class. The MVP was then evaluated in class by showing how it was manipulated. The feedback from other teams based on their experience and the execution of the exercise, in general, was used to improve the functionality, reliability, usability and the emotional design of the statements concurrently. When the teacher was able to see where the struggles were to understand the formulas, the clarification and any alteration could be done in
real-time. This gave the teacher an opportunity to reset, recalibrate, or rerun the exercise in class without losing or delaying the opportunity for learning.

Some research and testing may be done in class. The purpose of this activity is to guide all stakeholders through a better, more desirable learner experience. If the exercise is partly designed by students and if the functionality of the exercise is assured by the same students that will be engaging in the exercise, then real-time modification is possible with facilitation. The class must be guided to assure that exercises are aligned in purpose and design. This also increases the level of understanding of the exercise in the classroom before it is enacted. Personal preferences can be sidelined so that an MVP can be used as a meaningful learning exercise in class. All learning activities need to be aligned with student learning outcomes. Analytics needs to be embedded in the design of the tasks. This may manifest itself as a comprehension measurement before and after the exercise. Transformative activities include interactive components that support a freedom and a willingness to experiment.

Learning velocity is of the essence if real-time objectives are to be met. Consequently, design hypotheses must be tested within rapid iterative cycles of decide, design and validate. Design work must be both collaborative and visible. Research is collaborative and best done by including learners. Both qualitative and quantitative information should be included. Ultimately, the collaborative environment should yield a LEAN-Agile Center of Excellence that delivers learning experiences at an ever improving value level.

Enterprise scaling of the Agile Scrum method involves the alignment and the coordination of the learning environment across the cohort. In fact, the participants in a cohort may be analogous to a remote workforce. Consequently, some similar principles will apply. The
key paradigms with enterprise scaling are execution (a portfolio of learning methods are known and used), alignment (the cohort is synchronized to achieve goals that are clear), quality (the methods are measurably effective) and transparency (each person knows where they are in the roadmap). The cohort is energized, synchronized and aligned to achieve their educational learning objectives.

**Challenges to Implementing Scrum**

The team needs to adjust to the learning process of Agile Scrum. Students may have come from classes that did not have the same level of transparency, inspection or adaptability. This is a culture change that includes a level of vulnerability that should be motivational. They may not have had the chance to reflect on their performance and as adult learners, take steps early in the class to improve. They may not have seen that they can influence the teacher’s agenda or emphases in the class as the teacher gets to know their interests and their knowledge gaps in light of class objectives.

When the culture is quickly adjusted, it becomes natural for learners to do a poll, form a team, engage and interact with each other to solve a problem, or give a quick presentation or demonstration in front of their classmates. These principles work in an academic environment where there are tight schedules and tight time budgets. The most common failures, such as exceeding your time budget, missing deadlines, a lack of engagement, etc. are mitigated by these principles. ‘Time-boxing’ helps learners to meet deadlines and maintain quality, while maintaining control of their schedule.

Each project should be divided into portions that are time-boxed thereby creating a suitable cadence needed to accomplish all tasks. Each phase of the project must be achieved on
time. Within a phase some personal sacrifices may need to be made to achieve the expected results of each phase. By prioritizing the requirements, quality can be optimized and time requirements can be met. The requirements for the project (or homework assignment) can be identified and prioritized so that the most important requirement related to quality is achieved within the schedule. Typically, as students are motivated to achieve beyond the established expectations, it is typical that deliverables be of a higher quality than what was expected.

DISCUSSION

The principles of this pedagogical activity can be easily associated with a typical class learning event. As illustrated below, this event is meant to introduce the idea of the business incubator to students. In a poll prior to class it was determined that none of the students knew what a business incubator was. This is important because after the class was completed each student not only had a thorough understanding of the business incubator but could easily pick one if needed.

From an academic perspective the goal was to help students gain knowledge about business incubators. This was accomplished through the five phases of learning as described in figure 3. First, the students are engaged because they have a need, in light of their product development projects, to find a suitable incubator. Now that they are familiar with the idea they are curious to find what might be available to them. They engage with search engines and “wander around the internet” at their own pace to see what is available such as sites that represent individual incubators or incubator associations. As students engage in this process they acquire new knowledge. The need to find an incubator motivates them to absorb as much as possible so that they can make an informed decision. Students build confidence in their skills by
sharing what they have found and the rationale for their choice. Other teams that have chosen incubators are examining the research that each team has conducted and the rational used in their choices.

From a creative perspective, the teams need to be able to use their imagination and come up with a unique solution. As students engage in discussion, they can discuss how their needs are unique and how they can use or create special features in their incubator to minimize cost and get the best results. As they explore the competitive environment in the incubator business they will see how unique features can produce value for them. This in turn will encourage them to create their own unique incubator features. For example, features of the co-working space of an incubator may be uniquely conducive to the maturing of their particular product portfolio. The teams can also be creative as they understand alternate uses and the creative possibilities for some of the features. With an understanding of the creative possibilities the teams can determine how they can apply their own creative ideas to the space. When this is shared the discussions will produce constructive feedback.

From a practical perspective, student teams can determine the financial impact to their project given the features desired. This may also include the geographic locations of their projects and the associated costs and challenges. Through financial modelling they will link the project features to their respective costs. When the cost drivers are understood, they can be linked to financial analysis so that decisions can be made to optimize the costs incurred by the incubator. Based on financial analysis, student teams will determine whether or not the return on investment is acceptable and thus the viability of the product.
With this knowledge, students will be able to apply their understanding to a large variety of business scenarios. They can explore options if their project changes. They will be able to engage in conversation with other people who have experience with incubators or with those who want to understand the basics. They will be able to acquire information from other incubators quickly in light of their own needs. This knowledge can be applied and they will be able to share their choices with the class to get feedback. In each case predictable outcomes will help the teacher know if the goals have been achieved in the class.

![Figure 8: The 5 Knowledge Acquisition Phases and the 4 Processing Spheres.](image-url)
Conclusion

Teaching methods need to keep pace with a changing environment. It is expected that with Agile Scrum, teachers customizes their teaching as needed. Adopting a context inspired view of teaching/learning diminishes the belief in unaltered pedagogical model replicability. However, a careful examination of an individual’s planning, implementing, and reflecting conventions can provide a schema for independent application. Confidence in the premise that cognitive conceptualization can be a preliminary step towards pedagogical change warrants the use of authentic case study illustrations. Accordingly, the preceding case study encapsulated a journey from content-driven to context-embracing teaching/learning. Knowledge in the technological era is generalized when individuals are engaged, when they absorb content with speed, and when they are flexible. Learners must have the skill and the will to learn. The ultimate outcome of education is the thrill of discovery and application of knowledge for good in an ever changing world. The methods described by Academic Agile Scrum emphasize the importance of using instruction as a means of combating the limitation of the current impact of right-answer based reforms.
REFERENCES


Csikszentmihalyi, M. (Sep/Oct97). “Happiness and creativity: Going with the flow,” Futurist v.31 (5) 8-12


1. Can Repeated Information Exchange Activities Increase the Speaking Self-efficacy in Japanese University Students?

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6. Abstract

   Though many Japanese university students express the desire to speak English, many of them bring a self-deprecating attitude to the university with regards to their English abilities, especially speaking. This attitude may stem from the lack of opportunities to actually speak the language they have studied the previous six years in junior and senior high school. The aim of the following research was to determine whether an oral information exchange activity, with quizzes would lead to an increase in their speaking self-efficacy. Bandura (1986) states the four sources of self-efficacy to be: (1) performance experiences, (2) vicarious experiences, (3) verbal persuasion, and (4) physiological feedback. All four of these points were paid close attention to in the following action research.

   Over the course of a 15-week semester, the information exchange activity was administered to thirty students in an economics faculty at a private Japanese university. In 10 minutes, each participant of a triad group was required to read a different short text and list 10 words on a separate page. These 10 words were used as an aid to explain their particular reading to two partners, who in turn took notes and clarified the information given. Participants were then given up to 6 minutes to explain their particular reading. A 10-item quiz concerning all 3 readings was read aloud at the end of each activity and then subsequently scored.

   The participants answered pre and post 7-item questionnaires regarding their perceived ability to effectively complete the task. The questionnaire answers ranged from strongly agree to strongly disagree and
only results from participants taking part in four or more of the information exchanges, and both questionnaires were used. This excluded four participants for a total of 23 subjects; 12 male and 11 female. The comparison between pre and post-activity questionnaire results showed that students’ communicative self-efficacy rose slightly. Post activity interviews with five students also revealed that activity quiz scores, the amount of encouragement from the instructor, and the language taught to enhance clarification among groups, affected how students felt about their ability to perform.
Title: Integrating Information Literacy into Special Education Courses in a Post-Truth Era

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Abstract:

In this era of fake news/alternative facts, students must be in a position to identify valid research for inclusion in scholarly work as opposed to searching for and finding unsubstantiated claims and misinformation, which supports a predetermined personal point of view. Information literacy or successfully locating, evaluating, and ethically using information is crucial for pre-service teachers to practice; especially since “once in their own classrooms, PK-12 teachers model for their students how to critically navigate the current maze of information and how to use information to construct credible arguments” (IL Standards, 2011).

A faculty librarian and two special education faculty regularly collaborate to infuse information literacy competencies into undergraduate and graduate level courses. Learning outcomes have included: locating, evaluating, and the ethical use of sources in student research projects. Special education faculty noted an increase in student use of non-scholarly/uncredible sources. Specifically, the topic of autism repeatedly led to assignments which included sources generating unsubstantiated claims and misinformation correlating the link between vaccinations and autism.

This paper session outlines the ongoing research around information literacy competencies in special education courses in order to determine the effectiveness of the instructional methodologies and to share ideas among conference participants. This quantitative study utilizes pre/post assessment to determine the answer to the following research question. “To what extent are the instructional methods used by faculty increasing the students’ ability to locate, evaluate, and utilize ethical sources?” The research participants are undergraduate and graduate students enrolled in the University of Alaska Anchorage and taking one of the courses taught by the researchers. The courses are delivered via live, synchronous, distance education technologies.

Faculty will share successful pedagogy that can be integrated into any online or face-to-face course to strengthen information literacy skills in a fake news/post-truth era.

References:
Title Page

1. **Submission Title:** Culturally Responsive Teaching and the student teacher: Exploring how the introduction of CRT affects the perceptions and success of candidate teachers

2. **Topic Area of the Submission:** Teacher Education

3. **Presentation Format:** Roundtable Discussion

4. **Description of Presentation:** This roundtable will discuss research that is being conducted on the implementation of Culturally Responsive Teaching strategies with candidate teachers. The researchers are asking if CRT strategy introduction and targeted, individualized training assist these teachers in both changing their perceptions about students and if such strategies increase their ability to increase student agency and achievement.

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Culturally Responsive Teaching and the student teacher: Exploring how the introduction of CRT affects the perceptions and success of candidate teachers

Abstract

Described by Diller and Moule (2005), cultural competence is a framework to allow teachers to teach students from cultures other than their own successfully, where the teacher is both able to respect that student’s culture, while being self-aware of their own. This self-awareness stems from the understanding that everything we experience growing up including our race, the makeup of our family, our religion, the socioeconomic and educational levels of our parents and more define our own understanding of the world and shape how we operate within it (Diller & Moule, 2005). The same is true of a teacher’s students. If that teacher is different in any way from their students, the teacher must understand those differences and how to navigate them. The problem is that such understanding is not being taught as often as it should be. The National Education Agency (2008) reports that only 1/3rd of states are currently requiring teachers to study any aspect of cultural diversity as a part of their formal teacher training. Further, only nine states currently have any type of stand-alone cultural awareness standards that their teachers must master prior to becoming certified (National Education Agency, 2008). Such failures certainly don’t help create culturally competent educators, which, in turn, may further limit the student’s ability to find their voice and use it in a safe and protected environment.

This paper is a work in progress update to a full study that seeks to change those numbers by introducing Culturally Responsive Teaching strategies to a group of candidate teachers at a major university. The teacher preparation program these teachers are a part of currently offers no specific CRT training, aside from basic overviews of theorists that work in fields tangentially related to CRT. The teacher preparation program, as it stands does not provide specific CRT instruction, nor do they prepare teachers to challenge their perceptions about their and other cultures and connect the revelations that occur to their performance in the classroom. This study attempts to change this by introducing CRT to a set of candidate teachers assigned to a middle school in an urban school district through a series of targeted workshops, as well as multiple individualized coaching sessions. The workshops ensure there is a specific focus on oppression versus privilege amongst both students and teachers, as well as how these oppressive cycles create power dynamics that affect students’ achievement and ability to both develop and utilize agency. Then, specific CRT strategies are introduced that focus on developing agency within the classroom, assisting teachers in continuing to recognize their and others’ privilege, as well as help them develop specific interventions to craft student-teacher conversations about power and control that can eventually lead to the development of agency. To that end, the authors define agency as the ability of the student to act independently and exercise their voice regarding their learning. Individuals with agency are self-reflective, self-organizing and self-regulating despite the social systems that surround them. The purpose of the specific interventions being provided to the teachers are to assist students in developing self-empowerment to make decisions about not only what is learned but how it is learned.
By the end of the research period, the authors will have conducted pre and post surveys with candidate teachers regarding their perceptions about education and their students. Additionally, candidate teachers will have provided four self-reflections and participated in post-interviews with the researchers about their use of CRT strategies. Further, researchers will be conducting one on one coaching with the candidate teachers, as well as observing their use of CRT strategies through a series of classroom observations. By the time of this conference, all research will have been collected, but potentially not analyzed. Thus, the paper presented will feature the research in progress, as far as data analysis has occurred, and will present the initial findings of the researchers for discussion with session participants. Additionally, it is the hope that this study will be extended beyond this first group across the entire teacher preparation program at the University being used, so the authors will be able to speak to those plans, as well.

The authors’ hypotheses for this study are that students from vulnerable populations from a diverse set of multicultural backgrounds are at risk of experiencing oppression both within and outside of the classroom, particularly when being taught by teachers who possess a different cultural experience than their own and when that teacher does not have CRT training. As a result of this lack of training, many teachers, both currently in education and those seeking to enter it, are unaware of how their own experiences affect their students, as well as the long-lasting impact such a lack of awareness can have on their students’ ability to succeed in their classrooms and beyond. Thus, the authors ask the following two research questions:

- How will pre-service teachers, in-service teachers’ awareness of oppression and privilege both in and outside of their classrooms change once exposed to CRT?
- How will the student experience change within candidate and mentor teachers’ classrooms once CRT strategies are introduced?

We will be using a mixed-methods study that will combine quantitative survey results with qualitative interviews and self-reflections completed by participants. It is our intention to use a triangulation design and convergence model. Further, we are using a multi-case study that is a descriptive case study. This multi-case study is bound by time, definition and context. The time period is the fall semester of the 2018-2019 school year. The definition is the teacher preparation program at a major university, as well as within student-teacher classrooms within a middle school within an urban school district. The context is the transition from traditional classroom instruction to instruction that is based upon and includes CRT strategies. Case studies like this one are used to explore a topic of interest and potentially identify previously unknown aspects about the phenomenon being explored through this study (Baxter & Jack, 2008). For this project, our case study will specifically focus on what it is like to be a practitioner and student teacher both before and after aspects of CRT were introduced. Such inquiries are at home in the realm of education, as much of being a student and the learning process exist around the idea of stories and the telling and retelling of those stories (Connelly & Clandinin, 1990). Therefore, the story told in qualitative data from the perspective of participants serves as a record of research about the development of CRT in educational practice. It is a multi-case study for how CRT strategies can be implemented in real classrooms with students from vulnerable populations. Through the data, the authors will focus on the stories of other teachers and the students themselves.
Since this is a multi-case study, we will ensure our data points are not analyzed separately but used together to “understand the overall case, not the various parts of the case (Baxter & Jack, 2008).” Therefore, we will use a bricolage method working from the perspective of combining multiple types of qualitative and quantitative research outlined above (Denzin & Lincoln, 2003). Denzin and Lincoln (2003) explain bricolage as a type of research where the researcher pieces together stories and data collected in a type of patchwork connecting these disparate sources of data to determine information about a subject. By using such a methodological framework, we will interpret our data and explore multiple aspects of our research without being constrained by one type of formal data analysis. As Denzin and Lincoln (2003) describe, bricolage rejects the positivist approach to research that begins with the belief that knowledge about a subject can only come from a scientific exploration of empirical facts. This implies that this is one correct way to get information, which Lincoln and Denzin (2003) reject. Instead, bricolage research begins from a constructivist perspective and looks at how sociopolitical and historical contexts influence what is being examined (Kincheloe, 2005). In this vein, our data analysis comes from the researchers being a narrative bricoleur where we will draw from multiple perspectives and use varied sources to interpret the effect CRT strategies have on the classroom (Rogers, 2012).

Further, we will be triangulating our quantitative and qualitative data attempting to find connections between each in the hopes of showing the success or failure of our CRT interventions. As stated above, we will be using a triangulation design and convergence model. Both qualitative and quantitative data will be collected throughout our project and analyzed separately prior to being combined. First, with regard to quantitative data, we will be analyzing our survey results using descriptive and inferential analysis to view trends and potential changes in perceptions and experience amongst candidate teachers. Then, we will move onto our qualitative data. Using our interview transcripts and reflections from candidate teachers, we will generate a series of themes identified throughout the analysis phase. To find these themes, we will use a holistic coding approach. Holistic coding is useful with data that has a standard set of time, which ours does, limited to the 2018-2019 school year. Further, thematic analysis is highly effective with holistic coding (Saldana, 2009).

Once completed, we will compare and contrast our quantitative data to gain more insight into our research questions. We will finish with an integration of both to make the final analysis of our data and find answers to our research questions.

References


Title Page

1. Submission Title: Exploring the potential of student-directed learning: Using student autonomy to build student agency and success among vulnerable populations

2. Topic Area of the Submission: Teacher Education

3. Presentation Format: Roundtable Discussion

4. Description of Presentation: This roundtable will explore the idea of using student-directed learning to increase student agency, engagement and achievement in the classroom. We will explore how current student-directed learning programs globally that are being used and whether or not access to this type of learning should be expanded within the United States, specifically with vulnerable populations.

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Exploring the potential of student-directed learning: Using student autonomy to build student agency and success among vulnerable populations

Abstract

Student-directed learning is an instructional framework that provides students with autonomy in the learning process. When student-directed learning occurs, there is an innate power shift in the classroom where the teacher and students share equal power over both what is learned and how it is learned (Warren, 1988). It is the hope that by doing so, student-directed
learning is able to promote high levels of academic engagement and achievement in the classroom (Tapp, 2015) (TedX Talks, 2014). Currently, there are multiple examples of student-directed learning and democratic schools throughout education systems across the globe (A.S. Neill’s Summerhill) (L’Ecole de la Neuville) (Calgary Board of Education) (Templestowe College). The first purpose of this paper is to explore how these programs work and compare their ability to increase student engagement, achievement and agency in the classroom. By doing so, the argument can be made that access to student-directed teaching should be expanded within the United States education system, including within public schools. At this time, the only programs that are based in student-directed learning within America are smaller campuses outside of the public education realm (Houston Sudbury School) (Brooklyn Free School) (Alpine Valley School). Thus, student-directed learning reaches a very few number of learners every year. Students, specifically those from vulnerable populations, are currently unable to gain easy access to this type of learning that would potentially benefit them. In its second purpose, this paper will make the case for why vulnerable populations would benefit from student-directed learning and the agency crafted as a result of this teaching style (Friere, 2014) (Hooker, 2009) (Diller & Moule, 2005) (Hooks, 1994). Then, the authors will explore how to extend such opportunities to vulnerable groups of students using the comparative analysis on current student-directed learning as a basis for how to begin student-directed learning throughout some of the nation’s most vulnerable school districts. By increasing the agency experienced by these students, the opportunities for an increase in engagement and achievement occurs amongst these student bodies that fall within the achievement deficit seen across the United States and other global school settings that prepare vulnerable populations of all-level learners.

References


Tapp, J. (2015, October 27) Drum interview: Education is broken, here’s how we can fix it. 


1. Title of the submission.

Identifying roadblocks and pathways: A librarian and teaching faculty collaboration to improve the business information literacy of first-year university students

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6. Abstract.

Librarians and teaching faculty at the Haskayne School of Business came together to study and re-design an information literacy session for business students. Through an iterative process grounded in lesson study protocol, the researchers identified factors that prevent and enable students’ understanding of complex concepts. Learnings were put into practice resulting in more effective learning for students.

At our university, approximately 800 business students every year are required to take an introduction to business skills course. This foundational course emphasizes skill development in the areas of: communication, critical thinking, decision-making, and research skills. The course further serves to acculturate the student to the university environment, and to business as a professional and academic discipline.

Business research is challenging to teach, because information sources are not highly structured or always evident. Students need to understand the nature of business information and how to apply this knowledge when conducting research.
Academic librarians serve as partners in helping students acquire critical information literacy and research skills (Raish & Rimland, 2016). At our School of Business, librarians have been heavily involved in the creation and delivery of a one-shot business information literacy session for the introduction to business course. Early versions of the session were typically lecture-based. In some aspects, this approach was successful. However, there were a number of roadblocks to student learning and comprehension. Anecdotal evidence showed that it was not unusual for students to struggle with identifying, finding, and synthesizing the information they needed for the major research project in this course.

This paper chronicles the implementation and evolution of a lesson study project by the instructors and librarians involved in the course. Cerbin & Kopp (2006, p.250-251) describe lesson study research as a small team that works together to “design, teach, study, and refine a single class lesson.” In order to investigate how students learn, emphasis is placed on making learning visible. For this project, investigators used a flipped classroom format to encourage active learning (see Arnold-Garza, 2014). To flip the lesson, key concepts from the lecture content were presented in online modules prior to class time; this allowed the class time to be used to integrate learning into practical application activities. During the class, a librarian acted as a guide, leading students through the learning process. Data collection points were set-up throughout the process. Data was then analyzed for roadblocks and pathways to learning. In the first delivery of this lesson, the investigators learned that students struggled with the concept map activity. In response, the investigators made a number of changes to the lesson plan and delivery. Students in the second iteration of the information literacy session recorded a higher level of satisfaction with the lesson and fewer stumbling blocks to learning.

This session will take attendees on a journey through our lesson study project, including practical considerations for implementing lesson study design, lessons learned, and research considerations.

References


Teacher Educator Technology Competencies: An Introduction

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Abstract: This study documents the collaborative research process that was used to develop technology competencies with related criteria for teacher educators. The methodology involved three phases: (1) crowdsourcing of literature, (2) a Delphi method to gain expert feedback for revisions, and (3) an open call for public comment to finalize the list of competencies and related criteria. The Delphi method utilized a panel of teacher education and educational technology experts to identify the technology competencies (knowledge, skills, and attitudes) expected of all teacher educators. The goal was to develop a comprehensive list of technology competencies that will help guide teacher educators in teaching with and about technology. Results from the study identified 12 competencies with related criteria for all teacher educators.

The 2017 National Education Technology Plan (NETP) calls for PK-12 students to become active learners and contributors in a 21st Century society, driven in part by technology (U.S. Department of Education, Office of Educational Technology, 2017). It seems that although current technologies, like the internet and other similar digital tools, offer many possibilities for PK-12 teachers and students, as well as newer teachers who tend to limit their use of technology to developing instructional materials and communicating with others (Ertmer, Ottenbreit-Leftwich, & York, 2005). There is a national concern that teachers, in general, tend to limit their use of technology to writing, creating spreadsheets, managing student data, and making presentations (Gray, Thomas, & Lewis, 2010). For the most part, preservice teachers enter preparation programs knowing how to operate their personal devices, but need support in learning how to integrate technology in ways that are powerful and meaningful (Dexter, 2006). Colleges and schools of education attempt to address this need in their curriculum, yet many teacher preparation and professional development programs fail to prepare teachers to use

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The 2017 National Education Technology Plan purposefully shifts the idea of technology integration from the PK-12 focus of the prior plan, to one that includes commitment from every level, PK-20. Specifically, it calls for teacher preparation institutions to assure their teacher candidates, from day one, know that “effective use of technology is not an optional add-on or a skill that we simply can expect teachers to pick up once they get into the classroom” (p. 35). A meta-analysis of studies related to preservice teacher preparation and technology integration conducted by Tondeur et al. (2012) identified 12 critical variables that impact preservice teachers’ use of technology in their practice including role modeling, aligning theory and practice, and providing opportunities for reflecting on attitudes about technology. If all teacher preparation programs in the United States (and around the world) are charged with the need to prepare preservice teachers to use technology in powerful ways, then teacher educators responsible for this charge must establish curriculum for teaching with technology and serve as role models for using technology in teaching (Foulger, Graziano, Slykhuis, Schmidt-Crawford, & Trust, 2016).

Consequently, the 2017 National Education Technology Plan explicitly calls for those involved in teacher preparation to develop a common set of technology competencies and expectations for university professors who support preservice teachers. Establishing a set of clear and useful competencies that apply to all teacher educators, regardless of their content focus, would help colleges and schools of education move forward in the effort to develop preservice teachers’ ability to teach with technology. Thus, this paper outlines a research study that answers the call and describes the methods used to develop a list of technology competencies with related criteria that will assist with setting the expectations needed to guide teacher educators in preparing teachers who will ultimately use technology effectively for teaching and learning. The research question that guided this study was: What knowledge, skills, and attitudes related to technology do teacher educators need?

**Literature Review**

One critical factor influencing new teachers’ use of technology in classrooms directly relates to the quality and quantity of technology experiences they encounter in their teacher preparation programs (Agyei & Voogt, 2011; Drent & Meelissen, 2008; Polly et al., 2010). Beginning teachers still report they are ill-prepared to use technology effectively when they enter classrooms (Sang, Valcke, van Braak, & Tondeur, 2010; Tearle & Golder, 2008). Many teacher preparation programs typically offer a single educational technology course (Gronseth et al., 2010; Kleiner, Thomas, & Lewis, 2007). Others align the content from the technology course with subject-specific methodology courses taught concurrently or later in the program (Dexter, Doering, & Riedel, 2006), while some programs focus on integrating technology into specific content areas across the entire program (Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010). There is obviously not a single best approach for addressing this problematic task related to integrating technology experiences in courses taught by teacher education faculty (U.S. Department of Education, Office of Educational Technology, 2017).

Teacher educators typically lack the necessary knowledge and skills needed to effectively model technology use and integration for teacher candidates (Goktas, Yildirim, & Yildirim, 2009; Tondeur et al., 2012). This study used a collaborative and iterative research process
involving the crowdsourcing of literature, a Delphi method for expert feedback, and an open call for public feedback to help facilitate the development of teacher educator technology competencies (TETCs). These three methods will be described briefly.

The method of crowdsourcing was used to gather a collection of literature focused on technology competencies for teacher educators. Crowdsourcing is a Web 2.0 form of outsourcing a task or function to an undefined group of people in the form of an open call (Howe, 2006). Although crowdsourcing has been a common method used in the business world, it is gaining popularity and is being used more in the academic community. Ultimately, crowdsourcing provides a mechanism for many individuals to participate in knowledge generation and those individuals participate based on expertise and experience.

Once articles were determined a good fit for the intended purpose, a list of draft competencies were developed for review and feedback with select participants through a Delphi method. According to Nworie (2011), the Delphi method is a research technique used to elicit, distill, and determine the opinions of a panel of experts. It is a group decision-making process that seeks consensus and stability of results. Experts are selected to the panel based on their expertise in the field and their understanding of the issue being studied (Okoli, & Pawlowski, 2004; Shelton & Creghan, 2015). As Nworie (2011) states, “The collective viewpoints of expert panelists can yield better results than the limited view of an individual” (p. 29). Six iterations of the Delphi method were used in this study to gather expert opinions until a consensus on a list of twelve teacher educator technology competencies with related criteria was reached.

Finally, researchers solicited public comments to assure the final TETCs would be widely accepted by teacher educators. Information gathered from public opinion is most reliable when the information is gathered from individuals who are well informed about the subject matter. The product of a crowdsourcing process is oftentimes shared freely, and has strong agreement due to the participation of many (Morris & McDuff, 2015). Modifications can always be made to the product, document, or decision as a result of the data gathered from a public comment cycle. Feedback used for improvement in order to assure goals are met is always beneficial to the entire research process.

Methodology

The purpose of this research study was to identify a common set of technology competencies with related criteria that will help guide teacher educators in teaching with and about technology. Three research methods were followed to identify the teacher educator technology competencies (TETCs) and related criteria: 1) crowdsourcing of literature, 2) a Delphi method, and 3) public comment. All of the research methods used in this study were highly collaborative and involved the input of many individuals and organizations. Following are brief descriptions of each research phase used in the study.

Phase I: Crowdsourcing Literature

Crowdsourcing was conducted to identify research articles that address the competencies needed by teacher educators who support the development of preservice teachers as they learn to teach with technology. A call for literature was sent to social networks (e.g., LinkedIn, Twitter) and teacher educator networks (i.e. SITE, ISTE). Initially, 93 articles were submitted to a web-based portal. Each researcher was then assigned 18-20 articles from which to identify and
compile a master list of competencies extracted from the literature. When writing the competencies, each researcher referred to a prepared checklist that included eleven evaluation criteria for writing an effective competency statement. The initial list of competencies was constructed by having each researcher write the competency, list any criteria aligned with the competency, and cite the article(s) from which the information was extracted. As a result of the crowdsourcing method, a list of 24 teacher educator technology competencies was generated. This initial list of technology competencies was used to begin phase II.

**Phase II: Delphi Method**

To identify participants for the Delphi phase of the study, a participant request application was distributed through targeted listservs (i.e., International Society for Technology in Education (ISTE) and Society for Information Technology and Teacher Education (SITE)). The application was a virtual form that included demographic questions and questions related to three qualification criteria: 1) Expertise (e.g., Do you have expertise related to teaching with technology in teacher preparation?); 2) Impact (e.g., Do you have products and synergistic activities that have benefited the field of educational technology in teacher preparation?); and 3) Availability (e.g., Are you available to participate in multiple rounds of the Delphi process?).

Forty-six individuals applied to participate in the study. A list of variables (i.e., country, grade level, subject, size of university/college, ISTE/CAEP/SITE affiliation, online/hybrid teaching experience, professional development in teacher preparation experience) were created and used to select a diverse group of Delphi participants. Eventually, 18 participants were selected for the study. Of those 18 participants, 17 committed and signed IRB consent agreements.

Participants completed 6 rounds of data collection. For each round, participants were given instructions on their tasks to complete using a Google Form and then submitted their responses using the same form. Table 1 provides a description of the research tasks participants completed for each round of data collection. The research team analyzed the results after each round of data collection and then prepared materials for the research tasks for the next round based on those results.

<table>
<thead>
<tr>
<th>Data Collection</th>
<th>Delphi Participants’ Research Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round 1</td>
<td>Participants’ tasks were: 1) to review the list of initial competencies (N = 24) (extracted from crowdsourced literature), 2) to decide if each competency was important for teacher educators, 3) to decide if each competency was well written (should it be modified?).</td>
</tr>
<tr>
<td>Round 2</td>
<td>Participants’ tasks were: 1) to review rewritten competencies (N = 19) and decide if each competency was important, 2) to decide if modifications were needed, 3) to decide if any competencies should be combined and revised, 4) to identify any missing competencies.</td>
</tr>
<tr>
<td>Round 3</td>
<td>Participants’ tasks were (similar to round 2): 1) to review rewritten competencies (N = 13) and decide if each competency was important, 2) to decide if any competencies should be combined and revised, 3) to identify</td>
</tr>
</tbody>
</table>
Phase III: Public Comment

Finally, broad-based public comment was sought. A web-based survey, available for a one-month period, was sent through targeted emails to a variety of organizations and individuals. The survey was also shared on a variety of social media platforms. The survey consisted of four brief questions. The first question asked, what aspects of the TETCs are most useful? The second question asked how others would use the TETCs? The third question allowed for the inclusion of concerns about TETCs, and the last question asked for additional comments. The responses submitted were from all geographic regions of the United States as well as Australia.

Findings

After crowdsourcing the literature, conducting six iterations of data collection from expert panelists (Delphi method), and soliciting feedback during an open public comment period, a list of 12 teacher educator technology competencies (TETCs) with related criteria were identified (Foulger, Graziano, Schmidt-Crawford, and Slykhuis, 2017). These TETCs represent the knowledge, skills, and attitudes teacher educators need to transform their own understanding about technology and its value within the content they teach while preparing their preservice teachers to teach with technology. For more information on the background, methodology, and a list of the TETCs with related criteria, please visit Foulger et al. (2017), Foulger, Graziano, Schmidt-Crawford, and Slykhuis (2018); Foulger et al. (2016); Graziano, Foulger, Schmidt-Crawford, and Slykhuis (2017); and Slykhuis, Foulger, Graziano, and Schmidt-Crawford (2017).

Discussion and Conclusion

The teacher educator technology competencies (TETCs) with related criteria were the direct result of data gathered and analyzed using a series of highly collaborative research processes, all selected to provide feedback from those in the field, and to seek consensus from teacher education and educational technology experts. Crowdsourcing of the literature and public comment were solicited from the field at large while the Delphi process included select individuals who committed their time and energy to provide their expert opinion for revisions. The resulting TETCs are intended to support preparation programs and their faculty as they learn to address technology integration within their courses. The TETCs will also help guide changes made to course goals as well as course design, guide pedagogy which might include the inclusion of modeling practices, and frame a plan for possible faculty development. Findings from this
study are aligned with the work of the United States Department of Education, Office of Educational Technology, and is supported by the following organizations: Society for Information Technology and Teacher Education (SITE), American Association of Colleges for Teacher Education (AACTE), Council for the Accreditation of Educator Preparation (CAEP), International Society for Technology in Education (ISTE), and National Technology Leadership Coalition (NTLC).

The U.S. Department of Education and Office of Educational Technology (2017) acknowledged the need to develop a set of competencies to help guide teacher educators in understanding what knowledge, skills, and attitudes are needed to use and integrate technology within all courses throughout a teacher preparation program. The list of TETCs which emerged from this study shed light on the breadth and depth of knowledge and skills all teacher educators need for addressing technology within the courses they teach and throughout the preparation programs where they work.

Next steps will actually determine the usability of the teacher educator technology competencies (TETCs). Research possibilities include implementing faculty development/training around the TETCs, developing case studies from teacher educators using the TETCs, and curriculum alignment and course design projects using the TETCs. Teacher educators might also see value in using the TETCs as a mechanism to systematically address how technology is being used within their teacher preparation programs. Ultimately, the end goal is to use the TETCs to positively impact teacher preparation programs and the teacher educators who teach within those programs. Collectively, all teacher educators are responsible for preparing teacher candidates who enter future classrooms with the skills needed to use and integrate technology appropriately for teaching and learning.

References


Fundamental Foundations in Early Childhood Development

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Abstract

Learning begins at birth; education is a process whereby the mind is developed to a higher dimension, enabling an individual to understand and deal with the life experiences from an informed perspective. Early childhood programs can result in more alert minds, better school attendance, lower drop-out rates, and stronger academic skills. Quality early childhood experiences can be provided both at home and at professional care centers provided the environments are conducive to learning and teaching. An effective education must have an intentional foundation through which a child will grow.

At its core, there are three pillars critical to support this foundation. First, ethics – development of personality and values; a vital element to helping a child learn their role within society and culture. Secondly, innovative pedagogy – captivating a child’s mind through curriculum and activities built for specific learning styles. Language, sensory, and social interactions with both adults and children, along with warm, loving, and consistent care, are the keys to making it possible for children to form secure attachments to those who care for them and help them grow into curious, confident, and competent learners. Education addresses the physical, mental, social, emotional, and moral training of the child. Thirdly, the educational environment provides that platform from which all aspects of development are nourished. The education environment encompasses more than just the classroom. Unique family, socio economic, and culture differences of each child’s situation should be acknowledged and celebrated. Education is, therefore, absolutely indispensable in shaping the personality and building the character of the child. Education undoubtedly plays a pivotal role in producing the well-rounded, productive, and decent citizens of a nation. Therefore, the focus is on the interrelationship between home, society and culture and their influence on the typically and atypically developing child. Also, the importance of nourishing home and family relationship in the education of young child is critical.

Children are susceptible, impressionable, unresisting to any stimulus. Since the child is a hero worshipper, s/he is prone to be influenced by the individual (teacher/care-giver) who spends the most of her/his time with the child and who leaves a vital impact on the personality of the child. The child unconsciously or sub-consciously picks up the teacher’s personality traits, and thus the teacher must be a good role model. Since the child trusts almost every adult, one should never betray the confidence of the child. The younger the child is, the more honest s/he is. One should always respect the child’s spirit of honesty and sincerity. Also, the child is forgiving. S/he is quick to forgive. Again, the younger the child is, the quicker s/he is to forgive. Keeping in mind the uniqueness of each personality, teachers should deal with them on individual basis. An educator cannot use one and the same method for all of them indiscriminately. Further study should be conducted to focus on diverse contexts including the influence of individual, culture, linguistic, ethnic, social and cognitive differences, as well as abilities and disabilities. Educators should conduct themselves with courtesy and professionalism; and interact with children by expressing love and respect.

Teacher can be compared demonstrate these attributes by adapting to the versatile characteristics of bamboo. A stalk of bamboo is hospitable and generous. It provides food for the largest of animals, the elephant. In the same manner, a teacher provides the most critical intellectual food, knowledge. Bamboo is also flexible, swaying in the midst of a storm. The flexibility of the stalk
and its strong protective housing prevents destructions while other plants fall or uproot, not being able to adapt to winds of change. Similarly, successful educators adapt to changes within the classroom, district, and beyond; creatively acclimating to modern technologies and trends, but never being uprooted in matters of ethics. Bamboo is also used in construction trades as a scaffolding because of its versatility. A teacher can express this versatility through adapting pedagogy to meet the needs of their particular students. Bamboo is also amusing, often made into musical instruments (wind/percussion), providing entertainment. Educators can perform in a similar manner, incorporating humor and creative entertaining classroom activities. The root system of bamboo is supported by numerous shoots. A single stalk is never found alone; instead, they grow cohesively to support one another through a united root structure. Teachers must partner with peers, interns, master teachers, community resources, and student families in the same way, developing local support communities.

Today, in the 21st century, as the world embraces unprecedented advances in communication technology, we are seeing the creation of a culture born with a global identity unlike any we have seen before. The changes in the way we communicate globally have necessarily affected the language and academic skills necessary to succeed in today’s world. Just as technology is in a state of constant metamorphosis, so are the skills needed to utilize it. Education is, and has always been, the purveyor of change. It is incumbent upon educators not only to understand the immensity of the changes occurring in our current global communication, but also to be able to recognize how this communication affects the changing identities and need of instruction in language and academic skills. Embracing ethics, innovative pedagogy, and an innovative learning environment are critical to establishing a solid foundation for early childhood learning. Like the bamboo stalk, one must adapt to change by incorporating these versatile characteristics to help educators increase effectiveness and engagement in their classrooms.
Paradigm Shifts Necessary for 21st Century Learning (and Beyond).

Topic Area: Educational Foundations

Presentation Format: Workshop

In many districts across the United States, recess in elementary school is being reduced and even eliminated to increase instructional time. The assumption behind this is that Common Core has placed more pressure on teachers and students to score better in the classroom.

This workshop discusses the implementation of extended opportunities for recess, yoga and mindfulness into the school day, to support children in all areas of their lives; social, emotional, physical and academic.

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This work is at the core of the author’s doctoral research, and a hot topic in education today.

Paradigm Shifts Necessary for 21st Century Learning (and Beyond)

Play is not a luxury, it is a necessity. In many districts across the United States, recess in elementary school is being questioned, reduced, and even eliminated (National Education for the Education of Young Children [NAEYC], 1998; Pellegrini, 2005) to increase instructional time. The assumption behind this is that Common Core has placed more pressure on teachers and students to score better in the classroom. There has been very little research which has proven that more time in the classroom, and less recess, equals better academic outcomes for children.

In 1983, A Nation at Risk misleadingly alarmed our country that the educational foundations of our society were being eroded by mediocrity. Since that time, there have been numerous reformations of our American education system, none of which have proven to improve the quality of education for all children. Throughout the last twenty years, we have seen states raise graduation requirements, compete for funding, and implement a faulty accountability system for educators based on test scores. No Child Left Behind (2002) left many children behind and left teachers questioning their practices. Common Core narrowed curriculum and forced teachers to read from the scripts of packaged programs. The big business model and money pit has created a dangerously antiquated system. In the wake of this hysteria we have
caused the destruction of American public education. In an effort to meet federal and state standards, the days of recess are dwindling, yet the reality is that recess may not be the problem, but the solution.

Educational leaders and policy makers need to transform our American education system. By looking to countries around the world, such as Finland, who are global leaders in education, and learning from and collaborating with them, we will have a better understanding of how to prepare our students as successful citizens in a global society. Educating children by helping them to develop social competencies, emotional well-being, and physical abilities while teaching them how to communicate, collaborate, and problem solve is the best gift we can give to our children.

How do we do this? Offering elementary school students ample for time for recess daily (the CDC recommends at least 60 minutes a day), along with brain breaks between sustained instruction (5-15 minutes is all that is needed), will optimize attention to learning and as a result, students will be better able to attend to their academic tasks.

I speak from experience. As an educator for three decades, and having spent the first 26 years of my career as an elementary school teacher on all levels, I am well versed in curriculum, design, and best instructional practice. As an adjunct professor, it was evident that we need a complete overhaul in our teacher training. As an administrator involved in shifting the paradigm of my current district, we have implemented all of what has been recommended here. Every student in our school receives formal yoga instruction. Students have 30 minutes for lunch and 50 minutes for recess every day. Brain breaks are used to refocus students, and there has been no loss of instructional time. As a matter of fact, we have increased instructional time because “less is more.” Curriculum is an interdisciplinary approach with thematic units at the epicenter of our instruction. Attendance is up, behavior referrals are down. Our Discovery Center houses life sized blocks for children to create and explore. We go outside in the snow. We get dirty. We cooperate. We realize that mistakes are proof that we are trying. We offer students time to explore their talents and passions, and we are bringing CTE to our high school, so that every student has an opportunity to achieve.

This is my perspective. Let’s look to Maslow, Piaget, Vygotsky and Gardner, and remind ourselves of the true purpose of education, redefine our values, and the rest…will be history.
Innovation and Transformation in Health Education: iBook’s and iPads in Critical Care Nursing

**Title:** Innovation and Transformation in Health Education: iBook’s and iPads in Critical Care Nursing

**Topic area:** Health Education

**Presentation format:** Workshop

**Description of presentation:** The faculty of a Critical Care Nursing Program is transforming the boundaries of health education by creating course modules as iBook’s and providing them to students on iPads. Used in distance, classroom, simulation and clinical learning contexts, this innovative approach engages students by enabling the integration of multimedia alongside theory discussions supporting interactive learning and developing the highly specialized skills of critical inquiry and clinical decision making, thus preparing graduates to navigate complex situations.

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Abstract

Innovation and Transformation in Health Education: iBook’s and iPads in Critical Care Nursing

The faculty of a Critical Care Nursing Program is challenging the boundaries of Critical Care Nursing education by creating course modules as iBook’s and providing them to students on iPads. Used in distance, classroom and clinical learning contexts, this innovative approach helps prepare practice ready nurses by engaging students at higher levels. iBook’s enable the integration of multimedia alongside of theory discussions supporting interactive learning, thereby accommodating various learning styles and effectively bridging any potential ‘theory-practice gap’. This assists students to develop the highly specialized skills of critical inquiry, clinical decision making, and reflective practice, thus preparing graduates to navigate complex situations in critical care.

Literature identifies many factors that influence the theory-practice gap including the learning environment, teaching learning strategies, and curriculum (Swardt et al., 2012). Benner et al. (2010) in calling for transformation of nurse education, recommend the use of technology that fosters integration of theoretical concepts with clinical practice, while others propose computer-based support (Billings & Kowalski, 2006). Developing and delivering the critical care nursing curriculum as iBook’s and iPads, is consistent with these recommendations, and evaluation data has demonstrated overall positive outcomes.

The process and journey of how the Critical Care Faculty came to this endpoint will be described. Exploration of our origins on paper based, and how we choose iBook’s, transitioned, developed, and tested the iBook’s delivery will be described. Interest in the benefit of iBook delivery, from not needing Wi-Fi, to utilizing the iBook’s in different learning contexts such as students being able to use the small iPad in a clinical setting will be highlighted.

The need in our current global health care system is for practice ready critical care nurses. This presentation describes how iBook’s and iPads enhance effective theoretical and clinical preparation of nurses for critical care nursing practice. During this engaging and interactive presentation, participants will experience iBook’s from a student’s perspective, allowing them
to understand and explore the impact of embedded multimedia and how it supports and engages learners. The role of iPads in providing point-of-care access to information during clinical learning will be highlighted.


Abstract

Today’s instructors are constantly being challenged to teach more content, faster than before, to an ever-growing classroom. My challenge as a design educator is to teach students to observe, understand, and create interactions that purposefully go unnoticed to most people. A successful design is one that makes the user think, “why hasn’t it always been this way”? Metaphors and similes can frame the way that we see a problem, build upon preexisting mental models, and increase the chances for early success.

So, how can we employ comparative language to get better, faster, and longer lasting understanding from our students and more cohesion between our faculty? This paper will discuss the parallels between design education and tool sharpening to help teachers and students manage expectations, set high standards, increase the cohesiveness between faculty, and build a culture that values mentorship and excellence.

1. Introduction

The forge cuts on; the fan lets out a low whirl. An energetic glow edges out from behind the bed of coal. The craftsman selects a handful of tools and places them to the right of the anvil. Across the room an assembly of sharpening stones rest on the rack just above the sink, still damp from giving the ir all the day prior. The air is still: slightly crisp. Multiple steel blanks are lined up ready to be crafted into a range of shapes, each suited for a unique yet unknown purpose. At this moment all is quiet in the studio but in a few minutes the fire will roar, sparks will fly, and edges will be formed. It’s just another Wednesday in the Industrial Design classroom.

Cleverly crafted metaphors empower designers to do amazing things. They can help people navigate complicated digital landscapes or increase the accuracy and efficiency of a physical task. Properly formed metaphors can lower the learning curve by leveraging individual’s preconceived understandings and applying them to new context.

A wise professor once said design cannot be taught, but it can be learned. Design is more than an occupation; it is a way of viewing and responding to the surrounding landscape. Those who take on the challenge of teaching young people the lifestyle of design likely suffer from some form of insanity. Any progress made with a group of students is reset yearly by a fresh batch ready to be refined. This leads to a continual loop of transforming raw material into carefully honed, highly effective instruments. Why would design professionals take on such a challenging task? The reason for their peculiar activity is because they love to sharpen knives.

Design education is the knife making process. Crafting a portion of steel to become a useful instrument shares many similarities with the transformation of a student into a skilled professional. In this metaphor students are the raw material of steel ready to be fashioned into knives, professors are the sharpening stones, and the studio is where all the changes take place.

2. The Steel

Knives can be formed from virtually any material. Plastic, wood, aluminum, or stone can all be sharpened, with varying amounts of effort, to hold an edge and serve as a proper cutting utensil.
However, the measure of a blade isn’t solely its ability to take an edge but rather its ability to hold that edge over time. A quality knife can endure a season of improper or excessive use and still remain resilient. This resiliency can be acquired but in most cases it is part of the very DNA of the blade.

Very often the difference in knives can be traced back to the molecular composition of their metal. Students, like steel, are created through a mixture of circumstances and climates. Carbon, manganese, tungsten, curiosity, empathy, and teachability are often traits infused in the place of origination rather than in the studio [1]. A design student who has been prepared before he or she arrives to the workshop has two advantages. The first is the propensity to be shaped into a useful blade; in a sense, the metal is malleable. The second is the ability to spotlight and sustain their given attributes.

To quote Anton Ego from Disney’s, Ratatoullie, “not everyone can become a great artist, but a great artist can come from anywhere” [2]. The quality of a blade is more than its pedigree or preparation. Similarly, great designers can come from diverse backgrounds like theatre or physics, a daughter of hairdresser [3], or a son of a janitor. The source of the metal may be untraditional but the quality of the metal can be surprising, even to the stone.

This quality may be difficult to see at first glance. Many designers enter into the industrial design curriculum unaware, ill prepared, and completely lacking of a competitive edge. Both pressure and heat have a way of bringing about change and realignment. The process of annealing, moments of heating and cooling, shaping and resting, can take otherwise ordinary steel and radically transform it into a device that is unrecognizable from its former state [4].

### 3. The Sharpening Stones

The sharpener doesn’t get to choose the blade. The success of a sharpener is measured by how well it can progress the overall quality of a knife. There is just as much achievement in bringing a poor blade up to working order as there is in improving a good blade into a great blade. The quality of the stone is not proven by its own characteristics. Rather, it is validated by the quality and success of what is produced, in this case the knife.

![Figure 1. Stone Progression (Sharpedgeshop)](image)

This sharpening doesn’t exist in a vacuum. Sure, a single stone can be used in isolation but when combined with varying levels of grit, results can be amazing! Pairing different and complementary roughness is commonplace in the workshop. Coarse grit quickly removes large volumes of unusable content. Finer grit balances and refines an edge to perfection [5]. Students benefit from being exposed to different approaches, experiences, and personalities even if the views don’t always agree with one another. Design frequently deals with ambiguity and what better place to learn management than in the classroom? This is why it is essential instructors work with each other to generate a holistic learning environment.

Professors don’t always know where their students will end up and neither do the sharpening stones get to determine when, where, or how the knives will be used. Sharpening doesn’t always have to be done using traditional stones. Ceramic, diamond embedded compounds, even steel [6] is used to bring about an edge. For this reason students should seek a range of outside influences. Influencers can come in the form of classroom peers, young professionals in the industry, or mentors who have seen it all. In a career that is quickly changing, the more ways a knife can be sharpened, the better it will be prepared for the uncertain future that lies ahead.

### 4. The Method

While the sharpening stones may be similar in shape or form, the way the blade comes in contact with the stone makes all the difference. A utilitarian stone can yield truly amazing results if it is used with great care and experience. Similarly, an instructor with average skills but a wealth of experience, empathy, and self-understanding can radically transform his or her students.
Inversely, an exquisite stone can cause elevated levels of damage to both the knife and itself when handled with ignorance, inexperience, or pride. For this reason, experience and self-awareness are highly valued in the worlds of sharpening and education.

What good is applying effort if the result is short lived? The transformation of a blade is made when the molecules or atoms are permanently locked in place. Blades need to be heated. Students need to be challenged. Both need to be pushed far beyond their natural capabilities to reveal undiscovered potential. Heat is incredibly useful but heat alone can leave a knife’s edge brittle. The process of annealing uses heat to shape the metal and quenching in water to permanently realign the molecules [4]. Just like annealing, learning and reflecting are required again and again to be successful. Design teaching is heuristic; learning through doing. Imparting truths upon students and giving room for exploration and failure develop change agents that have a lasting influence everywhere they go.

The process is difficult. Design education by its nature is conflict. The conversations of innovation versus experience, or imagination versus reality increase the heat between blade and sharpening stone. And within this conflict both parties share abundantly in the abrasion. There are stages of sharpening that include lots of force and resistance while others call for a precise touch and pinpoint finesse. Regardless of the approach, friction between the blade and the stone is inevitable. In such cases, oil can make the process a lot smoother.

Figure 2. Knife, stone, and slurry (Didriks)

This oil can come in the form of empathy, patience, and time spent with the student. To know the knife’s background, its composition, and how it responds to different stimuli can aid immensely in how the blade is sharpened. Oil needs to be used in a controlled and trusted setting. Too little or too much could be problematic. How the blade is handled, literally and metaphorically, can make all the difference.

There is bound to be friction and erosion when shaping young talent. No amount of oil or special techniques make sharpening stones exempt from this reality. Over time they get worn down and need to be resurfaced. Use and lack of maintenance can literally leave a sharpening stone in a rut, damaging the stone and the knife. During these times, sharpening stones need to step away to be examined, to be resurfaced, to be realigned. Those who spend their profession giving themselves away are in most need of recharging and resurfacing.

5. The Dangers

The most dangerous tool in the kitchen is a dull knife and sooner or later, dullness always leads to injury. Failure to deliver a sharp edge is dishonest. This kind of knife mangles and flattens, taking three times the effort to deliver an underwhelming result. What was meant to form content, product or produce, results in sub par, disappointing outcomes. Who is to blame for a dull knife? Is it the steel itself, an inferior process, poor sharpening, an unfavorable environment? Rarely is there one contributing factor; however, a dull knife is a dull knife. People are people and they resist being machined into predictable results. Efforts need to be taken to ensure external expectations are managed. The marketing of a department and its students needs to match the output.

6. Application

As a knife must go through many stages of creation, refinement, and honing, so must design students go through many levels of their education. What does that look like in a college design department? How do the processes work with one another?

Students: Students are the raw material. Innovation in design is dependent on bringing new perspectives to the table. However, students must allow themselves to be sharpened. A student who thinks he or she has already obtained all the skills necessary to be a designer, should submit their resume and apply for industry recognition and
certification. If this is not the case, a student should demand the most of their teachers and look for additional sharpening opportunities in and outside of the classroom.

**Young Design Educators:** Young Design Educators bridge the gap between students and senior faculty. Their job is to sharpen the steel to the best of their ability. These young instructors will likely share great camaraderie with students but shouldn’t let their personal approach impede on challenging students to achieve their best. Educators need to demand far more from their students than the students would expect out of themselves.

**Assistant and Associate Faculty:** Assistant and Associate faculty look for ways to constantly improve. On one hand, continually develop the approaches that have been cultivated over the years. A well-balanced knife takes advantage of its sweet spot and can complete its tasks with minimal effort. On the other hand, don’t assume that these approaches are always bulletproof. Intermediate faculty should strike a balance between their own approach, the vigor and ambitions of younger faculty, and the wisdom and proven methods of the senior faculty.

**Senior Faculty:** Senior faculty are by far the experts of the curriculum. In many places they are the master sharpener: the final refining passes that align the steel before it departs for the workplace. It takes a village to make great designers. This means encouraging and requesting the best from younger faculty. Those who teach the upper level courses must remember that these students have already been through years of refinement. As such, senior course instructors should make the effort to be interested in the learning environments of younger students and younger professors.

**Design Departments:** Design Departments are central to the whole process and must operate as a team. Industrial design students are dependent on each teacher to elevate them to the next level. If one level falls short, the entire educational process is hindered. Departments need to invest in and examine how each member of the faculty contributes to the overall goal. Talk with each other about teaching successes and failures. Be open to new ideas. There is strength in numbers.

Each member of the department needs to be aware of their unique contribution to the overall success of its students. If each individual understands where they fit in the process then they will know their importance and value to the team. And those who know their value teach from the heart.

**Employers:** The process of sharpening is never complete. Employers must be mindful of how they use and care for their knives. Designers can be one of their most useful assets if used properly.

**Educators:** The work is challenging but the opportunity to transform lives, spearhead innovation, and challenge status quos is a goal worth striving for.

7. The Reward

No one knows how the knives will be used in the future. The stone sharpeners do not pick where the blades come from nor do they decide where and how the blade will be used. Some knives are hyper specialized while others can easily suit various roles. Teachers, like sharpening stones, need to engage in abundant optimism. The purpose of sharpening a blade is not to create an edge and return to the block. The process of sharpening is one marked by aspiration. One knife may be great at dividing produce and another at breaking down protein. One student may pull actionable insights out of the toughest research while another fits seamlessly into any team and immediately enhances their output. As with the sharpening stone, the professor sees what the knife could be rather than what it is in the moment. If knife worthy material can come from the unlikeliest of places, a lawnmower blade, a wrench, or a railroad spike, why should anyone limit where the tool ends up?

![Figure 3. Knife from 7/8th inch hand wrench (Caleb Royer Studio)](image_url)

The celebration of all the parties involved happens when the blade is put to use executing the tasks in which it was made for. It takes years to develop the best knives. The process is varied and many hands aid in the craftsmanship. From parents to professors to peers: layer-by-layer the knife is shaped into a blade that is dangerously exact and useful. At this point, the knife enters a new world, one where the knife gains credit for its own accomplishment. On occasion the knife will return
for sharpening but the time has come for the sharpening stone to transition into an advocate, a supporter, a cheerleader. It is time to watch and take great pride at the success of their crafted object. Keep on sharpening my friends.

8. References


[5] Aldridge, Chad, Personal Interview : ChadAldridgeStudio. 13 November 2013


Figure 1: Sharpedgeshop. Photo of Whetstone Kit. 2018. photograph. Instagram. 5 March 2018 https://www.instagram.com/p/Bf8V0_knyBr/. Accessed: 29 April 2018


Differentiated instruction in action: Integrating layered curriculum into foreign language course

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Session Description

Layered curriculum is a teaching method that builds on students' varied learning styles and readiness (Nunley, 2003). It is one of the methods used to differentiate instruction by allowing students to match activities/learning content with their individual learning needs. The layered curriculum could provide both teachers and students with multiple options in choosing topics, concepts, and activities depending on learning styles and readiness and help students escalate the level of cognitive processing at their own pace to achieve desired learning outcomes.

In this interactive presentation, the author demonstrates how to integrate layered curriculum into the basic/intermediate foreign language course to address different learner needs and enhance learning outcomes of individual students. The presentation particularly focuses on how language concepts and activities chosen for weekly theme-based curriculum could unfold differently through tiered lessons and culminating tasks that would address various learner needs and ultimately help individual students reach higher proficiency levels in the target language.

For this, the presenter first shows several prototypes of layered curriculum used in educational contexts, as well as specific materials and activities to be used in foreign language classrooms that reflect various genres, topics, linguistic features that are appropriate for learners of different proficiency levels. Next, the presenter showcases a layered curriculum design sample of Korean language course. It features how basic linguistic and content information gained from weekly theme-based curriculum could be reinforced and further expounded through differentiated tasks and materials that require learner participation, decision making, and Higher Order Thinking Skills. Then, the participants are asked to pick one of the layered curriculum prototypes and brainstorm ideas of developing short-term, content-based layered curriculum design with a topic of their choice. Lastly, benefits and challenges of developing and implementing layered curriculum in intensive foreign language courses are discussed.

Reference
Abstract for the 17th Hawaii International Conference on Education
Gyseon Bae, Ph.D.
Defense Language Institute Foreign Language Center

- Determine content resources
- Selection of appropriate language learning activities
- Things to consider: student needs, proficiency goals, institutional expectations, available resources, teacher abilities, expected performance outcomes.
- Theme, text selection: Teacher generated, vs. student chosen, sub-topics

Thread that links various themes unit linkages across themes which create greater curricular coherence.

Tasks/Activities to teach & practice vocabulary, discourse organization, formal aspects, ….
Devising a series of tasks which leads toward a final culminating activity/project
Transition that gives sense the logical progression from one topic to the next, from one task to the next.

Bridging topics and tasks provide coherence within and across topics.
Topical and task transition.
Create a sense of coherence and seamlessness.
Content, abstract concepts, concrete ideas

Implementing theme based curriculum
1. Planning: review student needs, institutional expectations, and objectives, resources, teacher preparation
2. Determine content, language, learning skills
   Topics open to student selection
Degree of tension that a theme generates. E.g., controversial issues that promote student involvement
Coherent sequencing
Choose texts in a variety of genres and format at the appropriate level of difficulty.
Texts that introduce varying perspectives on the theme/topics under consideration
Texts with alternative perspectives can lead to critical thinking skills and strategy training. Select a coherent set of topics
Tasks that naturally connect themes and add coherence to the overall curriculum.
Transition that facilitates a natural and systematic flow of content and tasks from one day to the next
Keep language and content learning in balance.
Assessment: How much content learning do we evaluate and how much language learning do we evaluate?
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Development of MS Word Integrated Tools for Creating ESL/EFL Teaching Materials
- A Report Focusing on Text Visualization and Teaching Material Creating Tools for Students’ pre-study -

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Development of MS Word Integrated Tools for Creating ESL/EFL Teaching Materials
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Abstract
We will introduce MS Word integrated tools for creating ESL/EFL teaching materials. The tools have the following four functions: authentic materials collection on the Internet, text difficulty analysis, paper medium or/and website quiz and assurance test creation support, and evaluation. We aim for realizing all the four functions available from the Microsoft Word menu. Though each feature can be found in highly regarded tools on the market, simultaneous multiple tools operation requires data exchange among them, which takes labor. Furthermore, acquisition of new or multiple tool operation hinders teachers who are not familiar with computer operation. On that point, our tools allow them to experience convenient data exchange, with all the functions available from familiar Microsoft Word. We have already presented two of the features, authentic materials collection tool and text difficulty analysis tool, and therefore in this paper, we will focus on a text visualization tool and a teaching material creating support tool for students’ pre-study.

Key Words: EFL/ESL, English reading comprehension education, text analysis, MS Word, materials for pre-study

1. Introduction
The purpose of the study is to build an environment where a series of work for creating ESL/EFL English reading comprehension materials (text collection, material difficulty analysis, material preparation for students’ pre-study, quiz creation and correction, and evaluation) will be conducted with MS-Word, which has been used by many teachers worldwide.

Currently, there has been an increasing number of English educational application software (application) and websites on the market, allowing learners to learn English with ease. Also, there have been many
applications and tools for English reading comprehension material creation, which enable teachers to complete the series of work on computers.

Improvement in material creation support environment so far has brought pleasure to those teachers who prepare hand-made materials suitable for their class levels. However, there are problems to solve. For instance, if they would like to pick up a seasonal news for a material, they would need to 1) search for a material on websites such as CNN, 2) check whether the material is suitable for the language level of their class, 3) if necessary, exchange difficult vocabulary with ones that students have learned, or annotate them. At present, these three procedures require teachers to confront multiple applications of a web browser, text analyzer, and text editor. If they wish to create materials for students’ pre-study and comprehension assurance tests, and evaluate scores, further tasks of multiple application operations and data exchange between applications will be indispensable. To use these applications separately might give stress to teachers unfamiliar to computer operation.

Based on these problems, we concluded that if the series of work for English reading comprehension education can be completed with only one application of MS-Word, which is most used in the world, without switching multiple applications, the tools will be proficient for teachers unfamiliar with computer operation.

In this paper, firstly an overview of our research including text analysis function, then newly added text visualization with word cloud and a material creation support tool for students’ pre-study will be stated.

2. Overview
Our project named “Microsoft Word Integrated Text Analysis Tools (an abbreviated form, “MiWIT”) project started with the aim for developing text analysis tools as its name suggests [1] and has been developing into comprehensive tools necessary for English reading material creation [2, 3]. Figure 1 shows the overview of the tools offered on the MS Word menu, and Table 1 shows the main features regarding text analysis.

2.1 Text Analysis Tool
We will touch only on the essential points here as we already discussed the text analysis tool [1]. There have been valuable text analysis tools including WordSmith Tools [4]. To analyze collected data requires time-consuming work of editing and exchanging analyzed data. For those who are unfamiliar with computer operation to start using a new tool is troublesome and may result in letting them resign the utilization of the tool. On the contrary, MiWIT offers users text analysis and transcription of difficult words into less difficult ones based on the analysis result, both of which are available on the simple MS Word menu.
Available Functions on Word Menu

**Text Analysis Tools**
Several text analysis tools (see Table 1)

**Text Collection Tools**
Display materials including designated keywords from designated websites. Readability judgement installed

**Dictionary Tools**
Create a dictionary for vocabulary difficulty analysis from a difficulty-based word list

**Material Creation Tools**
Material creator for students’ pre-study
- Create an essential word/phrase list
- Create flash cards with essential words/phrases

**Quiz and Assurance Test Creation Support Tools**
- Create tests in forms of TOEIC or TOEFL

**Correction Support Tools, Evaluation Administration Tools**
Correction Support Tools
- Support website quizzes correction
Evaluation Administration Tools
- Register evaluations with evaluation database

Figure 1. MiWIT Menu Overview
Table 1

The Menu of MiWIT Text Analysis Tools

<table>
<thead>
<tr>
<th>Text Analysis Tools</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word frequency counter</td>
<td>Count the usage frequency of each word except stop words like “a,” “the,” and “is.”</td>
</tr>
<tr>
<td>Phrase frequency counter</td>
<td>Count the usage frequency of phrases</td>
</tr>
<tr>
<td>Word level classification</td>
<td>Classify words according to word difficulty level</td>
</tr>
<tr>
<td>Spell/Grammar checker (*)</td>
<td>Show all misspelled words in a list form with a combo box including a suggested replacement word list</td>
</tr>
<tr>
<td>Readability checker (*)</td>
<td>Show readability of text using “Flesch-Kinkaid Glade Level Formula”</td>
</tr>
<tr>
<td>Sentence beginning and ending checker</td>
<td>Show the beginning and ending of the sentences. These tools may be useful for observing repetition in expressions of the beginning and the ending of sentences.</td>
</tr>
</tbody>
</table>

(*) These tools provided as a menu of MS Word show incorrect result in a document in which plural languages are mixed. MiWIT Tools complement these drawbacks.

2.2 Text collection tools with readability judgment
In language education, there are two types of reading materials: one is literature materials leveled in difficulty (see [5] as an example), and the other is authentic materials including seasonal news and specialty theses (see [6] as an example). MiWIT can be practical tools if teachers prefer authentic materials for their classes. Additionally, teachers can efficiently select materials suitable for the level of their students by operating web browsers equipped with readability judgment offered by MiWIT.

2.3 Dictionary tools
Flesh-Kincaid [7, 8] plays a vital role in readability judgement; however, MiWIT adds an option of text difficulty analysis dictionary to text analysis. The present difficulty analysis dictionaries are West’s GSL [9] and Coxhead’s AWL [10], if teachers wish to adopt other dictionaries according to their specialty, MiWIT allows them to create a new dictionary from the word list of their own. For example, in BNC/COCA [11] and Japan, there would be a case in which teachers would like to use Jacet8000[12]. With MiWIT, they can analyze text difficulty using their favorite word list.

3. New Features of MiWIT
We discussed the prototype of MiWIT [2]. Currently, we expanded and practicalized the functions of the prototype.

3.1 Text Visualization using Word Cloud
3.1.1 MS Word Text Interlocking Function
Although the prototype of MiWIT only displayed texts in a word cloud, the expanded version has
added the following three actions. (See Figure 2.)

a. To create a word cloud out of the text under editing with the word cloud menu.
b. By clicking any word in the displayed word cloud, every corresponding word in the text will be inverted and displayed, while displaying a KWIC-index-formed list.
c. By clicking any line in the KWIC-index-formed list, the corresponding line will be inverted and displayed.

These functions enable users to obtain usage list of the words used in the text as well as grasp the content of the text visually.

Figure 2. Text Visualization Tool

3.1.2 Availability from Text Collection Tools
These functions are available from text collection tools stated above. Adding the text visualization function has let users judge text readability and grasp general text content, improving the work efficiency.

3.2 Teaching Material Creating Support Tools for Students’ Pre-study
Materials for students’ pre-study have been diverse. Nevertheless, MiWIT has presented three types of preparation for students to pre-study the designated words before the class: 1) Wordlist creator for
students’ pre-study, 2) Flashcard creator, 3) Data-exchanger between Quizlet and FLASHCARDS.

3.2.1 Wordlist Creation Procedures
Following procedures show how to create a wordlist for students’ pre-study.

a. Highlight the words in the text to be pre-studied with a fluorescent marker pen. Efficiency improves by using classification function by word difficulty level (See Figure 3.a).
b. Click the “PreStudyWd” menu button.
c. A new MS Word document file with a list of words to be pre-studied will appear on the screen (See Figure 3.b).

d. Create Flashcards

That is all for users who would like to create a wordlist and let their students’ pre-study the meaning of
the words. For those who wish to create a flashcard, add the following procedures.

3.2.3 Flashcard Creation Procedures
a. Add meanings or comments to the created wordlist (See Figure 3.c).
b. Designate the size of the flashcard.
c. Click on the Flashcard menu button.
d. A flashcard is created and added to a new page of the document above (See Figure 3.d).

3.2.3 Conversion Procedures to Quizlet Data
We quote the top page of Quizlet [13].
Quizlet is used by more than 30 million students and teachers each month, on our website, iOS and Android apps. We have found in classrooms in rounds of Quizlet Live, as part of study sessions at home, and in the hands of learners studying for everything from spelling tests to college-level science classes to professional certifications.

MiWIT firstly considered developing an original flashcard application, however, shifted to adopting Quizlet, whose function exceeded than that of MiWIT. Quizlet study setting resembles the flashcard creation procedures for printing.

a. Add meanings and comments to the created wordlist (See Figure 3.c).
b. Click on the Quizlet menu button.
c. Table of procedure a appears in the separated clipboard, displaying a new Quizlet study set on a Web browser.
d. On this screen, 1) input title, 2) click on the import menu button, 3) paste the items into import box.

Going through the procedures above completes a word study set.

4. Outlook on MiWIT
Creating tools for quiz creation support, correction support, and evaluation administration will bring our MiWIT project to completion. Among them, part of quiz creation support tools, TOEIC and TOEFL format, has completed, on the other hand, cloze quizzes and other format have been under development. As for correction support tools, they have been under review.

5. Conclusion
We have referred to the overview of English reading material creation tools integrated to MS Word menu, which is currently under development, and newly developed 1) correspondence function of word cloud visualized text and MS Word document, 2) material creation support for students’ pre-study. Previous to MiWIT development, we had attempted establishing original text analysis tools,
often resulting in copying the text to MS Word format for material creation. Integrating the text analysis tools into MS Word has eliminated such inconvenience, providing users with far better usability.

Our project group consists of an English teacher (Associated Professor Matsuo), two Information Science teachers (Professors Matsuno and Tsutsumi). Associated Professor Matsuo proposes the essential functions and interface of the tools, while Professors Matsuno and Tsutsumi take charge of development. Cooperation with teachers from dissimilar fields has brought discoveries which may not have been found in respective fields, leading to synergistic effects: what developers consider as “usage everyone knows” turned out to be unfamiliar to teachers unfamiliar with computer, on the contrary, “inconvenient but inevitable MS Word functions” to English teachers can be improved or altered by developers. We will proceed with development with continuous cooperation.

Lastly, our final goal is to develop material creation support tools letting teachers operate without difficulty, even if they are not familiar with the computer but manage to operate MS Word and Excel. Though some of the tools have been under development, the developed functions can be efficient. Therefore, we would like to continue developing uncompleted functions as well as release the already developed functions to the public.

Acknowledgements

This work was supported by JSPS KAKENHI Grant Number 15K02743

References


Title: ExploreU summer STEM program for middle school girls

Topic Area: STEM Education

Format: Poster Session

Description: ExploreU is an annual STEM summer program for middle school girls. The program is designed to help young girls learn math and computer science skills while having fun. During the program, students use Scratch software to analyze patterns and learn the fundamentals of programming. Participants also learn about Geometer SketchPad, Prime Numbers, Fibonacci Sequence, Fractals and Cryptography. This program teaches important mathematical and computational ideas while helping students to think creatively, reason systematically, and work collaboratively.

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Abstract: **ExploreU summer STEM program for middle school girls**

Data from the U.S. Bureau of Labor Statistics (BLS) projects that employment in occupations related to STEM (Science, Technology, Engineering, and Mathematic) is projected to grow to more than 9 million between 2012 and 2022. That’s an increase of about 1 million jobs over 2012 employment levels. The Governor’s STEM advisory council states that “The goal of increasing STEM interest and achievement is critical to regaining Iowa's historic legacy as a leader in education and workforce development. In fact, STEM is a vital economic development advantage for quality job growth in our state.” While women represent approximately 60 percent of the total undergraduate enrollment, they are still vastly underrepresented in STEM fields of study. Therefore, preparing students, especially female students, for these fields is extremely vital. Research shows that the earlier students have interest in STEM careers, the better chance they have to earn a STEM degree.
It is essential that the preparation begins earlier in their education – in elementary and middle schools. One approach to excite females about math and computer science is to provide summer opportunities that engage middle school girls in activities that open their eyes to math and science in the world around them.

Our ExploreU [http://cslab.mtmercy.edu/summerschool/exploreu.php](http://cslab.mtmercy.edu/summerschool/exploreu.php) is an annual one-week STEM summer program for middle school girls completing sixth, seventh and eighth grades hosted on the Mount Mercy University campus. The program is designed to help young girls learn math and computer science skills while having fun. The students are eligible to participate for up to three consecutive years, learning new concepts each summer. ExploreU also engages students, teaches both ideas and skills, and ignites their interest in learning.

Additionally, the middle school females are mentored by five female Mount Mercy University (MMU) undergraduate majors in Math, Actuarial Science and Computer Science. These female mentors serve as role models, helping to illustrate the possibilities for women in STEM careers. To further increase vertical integration of female math mentoring, two female faculty members, who developed and implemented the program, Dr. Kleiman and Dr. Stehnova, provide the example for both sets of females, students and mentors alike. Dr. Kleiman and Dr. Stehnova developed an innovative curriculum in math and computer science that introduces core concepts in math and computer science, which are not traditionally covered in the standard curriculum during the academic school year. The math and CS topics are integrated in hands-on workshops and an inquiry-based learning environment. The topics covered are Geometer SketchPad math software and Scratch Programming as well as fundamental concepts of number theory, probability, cryptography, animation, geometry and LEGO robotics. NAO robot purchased with the AEGON Transamerica Foundation grant 2016 turned out to be a huge addition to our program: students, mentors and parents love interacting with artificial intelligence (AI) robot, and we receive many praises and requests to offer more NAO workshops. We developed and launched this program in the summer of 2012 with just one section. The following year we offered two sections during the same week one for newcomers
and one returners. Since then program has grown and this year we had four sections in two weeks (two for returners and two for newcomers) with total of fifty-eight girls being involved.

**Math Workshops**: Platonic Solids (constructions of 3D Models), Ancient Numeration Systems (learning to count in different bases for Mayan, Babylonian, Egyptian and Roman Systems), Fibonacci Sequence and Golden Ratio, Four Color Theorem, Fractals, Prime Numbers, Constructions with MIRA, Tessellations and Mandalas, 3D Visualization;

**CS Workshops**: Intro to Scratch Programming, Transformation Cipher, Programming Fibonacci Sequence, Animation of Fibonacci, 3D Fractals, Scytale, Caesar Cipher, Rail Fence Cipher, Enigma Machine, Euclidean Algorithm and Primes with Scratch Software, Animation, LEGO robotics with EV3 kits, NAO

**Mentors Sessions**: A session to learn about the college experience, majoring in STEM fields, and career paths for females in math and CS. Remaining sessions are spent on the Treasure Hunt – all students are split into teams of four girls, receiving daily clues as encoded messages together with encoded math questions. Each team decodes the message, solves the problem, obtaining the letter of the day as the solution. The collection of letters over the course of the program reveals the location of the Treasure Map. Teams find the Treasure Map and hunt for the treasure on the last day of the program. The Treasure Hunt is a very effective way for students to retain all information learned throughout the program. In addition, it encourages teamwork, collaboration and further mingling with mentors.

In addition, we administer a set of pre- and post-program surveys to the students, a post-program survey to mentors, a post-program survey to the parents of participants, and evaluations of the faculty involved in the project by the students and mentors. We use all of the surveys and evaluations to: 1) measure objectives, 2) compare the data to previous year’s results and 3) perform longitudinal studies on the success of the project. In particular, we note how many female participants are returning each year and whether their level of interest in STEM fields across the years (6th, 7th, 8th grades) has increased. In our poster presentation, we would like to share our ExploreU program development in details, highlight students’ success and provide the assessment data findings we have accumulated over last 7 years.
Title
Nevertheless, They Persisted: College Survivors of Academic Failures

Paper 286

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Abstract

In the U.S., among full-time students who enter a four-year college, fewer than 56 percent complete a bachelor’s degree within five years [1]. The current five-year completion rate in engineering is only 49.7 percent [2]. Researchers have identified many reasons for why students depart from engineering, including perceived academic difficulty, chilly climates, and poor teaching and advising. The problems that departers experience are not unique to them, however;persisters share the same kinds of problems. As part of a larger study of grit and persistence in engineering, we sought to better understand persisters by investigating the experiences of persisting engineering students who had experienced academic difficulty.

We used phenomenography as the qualitative research method to construct categories of description that describe the variety of ways persisting engineering students experienced academic failures. We interviewed 26 students who had continued in engineering even after they had failed a required technical course. From our phenomenographic analysis of their responses, we constructed four categories to describe their failure experiences: Unresponsive, Avoidant, Floundering, and Rebounding. The Unresponsive category describes the experiences of students who seem oblivious to failure and do not change their academic behaviors. The Avoidant category describes the experiences of students who become discouraged by their failure and exhibit self-sabotaging academic behaviors. The Floundering category describes the experiences of students who address their failures through increased but unproductive effort. The Rebounding category describes the experiences of students who confront their failures and make effective changes to their academic behavior. Also, we found that students do not always experience failure the same way every time; they can experience failure differently for different instances of failure.

This study complements a previous qualitative study that investigated the experiences of engineering departers [3]. Based on the findings of both studies, we recommend that failure be normalized in engineering education, and that course and program policies be revised to nurture the resilience of students and to promote learning from failure.

Acknowledgment. This work was supported by the National Science Foundation under Grant DUE-1626287, and by the Dale and Suzi Gallagher Professorship and the First-Year Explorers Program in Engineering Education at Purdue University.

References


**Topic Area**
Higher education

**Presentation Format**
Roundtable discussion

**Short Description**
Why do some students persist in college, despite failing a course that is required for their majors? We conducted a phenomenographic study of the experiences of students who persisted in engineering after they had failed a required technical course. Our study may offer new reasons for why undergraduate programs should promote learning from failure.
Minority Women in STEM Fields:
Increasing Capacity by Developing STEM Identity

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Abstract
The STEM gap emerges early for both women and underrepresented minorities (URM) and is generated by various societal and individual challenges. If we are to address tomorrow’s challenges, all students must have access and support, specifically URM and women interested in STEM. This study explores challenges and assets of first generation minority women in STEM majors through an institute intended to build positive STEM identities. The twenty-one young women participants serve as mentors to incoming STEM female students. Given their role as mentor and leader, facets of STEM identity are explored through personal narratives, interviews, participant artifacts, and reflective practice. Emerging themes of self-efficacy, performance in STEM and acceptance are explored within the context of larger societal and personal constructs.

Emergent themes from the analysis of data from the STEM Peer Mentoring Focus Institute include connections to elements of identity, including self and the broader societal constructs are evident. Females note evidence of developing a counter narrative to societal realities, develop successfully in STEM majors and begin to change the dominant perspective of women in STEM. Further, participants note a strong sense of affecting the broader good. This narrative of STEM with a purpose seems to resonate with minority females, specifically relevance of the work to lived experiences. This emerging understanding on global competencies toward positive change allows STEM content to be purposeful and relevant. Further, the importance of collaboration, critical thinking and problem solving all encompass the global competencies needed to address tomorrow’s challenges. The willingness to act embodies both the global and interpersonal. Many of them see mentorship and leadership as a way to change the limited numbers and societal perceptions of women and minority women in STEM careers.

If we are to address the issue of under-representation of women and URM in STEM, especially in light of demographic shifts, where California has just become a dominant minority state, we believe, we need to start with identity, self efficacy and self worth in the content area. This will provide insights into how best to support our emerging students in STEM, so they are interested, persist, and find their STEM identity within their passions and desire to contribute to broader global society. Providing a time and space for women to mentor each other, speak to and express their STEM identities might be a first step in helping
them feel more included in post secondary STEM settings. Increased equitable STEM outcomes may be assured through the systemic inclusion of intentional and purposeful engagement strategies that ensures participation of all students, validates each student’s voice, and creates safer spaces for positive STEM identity development. Since dominant society has limited minority STEM narratives, institutions must create spaces where women and URM feel supported and encouraged; one where they see a diversity of peers, role models, and mentors that can build a counter narrative, leading to a positive personal construct of STEM identity.

Full Paper

Objectives or purposes
This study strives to better understand and develop STEM identity in women and specifically women of color, many of which are first in their families to attend college. Through this understanding, potential implications for better supporting first generation female STEM majors are possible. Specific questions are addressed including:

- How can lived experiences define STEM Identities?
- How has current context negated or enhanced their STEM identity?
- How does the role of mentorship and leadership help develop STEM identity?

Perspective(s) or theoretical framework
In the United States, women hold about half the jobs in the United States (48%), but only about a quarter of the STEM related positions (24%) (Beede, et al. 2011). Women select or are guided toward alternate fields instead of STEM at every level in schooling including 1) grade school, 2) high school where they might have greater access to more concrete STEM preparation through courses and experiences, 3) college when they might select a STEM major, and 4) post-college and career when women might select a STEM career. Higher education institutions are challenged both in recruitment of women and in retention of women in STEM majors and careers. When women do select a STEM major, they often do not follow in a STEM career (Beede et al. 2011). Fewer women persist at definitive moments in a STEM trajectory.

Social expectations and commitments might contribute to underrepresentation of women in STEM. The genderized roles along STEM begin in childhood when boys are given more opportunities to explore science than girls at home. Parents often more readily explain science concepts to boys rather than girls in informal science spaces, such as museums (Diekman & Steinberg, 2013). Girls and boys seem to remember doing science, but remember different aspects of science. Women remember the planting of seeds and cooking more so than working with tools such as microscopes (Jones, Howe, & Rua, 2000).

However, given that achievement between genders has coalesced, why might women who might excel in such fields not select a STEM career? One hypothesis put forth by psychological theory is goal congruity. Goal congruity elaborates on how many women are not driven solely by goals of individual achievement, but instead, gender differences in the desire to orient to other people in a communal nature are a factor (Bakan, 1966). A communal nature is one where people work with others in a collaborative way toward a broader purpose of helping others (Diekman & Steinberg, 2013). In essence, STEM fields can be thought of as non-altruistic and not directly affecting others in a positive manner (Diekman, Weisgram, & Belanger, 2015; Diekman, Brown, Johnston, & Clark, 2010). This has negative effects on women desiring to pursue a STEM field.
Thus, the underrepresentation of women in STEM remains and seems counterintuitive given the number of women exceeds the number of men enrolling in college. If women select and persist in a STEM field once in college, then they more commonly select degrees in medicine or education, not engineering or academia (Beede et al., 2011). Further, if women are in engineering and computer science careers, they are also less likely to assume leadership positions (Beede et al., 2011). Mason (2014) speculates that the lack of female leadership in the STEM fields might be because of decisions to start a family. Women delay childbirth and pay a high personal cost for advancing in a STEM field. Other reasons can include gender stereotyping and the lack of role models (Beede et al., 2011).

Being challenged as a woman in a STEM field is augmented for minority women where in addition to challenges stated previously, cultural incongruencies and the extreme lack of role models may dissuade talented minority women from STEM. More broadly, while the interest in STEM careers by underrepresented minorities (URM) is relatively similar to their white and Asian counterparts, the degree completion in STEM by URM is much lower (Eagan et al., 2010). URM currently comprise 24.9% of the US population in 2010, but only 13.3% of scientists and engineers (Allen-Ramdial & Campbell, 2014). Their success is not solely determined by ability, interest and motivation, but also their identity as it relates to STEM (Carlone & Johnson, 2007). The necessity for institutions and structures to more intentionally personalize their connections with URM in STEM is evident (Kozoll & Osborne, 2004).

Identity forms in the intersectionality of experiences, contexts, and structures. In science, the identity as a scientist relates to 1) competence, 2) performance and 3) recognition (Carlone & Johnson, 2007). Competence, performance and recognition interplay with one another, experiences and the context of the individual all contribute to forming a science identity (Jones & McEwen, 2000). The notion of how minorities begin to form their understanding of STEM and how they might begin to identify with STEM might bring insights as to how we can best serve needs of URM and women interested in STEM careers (Christidou, 2011).

Research regarding student competence, the belief that one can be competent in the field has been widely studied (Chow, Eccles, & Salmela-Aro, 2012; Watt et al., 2012). Less studied have been the costs related to remaining in a STEM field (Perez, Cromly & Kaplan, 2014; Wigfield & Cambria, 2010). Costs can involve time and energy needed to be successful in a STEM field, vs. the pressure of family expectations, socialization, etc. Among the costs, socio-economic pressures continue to negatively affect the number of minorities in STEM fields (Estrada-Hollenbeck et al., 2011).

Social Identity Threat (SIT) might serve as an additional cost to women and URM in STEM. SIT is the concern people have of feeling inferior or less than in a social group where there is underrepresentation, be it gender, race, class, etc (Steele, Spencer, & Aronson, 2002). This social identity threat, might heighten stress, increase the affective filter and negatively affect learning. So beyond “cost” in terms of time and dedication, the females and minorities might struggle in STEM because of the dominant social constructs of who are scientists and engineers. This perception might become internalized, and block opportunities for women and URM to perform in STEM (Walton & Spencer, 2009). This is especially evident in the engineering field where women are only 10-13% of the engineering workforce and where they are leaving much more so than any other STEM field (Hill, Corbett, & Rose, 2013). Hall (2015) found that women in engineering experience social identity threat when speaking with men whose comments render feelings of incompetence and exclusion. The ongoing nature of these feelings is detrimental to a woman’s success in the engineering field specifically.

As we examine the intersectionality of identities, we can begin to think more concretely about structures of power in relation to STEM identity (Choo & Ferree, 2010). These point to a complex interaction
among societal contexts, non-STEM contexts, and STEM contexts. To this end, we have started to investigate the complex nature of STEM identity through a series of interactions with women in STEM. Women will build capacity in leadership skills, mentoring skills and grow professionally by starting with the STEM story.

**Methods and Data Sources**

**Context and Process**

This is a qualitative study of a 5-day institute for women in STEM. Twenty-one female participants meet for 27 hours over 6 months. The young women are interviewed and selected as mentors, guides, and tutors for incoming freshmen in the STEM fields. Participants are juniors and seniors in a single gender university. Seventeen of the young women are URM and most are also first generation students attending college. The sessions occur within June 2015 and December 2015. However, they meet additional times as a cohort throughout the entire academic year.

Participants in the institute engage in interactive activities related to STEM, specifically addressing their STEM identity as they begin to build capacity as mentors, professionals and leaders. The institute sessions were designed with various characteristics of adult learning in mind in order to ensure equity of participation, learning, and access by ensuring all student voices contribute to the discussion. A needs assessment was completed to determine learning outcomes, sequence, and to ensure a safe learning environment that fosters teamwork, engagement, praxis (reflection and action), and accountability (Vella, 2002). See Table 1 for the overall focus for each day.

Written documents are coded for themes and related concepts. Categories of information are developed from the text (open coding) and then connected (axial coding) into generative themes (Corbin & Strauss, 2014). Given the preliminary nature of the study, raw data is presented with interesting insights for future analysis and triangulation.

**Data streams**

Several data streams include participant artifacts on STEM identity including a STEM visual and personal narratives as well as interviews/focus groups and surveys. See Table 2 for a detailed description of data streams.

Through strategic and intentional engagement activities that included pair-sharing, small group work, collaboration activities, etc., student participation was increased during the professional development. Socio-cultural learning theory emphasizes the importance of learning with others (Vygotsky, 2012). Further, Zhao and Kuh (2004) found that learning in collaborative structures correlated with several positive outcomes including greater effort on the task and heightened engagement. Lev Vygotsky first stated the importance of learning through our interactions with others. Further, he emphasized language interactions a mechanism for learning. Vygotsky (1978) asserted that language is the most powerful tool to promote thinking, develop critical reasoning, and support cultural activities. Gibbons (2009) notes specific talk moves that extend talk beyond one-word responses and that commonly begin with teacher initiating with a question, students responding to the question and teacher either providing feedback or evaluating the student response. See Table 3 for a list engagement structures and activities.
Results and/or substantiated conclusions or warrants for arguments/point of view

Emerging themes from the analysis of preliminary data from the STEM Identity Focus Institute are stated in Table 4. Connections to elements of identity, including self and the broader societal constructs are evident. Females note evidence of developing a counter narrative to societal realities and develop successfully in STEM majors and begin to change the dominant perspective of women in STEM. Further, participants had a strong sense of affecting the broader good. This narrative of STEM with a purpose seems to resonate with minority females, specifically relevance of the work to real life (Espinosa, 2011). This emerging understanding on global competencies toward positive change allows STEM content to be purposeful and relevant. Further, the importance of collaboration, critical thinking and problem solving all encompass the global competencies needed to address tomorrow’s challenges. The willingness to act embodies both the global and interpersonal. Many of them see mentorship and leadership as a way to change the limited numbers and societal perceptions of women and minority women in STEM careers. Further analyses will continue to evolve our understandings.

Scientific or scholarly significance of the study or work

If we are to address the under-representation of women and URM in STEM issue, especially in light of demographic shifts, where California has just become a dominant minority state, we believe, we need to start with identity, self efficacy and self worth in the content area. This will provide insights into how best to support our emerging students in STEM, so they are interested, persist and find their STEM identity within their passions and desire to contribute to broader global society. Providing a time and space for women to speak to and express their STEM identities might be a first step in helping them feel more included in post secondary STEM settings. Increased equitable STEM outcomes may be assured through the systemic inclusion of intentional and purposeful engagement strategies that ensures participation of all students, validates each student’s voice, and creates safer spaces for positive STEM identity development. Since dominant society has limited minority STEM narratives, institutions must create spaces where women and URM feel supported and encouraged; one where they see a diversity of peers and role models that can build a counter narrative, leading to a positive personal construct of STEM identity.
### Tables

#### Table 1. Focus of the 5-day institute.

<table>
<thead>
<tr>
<th>Day</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>STEM, Culture and ME: STEM Identity</td>
</tr>
<tr>
<td>2</td>
<td>Working as a Community: Cultural Awareness, Equity and Diversity in the Humanistic - STEM and STEM Careers.</td>
</tr>
<tr>
<td>3</td>
<td>Mentoring and Coaching for Growth: A Pedagogy of Practice and Guidance</td>
</tr>
<tr>
<td>4</td>
<td>Professionalism, Communication and Building Leadership Capacity Experiences with negotiating culture and self in STEM fields and Careers</td>
</tr>
<tr>
<td>5</td>
<td>STEM Identity and the intersections with leadership and mentorship</td>
</tr>
</tbody>
</table>

#### Table 2. Description of various data streams used for this study.

<table>
<thead>
<tr>
<th>Data Streams</th>
<th>Descriptors</th>
</tr>
</thead>
</table>
| 1 | STEM Story - Visual Representation of the following:  
  ● Origins (representations of your background)  
  ● Interest/Passion for your STEM Field – Why did you become interested in your STEM field?  
  ● How have you been successful so far in your STEM Field? How have you struggled?  
  ● Vision for your future in STEM, your purpose in STEM.  
  ● Vision for your mentorship and leadership in STEM. |
| 2 | Artifacts from participant engagement throughout the institute. |
| 3 | Participant Surveys |
| 4 | Interviews and focus group discussions in December 2015 with a randomized sample of participants focused on changes in their STEM identity, their purpose and actualization in STEM. What might be their challenges as they mentor and think more concretely about their STEM path?  
  ● How might participants view women in STEM within broader society?  
  ● Why did they select a STEM major?  
  ● What is the purpose of STEM?  
  ● How might they imagine their roles as mentors and leaders in STEM?  
  ● What have been their challenges in pursuing a STEM degree?  
  ● How do the women in STEM hope to build capacity as a shared cohort, both inter and intra-specifically?  
  ● What keeps persevering in their STEM major? |
Table 3 depicts a subset of engagement structures during the first two sessions of the institute.

<table>
<thead>
<tr>
<th>Engagement Structure/Activity</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Stars and 1 Wish</td>
<td>Participants are asked to write three positive aspects of the session (Stars) and one area to improve or explore further (Wish). This strategy is designed to elicit reflection on the day’s content, learning, and connections to practice through feedback to the facilitator. The feedback is reviewed and used to modify/adapt future professional development and assess content delivery and pedagogical practice.</td>
</tr>
<tr>
<td>STEM Purpose Charting Activity</td>
<td>Working in small groups, participants receive a matrix containing different purposes for STEM, some societal, some personal. Groups were asked to discuss the purposes based on their beliefs and categorize them by themes. They were also encouraged to add their own purposes. This strategy ensures debate and argumentation, inclusion, increases student participation, and ensures higher levels of student talk.</td>
</tr>
<tr>
<td>Gallery Walk</td>
<td>A variety of STEM images, quotes, and statistics were displayed around the room. Some were positive and some negative. Participants were asked to write their immediate reactions on adjacent charts. This activity taps into participant prior knowledge, elicits an emotional response based on identity, builds feedback based on other participant comments, and ensures inclusion of all participant voices through comment writing.</td>
</tr>
<tr>
<td>Socratic Seminar on Book Reading: Bringing Out the Best in People (McGinnis, 1985)</td>
<td>A Socratic Seminar is an inter-student dialogue based on a reading where students generate their own questions and comments, and have a discussion that is student directed. Students charted their ideas to facilitate the discussion.</td>
</tr>
</tbody>
</table>
Table 4. Depicts themes that emerged through an analysis of artifact data during the first two sessions of the institute.

<table>
<thead>
<tr>
<th>Concept (Theme)</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformative Leadership</td>
<td>Leadership development, reflection, passion for their STEM and mentoring work, change societal perspective of URM and women in STEM, equity</td>
</tr>
<tr>
<td>STEM Identity</td>
<td>Desire to change STEM statistics to better reflect diverse population, motivation to succeed in STEM, high expectations for themselves, empathy</td>
</tr>
<tr>
<td>Emphasis on Global Competencies</td>
<td>Collaboration, critical-thinking, problem solving, value diversity, global economy</td>
</tr>
</tbody>
</table>
References


Title:
Lessons Learned from a 4-Year Longitudinal Interview Study at a Liberal Arts College

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Abstract:
The Whitman Study of Student Learning Experiences (WSSLE) is a longitudinal study of a cohort of students entering college in fall 2012, tracking them through four years. A representative sample of 75 students was generated for the study through random stratified sampling of the incoming first-year cohort. This panel of students was interviewed five times: at the beginning of their first year, and at the end of each academic year. In addition, participants received extra incentives to participate in all-campus surveys and to submit an annual portfolio of academic work.

The project was intended to identify the most influential aspects of a liberal arts education and document how students develop intellectually and personally. Interview questions were designed to capture the full range of the student experience, asking about academic work, friendships, extracurricular involvement, and other aspects of student life. Our goal was to uncover transformative experiences for students, things that lead to student personal or academic development, growth, or change.

Our interviews suggest that transformative experiences in college are largely the result of interacting with other people and with the broad campus community. In particular, there are seven aspects of an undergraduate experience that stand out as key to making transformative experiences more likely for students:

1. *Faculty who care about helping students succeed.* Interactions with faculty mattered to our students in many different ways. Conversations with faculty were catalysts for academic growth in writing, critical thinking, and other important academic areas. Faculty could help
encourage and guide students in their thinking about post-college plans. Effective courses, which were effective largely because of effective faculty, led students to new majors, new ways of thinking, and shaped who they became and what they wanted to do.

2. **Students who are willing to engage with each other on multiple levels, to share ideas and support each other academically.** Students are influenced by each other in a wide variety of ways. They meet new people and try to live up to the standards and expectations of these new people. They see the work habits and academic abilities of their peers and adjust their own habits and expectations for the quality of their own work. They learn that they can use their peers to discuss and develop ideas in their own work.

3. **Shared values around academic rigor, in a culture where students appreciate being challenged intellectually.** Faculty who care about students plus students who engage with each other leads to a culture where students appreciate being challenged intellectually. The norms and values of a college community are absorbed by students, and if these norms and values include a commitment to intellectual conversation and rigor, students will rise to the challenge.

4. **Extracurricular norms that encourage students to try different things without fear of judgement or failure.** Trying new things opens up new experiences and exposes students to new people. They also open up potential leadership opportunities. New things, new people, and leadership experiences can be transformative, and trying new things can boost students’ confidence.

5. **Leadership opportunities for students.** Extracurricular opportunities generally provide low-risk avenues for leadership. The actual consequences of failure for a student club president (for example) are relatively minimal, but for students they come with enough responsibility and pressure to make them meaningful experiences.

6. **Students who are able to engage with difference in a healthy way, either on campus or through off-campus study programs.** Peers expose students to different ways of thinking, behaving, and seeing the world. Interacting with students who are different from themselves, no matter how small those differences, can spark personal growth and development. Further, while encounters with diversity and difference are important ways students learn and grow in college, the learning and growth that comes from encounters with diversity and difference can be affected by the environment of the college or university. Off-campus study programs (such as study abroad programs) are another important vehicle for allowing students to experience difference and learn about themselves.

7. **Support to help students transition out of the institution and into the next phase of their lives.** No one is going to be a student forever –our students all have to leave college at some point. Helping students transition out of the institution also helps students learn about the world, who they are within the world, who they want to be, and how they can make a positive impact. They don’t figure this out without the help and encouragement of other people.
1. Title: The Effects of Physical Exercise on Stereotypic Behaviors in Autism: A Meta-Analysis

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ABSTRACT

The prevalence rate of children with autism has been on the rise for the past 20 years. A hallmark characteristic of this disorder is the presence of stereotypic behaviors. Children who engage in stereotypic behaviors experience difficulties in effectively interacting with their surrounding environment. Both consequence-based and antecedent based interventions have been successful in decreasing these interfering behaviors. The performance of physical exercise has shown positive results as both a consequence based and antecedent based intervention in reducing stereotypic behaviors. The current investigation conducted a meta-analysis on the effects of physical exercise on stereotypic behaviors in individuals with autism. This study was able to run this meta-analysis using both aggregate score studies and single subject design studies. This study identified 10 research articles that met all of the inclusion criteria. The 10 articles were coded according to sixteen primary moderators and four peripheral moderators. The 10 articles produced an overall large effect size of $d = -.456$. This large effect size
demonstrated that physical exercise is effective in decreasing stereotypic behaviors in individuals with autism. However, no significant statistical difference was observed within any of the primary and peripheral moderators. The lack of significant statistical difference within any of the moderators lead the current investigator to conclude that the effect of physical exercise on stereotypic behaviors in individuals with autism may not be impacted by external factors. Further research is needed to determine the internal neurobiological effects of physical exercise on stereotypic behaviors in individuals with autism.
“Innovation creation thinking” for creativity development

- Matching hidden needs and new seeds –

Koji MIHARA

Abstract
Innovation is continuously necessary for company for the future. Human resource development of the talented person who can create innovation is very important in the company. Autor is continuing research on "purpose expansion" for work design known as a creative technique as an innovation conception method. Furthermore, obtaining hints for a development method through "purpose expansion", Author proceeded with research regarding new conception methods and has proposed several development methods. Among these, "potential expansion" which develops possibilities, is a thinking method (conception method) of the type driving by the seeds to go forward developing new utilities. On the other hand, "purpose expansion" is a thinking method (conception method) of the type driven by needs to in pursuit of true needs by seeking higher goals, and he thought that he could use these two thinking methods systematically to increase the potential for innovation creation. An idea to think about both needs and seeds is necessary for creation of innovation. "purpose expansion" is the creation technique that is effective for thinking of innovation. "potential expansion" is thinking process of the seeds pursuit. It develops a new seed. "purpose expansion" is thinking process in pursuit of hidden needs. A preceding study shows that it is raised the possibility of the innovation creation by using these two kinds of thinking process. "innovation creation thinking" is developed based on the study of thinking process of these two. This paper aims to introduce a theory of “innovation creation thinking” and to show the effectiveness of this method.

KEY WORD : Planning Method, Purpose Expansion, Potential Expansion

1. Introduction
The survival of future businesses requires continuous innovation. The innovation research to date has nearly unanimously argued that the ideas that form the seeds of innovation are a necessary factor in innovation. In order to create innovation throughout various fields and domains, it is critical to conceive of these seeds of innovation. Previous study claims that conception of the seeds of innovation originates from need-oriented concepts, known as market driven and market pulled, and seed-oriented concepts, known as technology driven or technology pushed. There has long been a debate about which produces innovation – need-oriented or seed-oriented concepts. However, the current most rational interpretation is that needs and seeds jointly create innovation. In other words, the joint conception of both needs and seeds is required to create innovation, and so this is the short cut to the creation of innovation.

Author is continuing research on "purpose expansion" for work design known as a creative technique as an innovation conception method [1] [2] [3] [4]. Furthermore, obtaining hints for "purpose expansion" method through internal argument with oneself using "sentence expression of the function", Kurosu proceeded with research regarding new conception methods and has proposed "potential expansion" method [5]. "potential expansion" develops possibilities, is a conception method of the type driving by the seeds to go forward developing new functions. On the other hand, "purpose expansion" is a conception method of the type driven by needs to in pursuit of true needs by seeking
higher goals, and it is thought that these two thinking methods systematically to increase the potential for innovation creation. Furthermore, unifying this research, “Innovation creation Thinking” is developed in order to devise a seed of innovation. From 2014 a course on this thinking method was held as a subject in Waseda University EDGE, the Ministry of Education, Culture, Sports, Science and Technology, and has already had more than 100 students turn out who are now practically utilizing it.

2. Objective & Procedure
The purpose of this paper is to present the effectiveness of the “Innovation creation Thinking” method in designing new business while also explaining the logic behind it. Firstly, Importance of matching of needs and seeds and the logic behind the “Innovation creation Thinking” is introduced. An overview of the “Innovation creation Thinking”, two kinds of expansion which are core thinking method of “Innovation creation Thinking”. And each expansion is explained, and expansion example is shown. Finally, new business example which was planned by “Innovation creation Thinking” was demonstrated.

3. Previous Research on Innovation creation and Conception
There have been many conception methods proposed in the past resulting it a great deal of achievements. Among these, there are sure to be thinking methods, which create conception that turned into innovation. Design thinking and system thinking are two conception methods, which are receiving attention as innovation conception in recent years. However, as far as author knows, there is almost no conception method development research with the purpose of creating innovation. Nevertheless, we can conceive that innovation is being created through some kind of conception method. And so, it will be considered from what kind of conception method theories the seeds of innovation are being created.

In marketing research, in order to produce large economic value, needs are said to be required. And it is said that when you realize something with completely new needs and new skills, this leads to innovation. In this way, there is the concept that innovation has created precisely through the conception of new needs. On the other hand, there is the concept that it has created through the conception and realization of new seeds. And so, there is a conceivable argument as to whether the conception methods and creation technologies which we have utilized in the past will are conception methods to conceive of needs, or conception methods to conceive of needs. Therefore, an outline of past theories as to whether innovation creation creates needs conception or creates seeds conception are presented.

3-1. Needs-Driven and Seeds-Driven Innovation creation
There has been debate for many years regarding the issue of whether innovation occurs being needs-driven or seeds-driven. Namely, the debate is which is effective for innovation creation "market-driven", which is needs, or “technology-driven”, which is seeds. The market-driven innovation faction has proceeded with technological development through their involvement with needs, presented cases where innovation created, and has considered technological approaches to be a major factor innovation [6]. On the other hand, the technology-driven faction has argued that market (needs) information cannot be said to convey a message, which clearly specifies the directionality of market reform, and in general, the fulfillment of needs is determined on the side supplying the seeds [7] [8] [9]. As such debate continues to mount, Johne and Snelson considered innovation to be an expression of
balance between advanced technology (seeds) and market insight (needs) [10]. Furthermore, Clark argued regarding the interaction between technology and markets, and considered innovation to rely not only on technology but also on the interaction between it and the evolution of customer needs [11].

In this way there is a wide range of debate regarding the causes of innovation, and there is surely no one who would use it in a place where there were no needs whatsoever regardless of what kind of seeds were supplied, and of course no one who could use it even if there were needs but no seeds to realize said needs. It is believed that, as stated by Clark, it is appropriate to consider innovation to occur due to an interaction between needs and seeds.

3-2. Conception Driven by both Needs and Seeds

Some research can be found in which regarding both needs- and seeds-driven models, but all of it considers either needs or seeds to be the initial cause behind conception. Regarding methods of hypothesis-creation type design support, Noguchi, Tanimura, and Shiono[12] have taken an approach to Logically new designs with current products (needs) as a starting point and utilizing quantification class III and DEMATEL. Additionally, there is also research into techniques to conceive of future needs combining various ideas (seeds) conceived by industrialists through innovation games [13] [14] [15].

Furthermore, the importance of innovation creation through the matching of needs and seeds has been recognized even at the national level, with research into the matching of needs and seeds being carried out from the standpoint of Ministry of Education, Culture, Sports, Science and Technology industry-academic-government collaboration toward the creation of new value [16].

Although the importance of innovation research focusing on the interaction between needs and seeds in this way has been confirmed, currently it cannot be said that there is much research regarding needs- and seeds-driven conception methods.

3-3. Conception methods Matching Needs and Seeds

As confirmed in the preceding section, it would seem to be possible to create innovation by conceiving of a good balance of both needs and seeds and drawing on them both. In other words, recognition of both needs and conception methods focusing on the interaction between them would seem to be necessary for the conception of seeds of innovation. However, as far as author knows, there are no conception methods to be found which are scientifically recognized and extensively utilized and which clearly differentiate between needs conception and seeds conception and attempt to conceive of innovation through interaction between the two. Nevertheless, the seeds of innovation have been conceived of using the conception methods of the past. So, considering the question of why it was possible to conceive of the seeds of innovation despite not clearly differentiating between needs conception and seeds conception and attempting to conceive of innovation through interaction between them, the following would seem to be possibilities.

A) While conceiving of needs, people are matching them with the seeds they already possess (know).

B) When conceiving (developing) of seeds, people notice hidden needs.

Most conception methods from the past seem to have stimulated the ability to conceive of seeds by the person in the process of conceiving of needs, and vice versa. In other words, it seems to depend on the abilities of the conceiver of either conception.

In order to draw out the ability to conceive of both needs and seeds in a conceiver as much as possible, it is effective to mutually stimulate needs conception and seeds conception and conduct
conception method in a way that matches them with each other.

4. The logic behind the Innovation Creation Thinking method

4-1. An overview of the Innovation Creation Thinking method

The Innovation Creation Thinking method is composed of three expansions – “purpose expansion,” “potential expansion” and “measures expansion” – as well as an innovation map for obtaining an integrated overlook of these. “Purpose expansion” is a conception method for discovering needs. “Potential expansion” is a conception method for discovering seeds, and “measures expansion” is a method for creating realizable plans. The innovation map gives a bird’s eye view of these three expansions and is a tool for discovering concepts that could lead to innovation. Figure 1 shows a conceptual diagram of these three.

![Conceptual diagram of Innovation Creation Thinking method](image)

4-2. “Purpose expansion” for need conception

The goal of “purpose expansion” in the Innovation Creation Thinking method is to discover or create previously undetected or hidden needs. “Purpose expansion” is a conception technique originating from work design, which is a system design method.

In Innovation creation Thinking, thinking methods which can utilize "purpose expansion" for the purpose of system design for the sake of innovation conception [1][27].

4-3. “Potential expansion” for seed conception

4-3-1. Logic of “Potential expansion”

There are two types of seed conception. One is conceiving of uses for invented items and concepts that do not yet have clear uses and another is conceiving of new uses for previously developed and used items and concepts through new combinations. “Potential expansion” is a conception method capable of creating both of these approaches.

By systemizing a development method of thinking wherein one repeatedly asks oneself, "what could be accomplished if that were possible?", it is possible to investigate the possibilities and
conceive of ideas for application [5]. Considering this development made clear the following points.
A) When the seeds (features which can be supplied) change, the applications change
B) There can be many applications for a single seed (feature which can be supplied)
C) Research and development firstly originates from applications

Furthermore, I obtained the following guidelines regarding development.
(1) Because one repeats the process of abstract expression becoming concrete expression and vice versa, it is not necessary to continue to be concrete.
(2) Chronological development following the passage of time is sometimes conducted.
(3) There are also cases where one goes forward thinking of causes and results, leading to causal development.
(4) It sometimes leads to the development of analogous expression.
(5) When considering what is possible, it is better to think releasing oneself from restrictions.

4-3-2. Seeds and Application Development
There exists a great deal of technology which has been created but whose potential uses are unclear. There is a huge number of patent applications. However, it is said that perhaps less than one third of patents applied for end up becoming products. Possible reasons for this include: (i) The technology developed was not advanced enough to become a product; (ii) the cost for the functions of the product are too high, eliminating the prospect of sales; and (iii) although the technology developed is interesting, it is unknown what it can be used for. For example, shape memory alloy was considered a very interesting technology and product at the time of development, but no decisive field of utilization of application could be determined. The same can be said of “paper that produces sound”, etc. These are technologies, which seem interesting, but they are inventions and discoveries for which what kinds of uses would be effective do not readily come to mind. There are cases where companies decided to put such things and concepts to market without sufficient consideration for their fields of utilization and application. The reason they wanted the world to think of applications for such things and have customers use them in accordance with their needs would seem to be the fact that there were no application development methods, which had been systemized in the past.

There are also many things and concepts invented and discovered through research into natural science whose uses are unclear. These un-utilized inventions and discoveries seem to come to life in society only after conceiving of their seeds and devising ideas for application.

3-4-3. The thought process in “potential expansion”
People used to try to think up areas of application and uses for technologies, materials and expertise as well as the products and services created from these by identifying their characteristics (mainly the merits), and then trying to think up some way to skillfully put them to use.
The process is as follows:
1. First, identify the characteristic of the object (X) (in particular, a merit).
2. Find somewhere you want to make use of the characteristic of X (in particular, a merit).
3. Think of how to provide a “more appropriate X” for where you want to make use of it.
4. If the “more appropriate X” does not actually exist, then newly develop it.

Step 1 of the aforementioned process is the act of extracting the characteristics of existing technologies and products as well as discovered or invented technologies and products that do not
have clear uses. Step 2 corresponds with the process of conceiving of ideas for uses. Steps 3 and 4 correspond to the processes of designing products and services that reflect these new uses. It is the process of questioning yourself about the merits of a particular seed or product as in, “If this is possible, then what else becomes possible?” then self-supplying the answer. It is the process of expression expansion through repetition of this [5].

4-4. “Measures expansion” to devise realizable plans

Devising realizable plans is a thinking process in which one repeatedly asks, “What do I need to do to accomplish that?” and then supplies answers to those questions. In other words, just as in the previously mentioned “potential expansion,” realizable plans are conceived through the process of supplying answers to the question, “What should I do?” and then, repeatedly thinking, “What should I do about that?” concerning the answers. Through this process of expansion, a very specific, tangible image will form at some point. Then, one may conduct trials when the desire to actually perform them arises. At that point, one enters the production process. This marks the completion of an actual, realizable plan. Figure 1 shows an example of “Measures expansion.”

<table>
<thead>
<tr>
<th>&quot;To carry things with one to use while commuting&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>↓ (How to make this happen)</td>
</tr>
<tr>
<td>&quot;To carry things people can use while commuting in a state opening they can use the thing they want to use immediately without sticking for them to take them out is always open&quot;</td>
</tr>
<tr>
<td>(How to make this happen)</td>
</tr>
<tr>
<td>&quot;To carry things in a state where where an opening they can use the thing they want to use immediately without sticking for them to take them out is always open&quot;</td>
</tr>
<tr>
<td>(How to make this happen)</td>
</tr>
<tr>
<td>&quot;To make it possible for people to instantly take out things they are carrying with them to use while commuting&quot;</td>
</tr>
<tr>
<td>(How to make this happen)</td>
</tr>
</tbody>
</table>

Figure 2 Example of "measures dxpansion" devising an implementation scheme
(The "↓" indicates the question "How to make this happen" posed to oneself)

In this way, the thinking process of asking,” What should I do to accomplish that?” and self-supplying the answer, “You should ~” expands measures that then become realizable plans. That is why we named this Innovation Creation Thinking “Measures expansion [17].

4-5. Innovation Map for Matching Needs and Seeds and Devising Implementation Schemes

Up to the previous section, I introduced three theories of thinking expansion to support the foundation of my Innovation Creation Thinking. The ground-breaking ability to utilize this thinking method for practical work is the potential for devising many plans through the creating of an Innovation Map, as I will explain in this section.

An Innovation Map is a map which fuses three expansions.

When the series of expansion consisting of needs development via "purpose expansion", seeds development via "potential expansion", and development of an implementation scheme via "measures expansion" is developed by separate individuals with no related theme, it is difficult to find needs and seeds of a similar time from within the expressions of said development. However, when people and organizations engaged in the same product, business, or issue perform each development, the needs,
seeds, and design usually possess a relatedness. Furthermore, conducting development with a
unified theme is another technique to arbitrarily apply relatedness. The Innovation Map is a
development support tool with a commanding view of three expansions which are likely to be related
whereby people discover ideas that become new needs and attempt conceptions which realize
implementation schemes to realize these needs.

The most important point of this thinking expansion in any kind of expansion is the act of repeatedly
asking oneself the same questions over and over, and this is called the "same-question repeated
thinking method". Furthermore, conducting this consciously will lead to great results. Because you
repeatedly conduct these three thinking expansions, a variety of ideas arise from said expansion.
Furthermore, by taking these ideas and using arrows extending between each expansion to join them
and create a diagram, it is possible to draw up innovation ideas like a map. I have named this the
Innovation Map [18].

Innovation Maps created via Innovation Creation Thinking are drafted using the aforementioned
three expansion methods, so it is possible for a single person to create one in a relatively short period
of time.

Below I will show the features of an Innovation Map.

◆ Can be created by one person

By using the three-thinking expansion with the repeated self-questioning, the map can be created
by a single person.

◆ Logical Map Creation

The three expansions promote logical thinking. In "purpose expansion" one is required to think
logically about "For what purpose?"; in "potential expansion" "What could be accomplished if that
were possible?" and in "measures expansion", "How to make this happen"

◆ The creation procedures are clear

The creation procedures are systemized, reducing discrepancies in quality of maps caused by
the creator's abilities. No matter who creates it, if they do it according to the procedure they can
create a map of a certain standard.

◆ Discovery of New Added Value

By having a commanding view of the overall picture during the creation of and after the completion
of the Innovation Map, one can perceive of "products and services possessing new added value".

◆ Not influenced by the attributes of the creator

Because one goes forward conceiving from functional expressions, it is not absolutely necessary
to possess detailed business knowledge. It is also not necessarily required to use specialized
terms. For this reason, not only technicians but also people from sales and planning departments
can create the maps. By drawing the maps via this method, sales and planning department people
are able to draw a map more from the point of view of the user. This enables the discovery of new
markets and applications. And by showing this Innovation Map to a technician, the technician can
draw a more technical roadmap from a technological point of view.

For these reasons, this method does not place excessive time pressure (for meetings, etc.) from the
creator, while still enabling them to create the desired Innovation Map following the procedure.
However, this technique does not prevent people from gathering together to create maps in a meeting
setting. When creating the map in a meeting, the person asking the questions and the person
answering the questions do not need to be the same person. By enabling everyone to question one
another and answer an objective and general Innovation Map can be created, so it is effective for utilization in the expansion of existing business, etc.

5. How to implement the Innovation Creation Thinking method

As explained in the previous section, the Innovation Creation Thinking method is composed of three types of thinking expansions. There are two ways to commence thinking expansions in this creation technique – need-oriented commencement and seed-oriented commencement. The need-oriented approach is more suitable when developing and designing new business, so we present its implementation method.

5-1. How to implement need-led approaches

When commencing with a need-led approach, conduct “purpose expansion,” and then “potential expansion.” After that, match function expressions from the expansion series made up of the “purpose expansion” and “potential expansion.” It is sometimes not possible to match well at this time, but conduct “measures expansion” from the need expressions in the “purpose expansion,” and create a need-oriented proposal.

The following is a summary of the process.
Step 1) Conduct “purpose expansion,” and discover needs.
Step 2) Conduct “potential expansion,” and discover seeds.
Step 3) Match needs and seeds from amidst the “purpose expansion” and “potential expansion,” and create new function expressions (called new need expressions) combining them.
Step 4) Conduct “measures expansion” on the new need expressions created from the matching and devise several realizable measures.
Step 5) Line up all three expansions and create an innovation map.
Step 6) Take a bird’s eye view of the innovation map and summarize a proposal that is both innovative and realizable.
Step 7) Create a proposal outline.
Step 8) Perform detailed system design from the outline.

This paper is a detailed explanation of the process up to step six, in which innovation seeds are conceived and planned. Steps 7 and 8 are a system design period conducted after determination of the proposal, and these steps follow system design methodology nearly exactly, so please reference prior research [25][27][31][34][35][36][37].

5-2. Examples of Methods and Development of "Purpose expansion"

Determine what products and business fields at your company to target, repeat the questions "What is the purpose of this?" and "What is this for?" as a starting point for that one functional expression, pursuing the highest goals possible. During this expansion, needs which had previously been hidden will be discovered and created. The basic idea is essentially the same as "purpose expansion" in work design, but in Innovation Creation Thinking it is more important to conceive of new needs than to follow the expansion rules. And so, so that anyone can easily engage in this conception method, and since it is important in "purpose expansion" to comprehend the questions which pursue the goal, the deployment name "What For? Expansion" is also used based on the question, "What is this for?".

Figure 3 is a sample of "purpose expansion". The conceptions created through this expansion are actually utilized in planning.
Purpose Expansion

To buy tape-recorder.

↓ what is the purpose?

To buy a machine that can reproduce tapes which is leaving in house.

↓

To reproduce poorly stored tapes so they may be played.

↓

To reproduce tapes which deteriorated with a machine to listen to when I like.

↓

To have deteriorated analog sound sources that is including the music you used to love with the machine which always listens to.

↓

To listen anytime and anywhere to analog sound sources you used to love that have become unplayable due to no longer having a machine and to recording material deterioration.

Figure 3. Example of "Purpose expansion" with "Tape Recorders" as the Subject

5-3. Examples of Methods and Development of "Potential expansion"

"Potential expansion" starts with asking oneself the question, "If this is possible, what becomes possible?" The basic expression is, "To × × (predicate; verb) ○○(object; noun)". The expression "To × × (predicate; verb) ○○(object; noun)" is a "functional expression". In the structure of an expression when describing the 3 expansions, "functional expressions" are the basic structure.

"Potential expansion" is a development method where one goes forward developing potential with a certain function as the starting point. The things and concepts established at the outset as subjects of development are the pre-existing technology, products, and knowhow. Express the features of the technology, products, and knowhow which are the subjects, and make that the starting point. The subject of "potential expansion" is features, and in most cases, they become functional expressions which serve as the starting point as-is.

In "potential expansion", because there are multiple features of the technology, products and knowhow, it is necessary to functionally express these functions in various ways. Furthermore, once a certain feature is possible many questions arise about what becomes possible next, so it is recommended to gradually diverge when conducting development. The divergences are divergent thoughts to conceive of more plans, and it is a good idea to make it a point to proactively diverge to create ideas.

Figure 4 is an example of expansion from one feature, namely "wavelength correction technology".
Potential Expansion

<table>
<thead>
<tr>
<th>To be able to correct audio containing lots of noise on various wavelengths into wavelengths humans can hear.</th>
</tr>
</thead>
<tbody>
<tr>
<td>what else becomes possible?</td>
</tr>
<tr>
<td>To be able to output audio after correcting audio which is hard to hear into audio humans can hear.</td>
</tr>
<tr>
<td>To be able to re-record audio after correcting which is old and difficult to hear into audio humans can hear.</td>
</tr>
<tr>
<td>To be able to re-listen to audio recorded long ago that you wanted to listen to but could not by improving and clarifying the sound.</td>
</tr>
<tr>
<td>To be able to remind of the old forgotten memories based on a real record.</td>
</tr>
<tr>
<td>To be able to revivify lost memories.</td>
</tr>
</tbody>
</table>

Figure 4. Example of the "potential expansion" of wavelength correction technology

5-4. Examples of methods of "measures expansion"

"Measures expansion" starts from asking oneself the question, "What should we do for that to happen?" The expression used at this time is the "functional expression", "To × × (predicate; verb) O O(object; noun)".

"Measures expansion" is a development method to devise plans on how to implement the functions when selecting a "certain function" in "purpose expansion" and "potential expansion". It is a development method to devise plans on how to implement said functions. Therefore, the function established at the outset as the starting point for development will be the functional expression selected in "purpose expansion" and "potential expansion".

One note of caution in "measures expansion" is the fact that the question "What should we do to fulfill a certain function?" is not limited to a single answer. Because many ideas are conceivable, sequential divergence is not obstructed when conducting development. The divergences are divergent thoughts to conceive of more plans, and it is a good idea to make it a point to proactively create divergences.

Figure 5 is an example of functional expressions obtained by matching "tape recorder" with "wavelength correction technology". Because "measures expansion" is development in the opposite direction from "purpose expansion", in "measures expansion" development occurs from the bottom up.
Method Expansion

| To save digitized audio tapes which people have not heard which many people have as many as possible. |
| To save digitally convert tape audio that has become unplayable due to deterioration to a cloud server. |
| To deliver the audio which is converted the audio which deteriorate and cannot hear into a sound to be able to hear. |
| To correct the sound of analog audio that was stored because you used to love it but that has become unplayable due to no longer having a machine and to deterioration of the recording so that you can listen to it anytime and anywhere. |

Figure 5. Example of “Measures expansion” of the Needs from Tape Recorders and Matching from Wavelength Correction Technology

5-5. Creation and Application of Innovation Map

An Innovation Map is a map which itemizes the 3 expansions explained hereto, discovers matching among them, and takes a commanding view of the overall picture to conceive of new plans. Because the format of the map is not particularly pre-established, it can be created in a way that is easy for the developers to view and write. In this section I will provide an outline of the creation steps based upon a single example.

Step 1) Conduct “purpose expansion” on the company’s business and products

Through “purpose expansion”, you can search for the essential goals of the business and products. “purpose expansion” ultimately achieves the goal of “making people happy”, and the development to lead to that achievement is the "needs roadmap". The "needs roadmap" referred to here can be considered the needs in the target market or the market needs. “Purpose expansion” makes it possible to discover and investigate latent market needs by defining higher goals for your business and products.

Step 2) Conduct “potential expansion” on the technology, products, and knowhow possessed by the company.

Through "potential expansion” you can discover the potential of what your own company is capable of. The results produced in "potential expansion" can be called a "needs development view", and in a broader sense this is the "product and technology roadmap". In other words, development created through "potential expansion" is a seeds group based upon the company's technological factors and indicates the potential to create new business.

Step 3) Matching of needs and seeds from "purpose expansion" and "potential expansion"

Itemize “purpose expansion” and “potential expansion” for a commanding view to compare them and discover similarities or related functional expressions. By doing this you will discover seeds which conform to needs and vice versa. Unify the functional expressions of needs and
seeds and create functional expressions matching the needs with seeds. Even at this point you can be said to have devised one seed of innovation.

Step 4) Conduct "measures expansion" starting from the matched functional expressions.

Conduct "measures expansion" starting from the functional expressions matched in Step 3. "Measures expansion" as performed in this step does not necessarily need to be limited to the technology possessed by your own company. In any case, it is essential to engage in logical and free conception, taking in various technologies from other companies as well in pursuit of means. During this expansion, if a means arises which requires technology that you don't think you are currently capable of yourselves, this will become a prospect for your own company's development.

From this development, once expressions of a level that are implementable appear, compile these as an execution proposal. When compiling a plan, avoid limiting the use of functional expressions to one of those which has appeared, but rather incorporate all the functional expressions which seem usable into the plan to increase its feasibility.

This plan will be the plan, which forms the seed of innovation created through Innovation Creation Thinking.

6. An example of designing new business by innovation creation thinking

Figure 6 is an example map of devised proposals (called an innovation map) that is arranged to give an overlook of these three expansions. This example shows engineers with audio processing skills planning a new business using their skills. First, they conducted “purpose expansion” on tape recorders, a machine needed to listen to analog audio sources, in order to conceive of the needs of people who listen to analog audio, and they tried to discover hidden needs. And they conducted "potential expansion" from one characteristic of the analog audio correction techniques they possess, and then they developed seeds they could offer. Matching these expansions allowed them to create new need expressions, conceive of realizable plans by conducting “measures expansion” on these new need expressions, and create new business by making these realizable plans take concrete shape. These new businesses are examples that were actually developed as businesses.

7. Conclusion

Graduate school students and members of the general public have received classes on this Innovation Creation Thinking method in the EDGE Program [19] supported by the Ministry of Education, and so far more than 100 participants have studied this material. To the authors’ knowledge, since 2014 up to the present, this has resulted in the founding of two new companies, two entrepreneurs currently in planning, three cases of new projects within a company, and one case of manufacturing equipment that is currently in design development and preparation for a patent application. As an example, the digital transmission service for analog sound sources introduced in this paper (Figure 6) was started as a business, and so this displays the method’s effectiveness as a way to plan innovative, new business.
<table>
<thead>
<tr>
<th>Purpose Expansion</th>
<th>Potential Expansion</th>
<th>Method Expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>To buy tape-recorder.</td>
<td>To be able to correct audio containing lots of noise on various wavelengths into wavelengths humans can hear.</td>
<td></td>
</tr>
<tr>
<td>To buy a machine that can reproduce tapes which is leaving in house.</td>
<td>To be able to output audio after correcting audio which is hard to hear into audio humans can hear.</td>
<td></td>
</tr>
<tr>
<td>To reproduce poorly stored tapes so they may be played.</td>
<td>To be able to re-record audio after correcting which is old and difficult to hear into audio humans can hear.</td>
<td></td>
</tr>
<tr>
<td>To reproduce tapes which deteriorated with a machine to listen to when I like.</td>
<td>To be able to re-listen to audio recorded long ago that you wanted to listen to but could not by improving and clarifying the sound.</td>
<td></td>
</tr>
<tr>
<td>To have deteriorated analog sound sources that is including the music you used to love with the machine which always listens to.</td>
<td>To be able to remind of the old forgotten memories based on a real record.</td>
<td></td>
</tr>
<tr>
<td>To listen anytime and anywhere to analog sound sources you used to love that have become unplayable due to no longer having a machine and to recording material deterioration.</td>
<td>To deliver the audio which is converted the audio which deteriorate and cannot hear into a sound to be able to hear.</td>
<td></td>
</tr>
</tbody>
</table>

From this matching, function expressions in line with latent needs are created using the company’s technology and skills.

Collect analog tapes that have become unplayable at home, and save these to a cloud server after restoring and digitizing the sound sources, and then provide the service of transmitting these to the smartphones of those who want to hear them.
[Reference]


The conflict between dream and reality: The Great Gatsby

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F. Scott Fitzgerald’s The Great Gatsby offers a historical perspective on American culture, as well as a portrait of American society in the 1920s and of the American Dream, extending to a universal theme of dreams of a utopia and their frustration. As language is a part of culture, the ultimate aim of studying a foreign language is not just to be able to communicate naturally with the speakers of the language but also to understand the target culture. Consequently, it is required for learners of English not only to cultivate such basic English skills as reading, writing, speaking and listening but also to have a deep understanding of American culture. It is important to choose a suitable teaching material that provides understanding of and insight into the target culture. Jack Clayton’s 1974 film of The Great Gatsby would appear to be suitable as cultural educational material. Unlike the other film
versions, including the recent 2013 film, that mainly emphasize the romantic love between Daisy and Gatsby, Clayton’s film adds the director’s criticism of American society, focusing on social problems such as the gap between the rich and the poor, the prevailing materialism, and the collapse of the traditional morality and value systems. I have taught this film for Freshman English for several years, and I found that it is able to satisfy two basic educational purposes, first to increase student’s English skills and, second to help them understand American culture and human society more broadly.

This paper aims to research the dream of American Idealists and their frustration as depicted in the film The Great Gatsby. The main character, Jay Gatsby, is forced to compromise with the corrupt reality in the pursuit of realizing his dream. Many critics have supposed that Gatsby’s dream stands for American dream; Charles Thomas Samuels argues that Nick regards Gatsby as the prototype of those American Idealists who established the New World.(157,158) Marius Bewley also claims that Gatsby is an heroic personification of the American romantic hero, the true heir of the American Dream.(14)

The opening scenes serve as a preface, setting the mood of the film and making clear its specific period setting. In the opening credits, the Jazz music is heard over shots of articles and snapshots of Daisy. Consequently we can guess that the so-called the Jazz Age of 1920s will assume importance as the background of the film. In the aftermath of the First World War the U.S. became a powerful nation where people were able to enjoy more comfortable and affluent ways of life. However, the serious concentration of wealth among only a small number of people became a social problem. The low class, suffering from extreme poverty, is represented by the desolate life of the Wilsons in the Valley of Ashes, Myrtle’s attempt to escape through immoral love affairs, and the gloomy situation in Chicago described by Nick. The moral confusion reached a peak in the face of bright modern civilization, and as a result people indulged in a pleasure-principled life in order to compensate for their spiritual vacancy. In the opening scene of the film, we see Nick’s laborious crossing over the
watery strait between West Egg and East Egg, symbolizing the gap between the poor West Eggers and the rich East Eggers. Instead of hearing the news of Daisy's marriage to Tom from her friend Jordan, Gatsby in the film confronts Daisy over her change of mind: “Why did you marry Tom? Why didn't you wait for me?” By closing up on crying Daisy's face, the director's criticism of the dominant materialistic thinking is intensified. It seems Daisy had fallen hopelessly in love with Gatsby without knowing about his origins and when he left for war, she was overwhelmed by Tom's wealth. Unlike the novel, Clayton's film deals explicitly with the tragic deaths of the main characters. Such scenes as the death of Gatsby, and the suicide of Wilson, as well as an extreme close-up of the dead Myrtle's face, are shown in detail; the headlights of Gatsby's yellow car stained with Myrtle's blood and dented deeply from the collision are overlapped by the eyes of Eckleburg's advertisement, revealing Myrtle as a victim of a materialistic society.

The film opens with Nick's reminiscing about his stay on Long Island during the summer season. At that time he worked as a bonds salesman in New York City. Some critics regard this novel as Nick's bildungsroman and his maturation story. In some aspects, The Great Gatsby is the story of what happens to Nick, and the conclusion he draws from his experiences make up a large part of the book's thematic material. In the film Nick's role as a main character is emphasized with many close-ups of him observing people and events. In his conversation with Jordan, Nick criticizes Tom and Daisy as representing the corruption of the materialistic dominant class: “They're careless people, Tom and Daisy. They smash things up and then retreat back into their money or their vast carelessness or whatever it is that keeps them together, leaving other people to clean up the mess.” James E. Miller argues that not only the poor Wilson but also the rich Tom and Daisy are typical residents of the Valley of Ashes(31-32). That is to say, the spiritual barrenness and moral confusion of this area are epitomized by Tom. The extreme close-up of Tom's smashing Myrtle's nose emphasizes his violence and prejudice against the poor and socially weak. Their paralyzed moral consciousness
caused the tragic death of the main characters – Gatsby, Myrtle, and Wilson. Dust is a symbol related to the Valley of Ashes representing an irresponsible and immoral society. Eckleburg’s advertisement overlooking the valley is a symbol of the area; it is often shown in close up in order to emphasize the predominance of the materialistic way of thinking that respects money as God (Trask 215): “Fitzgerald wants us to view T.J. Eckleburg as a symbol of the corruption of spirit in the Waste Land - as if even God has been violated by materialism - reduced to an advertisement.” (Schneider 147)

Paralleling the scene of Gatsby’s seeking for his dream with that of the Valley of Ashes, we may see the implied author’s message that Gatsby’s dream cannot be realized because of the corrupt reality. This message is repeated in the following scenes, as the lonely figure of Gatsby stretches out his hand towards the green light in parallel with the Buchanans’ party scene. Nick also delivers the same opinion directly in his voice over: “Gatsby turned out all right in the end. It was what preyed on him, what foul dust floated in the wake of his dreams.”

Gatsby compromises with corrupt reality to achieve his dream are seen in his close relationship with his business partner, Meyer Wolfsheim: “This bizarre denizen of the twenties underworld serves to give another insight into the corrupt reality on which the attainment of Gatsby’s dream is based.” During the 1920s many upstarts were able to make a lot of money by gambling or by selling liquor illegally, and Wolfsheim is a case in point. Gatsby recounts to Nick stories about his past - how he grew up in a rich family, was educated in Europe, and served with distinction in the war. However, Wolfsheim’s information about Gatsby is different from this; he tells Nick how he had raised Gatsby from humble circumstances, but his true nature is hinted at by three clues: first it is seen that his cuff buttons are made from human molars, something that represents his cold-blooded, selfish attitude to making money, in pursuit of which he has never hesitated to make victims of other people; second, as a gambler Wolfsheim helped to fix the 1919 baseball World Series that was notorious for its “black socks” scandal, from which we may recognize his corruption and lack of morality; third, there was the
death a friend of his, Rosie Rosenthal, at the hands of gangsters who he may have sought out for the purpose, irrespective of whether he had committed any crime. So, Nick gets a hint in the form of Meyer Wolfsheim of how Gatsby really attained his wealth.

With the help of Jordan, Gatsby was able to meet Daisy again after a separation of 8 years at Nick’s house, suitably located for gazing at his luxurious mansion. The three walk through the mansion as he proudly shows off his rooms. In the dressing room, he takes out a pile of shirts, all sent from London, and throws them at Daisy and Nick, one by one, Daisy bends her head into the shirts and begins to cry; “I’ve never seen such beautiful shirts before.” She is deeply impressed by Gatsby’s sincere and genuine love for her: Gatsby’s shirts are among the “enchanted objects” created by money, significant only in as much as they contribute to gaining his ideal vision. This spiritual significance invests the shirts with a meaning that transcends their physical existence and gives them a “sacred” quality like that of the green light. Gatsby doesn’t seek to make money for itself but rather as the means for attaining his dream, as we see in the symbol of the beautiful shirts. He has made a lot of money in illegal and immoral ways, similar to many others in the period. However, he is different from them- everything he owns exists only for the attainment of his own vision, and this sets him apart and makes him spiritually greater than the materialistic society in which he lives.

After everyone leaves, Gatsby tells Nick that Daisy did not enjoy the party and that he makes a promise.

Gatsby: I’ll fix everything. Just the way it was before, she’ll see.

Nick: You can’t repeat the past.

Gatsby: Can’t repeat the past? Of course you can.

James Gatz had invented Jay Gatsby when he was a boy of seventeen, and he remained faithful to this conception to the end. He had invented a totally new person, and in becoming that new person
had lost the heritage of a historically oriented way of life. In a larger context, Gatsby’s attitude is that of his American ancestors’, trying to cut off their hereditary history and tradition in order to establish a utopia. (Mizener 133) They intentionally tried to break away from their existing cultural heritage in the belief that they could reach their utopian reality merely by making a lot of money. Ironically, this kind of utopian dream only gave rise to darker social contradictions such as slavery, the gulf between rich and poor, and the state of spiritual barrenness.

In the New York Plaza hotel Gatsby declares that Daisy does not love Tom and she will soon leave him. He tries to force her to say that she has never loved Tom in front of her husband, which is an impossible request for Daisy, for it means destroying the traces of an 8-year marriage. In order to realize his dream, and to move back completely to the beautiful days when they sincerely loved each other, he tries to erase the unsatisfactory traces of the past. Daisy confronts him, saying “You want too much! I love you now. Isn't that enough? I can't help what's past. I did love him once, but I loved you, too.” Through the close-up of Gatsby’s dazed face as he looks at Daisy’s daughter Pammy, it is implied that Gatsby’s belief in repeating the past is impossible. Nick meanwhile holds an opposite opinion - that human beings are defined by space-time - and accepts the importance of tradition and morality. Malcom Cowley suggests that Nick is the only character in the novel who is not corrupt and does not have any thoughts of materialism. (139) Even though he has escapes from his Midwest hometown to New York for material success, he never left behind the traditional morality that he had learned from his father. Nick survives because he possesses two kinds of knowledge that Gatsby lacks. The first is that heritage of traditional moral values; he is indebted to Mr. Carraway, for his “habit of reserving all judgments” allows him to value Gatsby’s romantic idealism. The second kind of knowledge is his ever-present awareness of man’s mortality. (Piper 97)

As Nick witnesses the conflicts of the main characters in the hotel, he suddenly declares that today is his birthday, he having turned 30, and that this is a sign of his maturity. Therefore, he will intervene
more actively in the world armed with his insight and deep understanding. Charles Thomas Samuels suggests that only Nick can correctly recognize the ambiguous reality that makes it hard to distinguish between right and wrong. The book's chief characters are blind, and they behave blindly. In the whole novel, Nick is the only one who sees, though his vision comes slowly. (153-154) Some scholars claim that the story is about Nick’s inner journey from ignorance to wisdom. At first, he refuses to take the job awaiting him in the Middle Western wholesale hardware business that had been in his family for three generations, and instead comes east to take a job in a Wall Street brokerage firm. But by the end of the novel it is the values represented for Nick by the image of his father that have saved him from Gatsby’s terrible mistake. Realizing this, Nick is ready at last to return home. (Piper 97) As a consequence he recognizes that the world of the east coast is corrupt beyond repair and to realize Gatsby’s dream he must choose the right way. Consequently he decides to move back to his Midwest hometown, for the Midwest is a symbol of morality and tradition. Nick will realize Gatsby’s dream morally based on tradition.

After arriving home and anchoring his boat, he catches glimpses of Gatsby’s lonely and transcendental figure gazing at the green light on the dock of Daisy’s house. From this scene, it is implied that we can guess that Nick will join Gatsby in pursuit of his dream. The symbol of the bird that represents the idealist Gatsby tells us that Nick has become a follower of Gatsby’s dream, as seen in his raising the bird, his putting the dead creature safely on the rock. This new role of Nick’s contributes to the success of this story and constitutes its moral center. In the novel, Gatsby is alone as he looks at the bay on Daisy’s side and imagines the wonder of the old Dutch sailors who faced the fresh green breast of the new world. However, in the film, Gatsby and Nick look out at the bay together and imagine the utopian dream of their ancestors. They share their view of how the island must have seemed to the Dutch sailors when they first arrived. The sense of unity between Nick and Gatsby is consolidated as they look, recollecting their ancestors’ dream. Here is implied Nick’s role as
a successor to Gatsby’s dream.

Nick: Can you imagine what this old island must have looked like to the Dutch sailors when they first saw it?

Fresh green, like a dream of a new world.

Gatsby: They must have held their breath. Afraid it would disappear before they could touch it.

In the latter parts of the story, Nick affirms Gatsby’s greatness by seeing him as the prototype of the dreamers who established the new world. The green light that symbolizes Gatsby’s dream of reunion with his long lost lover may be connected with the ancestors’ dream of new world that is represented by the same color. (Samuels 158) Gatsby appears in the attitude of a worshiper, alone and stretching his arms toward the single, faraway green light that is the visible symbol of his dream. Gatsby’s pursuit of his dream is described in terms of admiration, comparable even to a knight’s pursuit of the Holy Grail. Gatsby is compared to Benjamin Franklin, who tried to realize the American dream as the prototype American. Floyd C. Watkins points out that the minister’s Bible reading at Gatsby’s funeral is overlapped by Gatsby’s father’s reading of his son’s resolutions written in a book that is reminiscent of Franklin’s autobiography: “Mr. Gatz’s copy of Gatsby’s “schedule” is especially important in that it places his son squarely in the American tradition.” (201-202) In responding to Nick’s criticism about his car accident, Gatsby unconsciously reveals that the driver was Daisy. Nick has regained his trust in Gatsby. At first, Nick despised Gatsby’s disordered, immoral-seeming life. However, after listening to his father’s advice, he tries to sympathize with the other people’s difficulties instead of making hasty judgments. Just before Gatsby’s death, Nick tells him directly that the Buchanans are corrupt beyond redemption, far from Gatsby’s own greatness. Nick’s voice over that speaks of Gatsby’s greatness, his talent and romantic readiness for hope is heard over an extreme close-up of the green ring on Gatsby’s hand.

The most important and most admirable person appears again at the end of the film to summarize
the meaning of the previous scenes. In order to underline Nick’s important role, Clayton’s film ends with a close-up of him facing the camera. Nick walks across Gatsby’s drawing room and out into the garden. He looks at the green light and thinks about the dream that is symbolized for Gatsby. Nick’s voice over, saying “I thought of Gatsby’s wonder when he first picked out the green light at the end of Daisy’s dock” flows over the background of dark blue sea and sky and the flickering green light. In the midst of gloomy reality Nick makes a firm decision to realize Gatsby’s dream in a proper way, putting an emphasis on the greatness of Gatsby, who had pursued his utopian dream at the risk of his life.

Even 44 years after its production, the validity of Clayton’s film as cultural educational material remains. However, as modern-day students may find its old-fashioned techniques boring, it is necessary to prepare some back-up material, for example on its social and historical background, to excite their interest. If students are to increase their English skills, it is necessary to introduce intellectually stimulating materials that encourage them to express their own ideas.

REFERENCES


Fitzgerald’s *The Great Gatsby: the novel, the critics, the background* (pp. 133-140), New York: Charles Scribner’s Sons.


background (pp. 201-202). New York: Charles Scribner's Sons.
Title of the submission: **Supporting Faculty Teaching in Higher Education: The Learning Covenant Teaching Academy (LCTA)**

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**Abstract**

This session will highlight the successful implementation of the Learning Covenant Teaching Academy (LCTA), a semester-long teaching academy for college faculty who are within their first five years of teaching in higher education.

At the end of the session, attendees will be able to:

- Plan and sustain a similar faculty teaching academy on their campus;
- Create topics and tasks/experiences for their own faculty teaching academy;
- Discuss assessment outcomes for their faculty teaching academy; and
- Discuss how they would engage faculty colleagues in SoTL.

The LCTA has been in existence for 4 years. The purpose of the LCTA is to expand the pedagogical knowledge of faculty, and to increase their ability to design and teach learning-centered (Weimer, 2002) courses so that ALL students can learn course content, concepts, skills, and dispositions in a positive learning environment. Learning outcomes of the LCTA include the following:

1) Establish learning-centered objectives and communicate them to students on a syllabus;  
2) determine whether students meet those learning objectives using a variety of assessment strategies (Angelo & Cross, 1993);  
3) use pedagogical research findings to plan courses, assignments and assessments that actively engage all students in the learning process (Ambrose, et. al, 2010), and  
4) modify teaching strategies in order to improve student learning (Silberman, 1996).
Throughout the semester, participants implement various teaching strategies and assessment techniques with students and write weekly journal reflections about them. They also share their thoughts and experiences with other participants during our time together (creating a true learning community). The capstone portion of the semester comes at the end when participants share their plans/ideas for a SoTL project with the guidance of the Bishop-Clark & Dietz-Uhler (2012) book.

The content and context of the session is important to higher education for the following reasons:

1. Having administrative support for such a program is necessary (and will be discussed);
2. It will provide attendees the opportunity to explore the possibility of such a program on their home campus;
3. Sustained faculty development provides the opportunity for a rich and supportive faculty learning community; and
4. Providing participating faculty with a safe space to implement and discuss teaching/learning/assessment strategies in their courses would be of great benefit to them, and their students.

The relevance of this topic to other fields will be apparent when session attendees begin to brainstorm about the possibility of the creation, implementation, assessment, and sustainability of such a program on their home campus.
In the university setting, students are often exposed to one officially designated “social justice” course where they engage in conversations, or actions, for and about social justice issues. For many students, it is the first time they wrestle with “the inherent biases, e.g., homophobia, racism, sexism, classism and all the other social ills, which plague us at the core of our humanity” (Woodley, 2016, p.4) and inform their own ways of being in the world. As educators committed to social change, we seek to continue to infuse social justice throughout all of our courses, even, or perhaps especially courses that are not necessarily marked as being social justice. Gay (2013) calls for culturally responsive educators to “connect in-school learning
to out-of-school living; promote educational equity and excellence; create community among individuals from different cultural, social, and ethnic backgrounds; and develop students’ agency, efficacy, and empowerment” (p. 49). We respond to this call by remaining vigilant and intentional in the texts, guest speakers, and other curricular materials we select. Being intentional about curricular choices is vital as we know that texts in particular “participate in creating what a society has recognized as legitimate and truthful” (Apple, p. 5, 1993).

In addition to being mindful of curriculum, we also engage in the ongoing work of cultivating an expansive repertoire of pedagogical approaches that serve to create culturally responsive spaces where students may continue to develop their social justice lens, activist voices, and understand how they too can be agents of change in their chosen field (El Ashmawi, 2016; Ferguson, 2016; Woodley, 2014). We do so knowing that in the hands of social justice educators, curriculum and pedagogy become conduits to bring forth more than individual awareness. It can bring about social change.

The panelists bring diverse experiences and backgrounds to the discussion about pedagogy, education, and social justice. During this panel presentation, each will begin by sharing their positionalities as educator/researchers. Next, specific pedagogical approaches that are used in their classrooms will be shared. Finally, each presenter will share ways they seamlessly infuse social justice into their curricular design to support teaching practices in their higher education classrooms so students can continue to develop their social justice lens and understand how they can be agents of change in their chosen field. By making social justice part of the day-to-day work as educators, we move it from being a one-and-done class to a systematic approach that promotes personal transformation and social change.
References


Woodley, X. M. (2014). *Black women's faculty voices in New Mexico: Invisible assets silent no more*. (Dissertation). New Mexico State University, Las Cruces, NM.


Abstract

It is difficult to understand the process by which program learners write source code. Also, it is difficult to anticipate what kind of challenges they face in the process and how they solve them. The history for each version of the source code is insufficient in helping to know them, but taking a detailed record of a user's operation is effective [1][2]. We have proposed an editing history visualization system that is a learning environment for programming language learning [3]. This system easily prepares the learning environment and confirms the learning situation. Also, since this system accumulates learning logs, we can see where and how the learners modified the program. Programming languages that can be developed with this editing history visualization system are C/C++ [4], Java, JavaScript, Scratch [5], etc. It also deals with writing problems in English [6].

We proposed an effective flipped classroom based on the log information of self-study, called a “grouped flipped classroom” [7][8]. In applying this grouped flipped classroom to an actual lesson, we utilized the editing history visualization system [9][10]. As a result, a large amount of learning logs were accumulated when about 90 students took classes for 16 weeks.

I actually did a programming lesson and found that there were several students who asked faculty members for help without reading error messages even though they were displayed. The edit history visualization system accumulates all the source code of the process that is being modified until the program is completed. We thought that by automatically extracting the source code containing errors from all the source code, we could let learners practice correcting the mistakes. We developed a tool to realize it.

The debug exercise extraction tool we developed extracted 18,680 source codes (which became practice problems) that included syntactic errors that could be used as a debugging exercise from 16
weeks of program edit history data (total number is 31,562 files). The execution time was 488 seconds. Since it can be analyzed only once every six months, we believe it is a sufficiently practical execution time.

In the future, we will establish an extraction method that takes mistakable problems into consideration. In addition, we will verify that if students practice debugging using the problem extracted by our system, their dependence on teachers will be reduced.

Acknowledgment
The authors thank the members of the “e-learning for Next Generation” Project Research Program, Waseda Research Institute for Science and Engineering, Waseda University for their valuable comments about this paper. Part of this work was supported by JSPS KAKENHI Grant Numbers JP26350299, JP16K00491, and JP17K01101, and Special Account 1010000175806 of the NTT Comprehensive Agreement on Collaborative Research with Waseda University Research Institute for Science and Engineering. Research leading to this paper was partially supported by the grant as a research working group “ICT and Education” of JASMIN.

Reference


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**Choices and Challenges in Holocaust Education Today**

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There are many traditional reasons for teaching the Holocaust -- to illuminate some of the more complex issues of human behavior; to study questions of fairness, justice, and morality; to help students develop a knowledge of politics and its inevitable intersection with power.

Yet the reality in the world of education today is that enormous social, political, and pedagogical forces constantly interact to make the Holocaust one of the most uniquely difficult and deeply controversial topics in the contemporary American
And while educators and policymakers agree that Holocaust education should take place, few agree on how.

Because of this, many secondary-school teachers and administrators turn to programs developed and run by local and regional Holocaust museums as a way of offering the most appropriate, effective, and relevant Holocaust education to their students.

But how well do these programs succeed? Which practices work the best? How will programs evolve in the future as fewer and fewer Holocaust survivors are able to present eyewitness testimony?

Despite the fact that educators across the U.S. have worked diligently over the years to develop a thorough and nuanced awareness of the Holocaust, a recent Anti-Defamation League study reported that only 54% of the 53,000 people in 102 countries surveyed had ever heard of the Holocaust. And a full 34% of those who had heard of it doubted that the factual reports of it were true (ADL 2014.)

**Fulfilling an Educational Priority**

Clearly the need for cogent and meaningful education Holocaust education continues to present itself as a priority in our educational system. To determine how best this can be accomplished, this research project undertook to survey Holocaust education specialists, both program directors and facilitators, at several prominent Holocaust museums around the United States through the effective use of highly structured interviews. The study then employed the well-respected methodology of qualitative content analysis to organize, synthesize and interpret the data once it was gathered.

Additionally, insights were gained from examining published works, teacher-oriented websites, educational materials, and scholarly works on the Holocaust, the systematic, state-sponsored persecution and murder of six million Jews by the Nazi regime between 1933 and 1945 (Engle 2000.) This material provided broad and deep context on the events, experiences, causes, and results of the Holocaust itself and also enhanced the understanding of the procedures and processes of typical secondary-school social studies curricula.

The goal of the research project was to offer a meaningful and multi-layered evaluation of museum-based Holocaust education programs, so that educators would know how deeply they engaged students, what outcomes they achieved, and how those that are successful are evolving to meet students’ needs with the resources projected to be available in the future.

Using the methodology of content analysis facilitated identification and analysis of the institutions’ best practices and the philosophies that underlay and support them (Burghardt 2013.) These included not only the pressing topics of current discourse but also the most forcefully emerging issues surrounding Holocaust education programs for tomorrow. The objective was to enable the creation of a useful and philosophically sound set of conclusions that would aid educators in determining their own classroom direction in fulfilling this difficult educational mandate.

**Success and Satisfaction in Museum Programs**

The organizations surveyed were wide-ranging both geographically and in terms of their specific programs and practices. In addition, they served a variety of different populations with city and suburban roots, and also achieved the accommodation of varying numbers of students per year. This spread enabled the results of the evaluation to cover many bases, while still focusing tightly on a successful set of museum-based programs.

In order to best understand which of today’s practices are most effective and why, it is helpful to first have a firm grasp of the history of Holocaust education in the United States. Today, virtually every state of the union has some type of Holocaust component in its secondary social studies curriculum, though that can range from a one-hour historical overview within the context of a world history class or an analysis of just one prominent piece of literature, very often Elie Wiesel’s “Night,” to a full course of study of Holocaust events over a period of weeks or even months, augmented by a deep literature, music and visual arts curriculum (Feinberg and Totten 2016.)

Education about the Holocaust is legislatively mandated in only ten states; New York, New Jersey, California, Florida, Rhode Island, Illinois, Indiana, Michigan, Connecticut, and Kentucky. However, activists in the growing field of Holocaust and genocide studies are pursuing legislation in several other states to ensure that the history, memory, and lessons of the Holocaust live on (JTA 2017.)

All educators who choose museum-based programs to expand their curricular offerings are encouraged by the Holocaust center to prepare their students ahead of time through a variety of methods, though not all do so. Even when students arrive at the museum for their field trip with little preparation, museum educators can invariably rely on their detailed and organized programs to gain the students’ attention and draw them into the subject matter (Gray 2014.)

A Tried-and-True Methodology

What this material consists of, how it is presented, and why it is significant became clear during this study when the data was gathered and interpreted by applying the methodological principles underlying this research project. Data for the study was gathered from interviews with practitioners at several prominent Holocaust museums across the U.S.

These included the Illinois Holocaust Museum and Education Center in Skokie, IL; the Center for Holocaust and Humanity Education in Cincinnati, OH; the Holocaust Museum Houston; the Florida Holocaust Museum in St. Petersburg, FL; the Los Angeles Museum of the Holocaust; and the Dallas Holocaust Museum and Center for Education and Tolerance. Each of these museum centers offers Holocaust education programs for secondary-school students through visits to the museum on field trips.

Interviews with the museums’ education directors and facilitators were based on a structured survey plus an open-ended discussion on the issues facing Holocaust educators today. Questions included the following: What is the size and scope of your Holocaust education program? What are the components? What are their most effective characteristics? How old is your program? How many students go through it every month? How have the programs changed over the years? What do you perceive as the biggest problems facing museum programs of this kind in the future?
In performing the content analysis on the data collected through the interviews, it soon became apparent that a number of terms arose repeatedly, and these content elements tended to cluster around a small number of central axes. By analyzing the relationships among these groups of data, ideas began to emerge, and patterns and themes were identified from these groupings. The themes were distilled into four main areas: the fundamental goals of Holocaust education, critical topics to teach, necessary components of the programs, and guidelines for successful outcomes. Following is a discussion of each of these themes.

**Defining Purpose, Setting Goals**

The first primary theme concerned the basic purposes of teaching the Holocaust. Before deciding what to teach, the program leaders felt it was mandatory to create a rationale for why it was necessary to teach this history altogether. It was important for each learning center to clarify and state these aims in order to provide integrity and stability for the programs that were to be derived from them. This is typically considered the most effective way to start planning a program and to check on its usefulness as time goes on (Riley and Totten 2005).

Museum program educators spoke of two ways of identifying the goals: first was understanding why students should study the history, and then came naming the most significant lessons that they could learn by applying them to their lives. From these answers the particular curricula could be developed, a tried and true methodology that has proven successful over the years (Russell 2006).

Program leaders typically began this search by stating that their initial intent was to engage the intellectual curiosity of students so that they could grow personally, learn critical thinking skills, and become responsible citizens, thus fulfilling one of the central mandates of the U.S. educational system.

They then addressed the reasons for studying the Holocaust specifically. One of the most frequently mentioned reasons focused on the fact that democratic institutions and values are not self-sustaining and must be protected and nurtured. Thus the infringement of civil rights in our society can erode these values, and indifference to the suffering of others supports this erosion and worsens it. They also stated in a variety of ways that the Holocaust was not an accident in history, but rather a series of events that began with intolerance, prejudice, bias, and bullying and ended in mass murder. This occurred because people, institutions, and governments made decisions that legalized discrimination and allowed it to lead to genocide.

**Human Rights and Human History**

Other terms that clustered around the axis that came to be defined as goals in teaching the Holocaust centered around the fact that the Holocaust grew out of a deep and distinct violation of human rights that altered the course of human history, not only in the 20th century but for contemporary times too.

Because its effects are still felt today, the lessons of the Holocaust that students can learn through studying its complex history were seen as engaging and relevant parts of the education program (Kershaw 2008.) Museum educators identified several reasons
for this, including students’ frequent questions about fairness, justice, and individual identity, as well as issues of peer pressure, obedience, and conformity. They also touched on secondary school students’ natural interest in protest and resistance, and found that history lessons taught in context enabled students to come closer to grasping the enormity of the Holocaust.

Other areas that illuminated ways in which the lessons of the Holocaust could be applied today touched on developing an awareness of the value of pluralism and the acceptance of diversity, issues that confront students daily in their school environment, and learning to see the danger signals when society is threatened by the potential disintegration of democratic values and to know when and how to react to them.

What Topics to Teach?

The second major theme was a virtual consensus on which specific Holocaust topics were critical to teach. Not all programs were able to teach every subject in every field trip or docent tour, but all aimed to include at least parts of each component, recognizing that it is always difficult to make content choices. In order to present the material in an effective way, museum programs tended to organize their programs based on chronology, with the goal of demonstrating clearly the progression of the Holocaust. To do this effectively, they typically divided the Holocaust into three phases or time periods: 1933-1939, 1939-1945, and post-1945. Professional studies in Holocaust education virtually all recommended a version of this division (Russell 2006.)

The first period, 1933-1939, the early years of the Holocaust, centered around three important issues: how the dictatorship that operated in the third Reich was created and manifested; what took place during the early stages of persecution of the Jews; and how the first concentration camps were set up, where and why they were created, and how they set the pattern for the future.

The second period, the war years, 1939-1945, was the largest of the three chronological groups and contained the most topics. Educators first gave an overview of World War II and how it played out throughout Europe, thus providing overall context, then led into the euthanasia program, in which the disabled were murdered. From this the curriculum evolved progressively into the persecution and the murder of the Jews, the most effective way to lead into one of the most difficult parts of the Holocaust to explain (Hecht 2008).

Next the program facilitators tended to discuss the reality of the ghettos, explaining how they developed, where they were located, and what the Nazis had in mind when they organized them. Once ghettoization was explained, the next topic was the mobile killing squads, the dreaded Einsatzgruppen, who drove from village to village killing Jews in their gas vans, and then a description of how the concentration camp system was expanded to fulfill the stated goals of the Nazis. This in turn led to a unit on the killing centers and the gas chambers, such as those that operated so effectively at Auschwitz.

Lessons from the Resistance Movements
In addition to the Jews, of course, several other groups became victims of Nazi persecution, and programs invariably included a section on who they were and why they were labeled as undesirables. After a thorough explanation of who was targeted by the Nazis, educational facilitators typically turned next to the Jewish and non-Jewish resistance movements that tried to fight Nazism and halt or at least contain the progression of the German culture of death, devastation, and destruction.

Turning to a brighter topic, educators generally next worked through a unit about rescue, and how portions of the persecuted people were able to save themselves. They then described the death marches and liberation of the camps.

In the third and final period, post-1945, educators with sufficient time taught the students about the postwar trials and how the surviving Nazi victims who were not able to go home again fared in displaced persons camps until they were able to emigrate and build new lives for themselves.

Nearly all programs attempted to provide context for the Holocaust by describing Jewish life in Europe before the Holocaust. This was most engaging to students when it included material on anti-Semitism and teaching about the aftermath of the First World War to explain the rise to power of the Nazis (Feinberg and Totten 2001.)

Defining Best Practices and Their Components

The third theme is focused on the primary components of engaging and relevant Holocaust education programs. Virtually all the educators identified three major parts of their programs as both the most popular and the most effective. These were the docent-led museum tour, the interaction with the museum’s artifacts, and the testimony by a survivor.

All the museums offered choices in the focus of the programs, which enabled schools to bring the same students to the museum multiple times. Some were centered on teaching students how to speak out against prejudice and injustice, others on understanding the symbols of hate. There were programs that taught students how to find courage within themselves, and some that invited students to think about the responsibilities good citizenship required. Still others encouraged civic action and fostered empathy through focusing on students from a global perspective, which was deemed a useful way to involve students in a manner they would be most likely to remember (Landau 1998.)

Some used storytelling as a way to bring the lives of Holocaust survivors and victims alive. A few aimed at showing how health, educational, and environmental rights were violated in the Holocaust. Others put students through learning labs in which they compiled a personalized to-do list to use in their school, family life, and neighborhood interactions. Others had the young people create letters to send to elected officials to encourage them to sponsor human rights legislation.

Several museums utilized fine art and photography workshops and exhibitions to show students how to take action to right wrongs and to learn how to communicate their messages through the visual arts. Experiencing what it would be like to walk in the footsteps of a refugee or immigrant formed a component of many programs. Learning how to use technology to engage their local community was mentioned frequently as a
way to apply lessons learned. Some programs asked students to sign a pledge to try to put these lessons to work in their own lives.

**Training for Effectiveness and Compassion**

Docents who lead museum tours were extensively trained, both in Holocaust history and in transmitting the information to secondary-school students. Most were also made familiar with the issues of special needs students, and could communicate with them at their pace and level. Docents typically follow a chronological timetable in explaining the historical events of the Holocaust, using photos, maps, time charts, graphs, and often interactive electronic learning devices to engage the students visually and technologically as they toured the museum. When needed, tours at some locations were offered in Spanish.

Docents were taught how to answer questions and respond to students’ comments during the tours and to engage them in dialogue. Most often questions of why and how were asked, they reported, far more often that inquiries about what and when. Museum educators said the biggest problem today is not Holocaust denial but distortion of facts; thus they were trained to confront questions and statements from students who needed particular clarity about the true historical events of the Holocaust.

Often small groups of students toured the museum while the others engaged with the artifacts; then the groups switched places and experienced the other part of the program. Artifacts from the Holocaust can range from a child’s shoe to a railroad boxcar. In between these extremes are prisoner uniforms, refugee documents, yellow star patches, musical instruments, Nazi memorabilia, cameras, passports, poison gas Zyklon-B canisters, tin cups and other items from concentration camps. Virtually all Holocaust education programs reference involvement with physical artifacts as a surefire method of igniting student interest (Donnelly 2006.)

Once the tour and demonstration of the use of artifacts were completed, students typically gathered in an auditorium to hear eyewitness testimony from a survivor. This was universally described as the most effective, moving, and memorable part of the museum program. Survivors typically held the students spellbound as they talked about their experiences escaping the Nazis, living in inhuman concentration camp surroundings, being taken from their homes and separated from their families, surviving on grossly inadequate food, and being made to work almost beyond endurance.

**When Survivors Speak the Truth**

These personal stories tend to be most effective when the survivors were the age of the students in the audience when they were caught in the Holocaust. Students could then identify with them and often measured themselves against the horrors of the time, wondering how they would have fared and if they would have had the courage to survive, directly taking in the lessons of the Holocaust through this powerful and personal internal experience (Burghardt 2017).

Many museums also offer video-conferencing for those students too far away to attend the programs on a field trip. These programs generally entail a survivor who gives a talk and then answers questions. Museums also often offer teachers a glossary and
timeline of the Holocaust to help them prepare their students for the field trip and also to gain enough knowledge and perspective on how to answer the questions they are often asked once the students are back in the classroom. They also often provide extensive biographies of the survivors scheduled to testify about their experiences, so that students will be emotionally prepared to hear their stories. In this way students will more easily be able to overcome any difficulty in understanding why the speaker has an accent, for example, or seems foreign to them (Fallace 2008.)

**Trunks, Artifacts, and Testimonies**

Many museums also lend out trunks of materials which can aid teachers in fulfilling the Holocaust curriculum. These trunks can contain a variety of reference and resource materials, including literature sets, DVDs, posters, historical documents, and photographs. Most contain these items physically, but some of the newer ones have them all loaded onto tablets that the students can access electronically. Some include facsimiles of actual Holocaust artifacts that were used by the survivors who provide testimony.

In addition, some museums offer student leadership training to help students develop their skills in standing up to prejudice and learning to foster and promote human and civil rights and broaden their understanding of genocide and other human rights issues. Going further, some museums provide training for teachers and administrators in learning how to teach the Holocaust and apply its lessons. This program of involving education leaders has been shown to provide a significant boost to the value of the Holocaust education field trips (Gray 2014.)

Typically, museum programs accept students from all schools -- public, private, and parochial. Most field trips last between two and three hours, with an hour and a half devoted to the tour and interaction with the artifacts, and an hour or so to hear the testimony of a survivor and ask questions.

Most field trips impose a maximum of 50-100 students on the group, depending of course on the size of the facility. Museums generally try to assign one docent per 20 students for the museum tour portion of the program. Once back in the classroom, most programs emphasize document-based inquiry to further deepen the experience for the students.

**Creating Successful Outcomes**

The fourth theme that emerged from interpreting the data that was collected in the survey interviews with museum educators centered on the guidelines that museums follow for successful outcomes of their programs. In this area, survey participants uniformly pointed out that a high level of sensitivity and a deep awareness of the complexities of the Holocaust were mandatory for programs to succeed. In addition, several other critical comments stood out.

First it was considered deeply important to correctly define the term Holocaust so students knew exactly what series of historical events were being discussed. Next, several educators pointed out that students should be told that the Holocaust was not inevitable – that it took place because groups, nations, and even individual people took
specific action or chose inaction in the face of what was taking place around them. In this way students could begin to understand human nature and learn to become not only better critical thinkers, but citizens who see that how they act can make a big difference in the world.

Another guideline mentioned consistently to make museum programs successful was for docents to answer students’ questions honestly and fully and not try to withhold information “to protect them.” They were advised not to oversimplify or distort the facts of historical reality with euphemisms. Precision of language was considered important too, as was avoiding stereotypes of group behavior or reducing any nationality -- the Germans, in particular -- to a one-dimensional description, but also to avoid using any form of Nazi terminology, particularly as it referred to the Jews, as these terms were created for propaganda purposes and were invariably pejorative. Literature on teaching the Holocaust bore this out (Hecht 2008.)

Some museum educators thought it was helpful to discuss the fact that there are varying interpretations of history, and thus to encourage students to think analytically and investigate the origin and authorship of all written material they find, particularly information on the internet. This was mentioned as being especially important during the docent-led tour of the museum. Students should be encouraged to question sources, and, to increase credibility, docents should be able to explain where the material comes from (Donnelly 2006.)

Other Lands, Other Peoples, Other Genocides

Often the reality of other genocides and questions about how they relate to the Holocaust were raised during student visits, and educators said they found it useful to refrain from comparing the amount of suffering of individuals or groups in different historical events. They also found it effective to always be aware of trying to offer a balanced view of history, stressing factual accuracy rather than overly romantic versions of heroes, demons, perpetrators, and victims.

Students who were well-prepared by their teachers before their field trip to the museum tended to fare better and got more out of the visit, mainly due to the extra perspective they gained by knowing some of the historical context in which the Holocaust took place. This was also true when docents and other educators the students came in contact with were able to translate statistics into human terms. The sheer number of victims of the Holocaust is nearly impossible to comprehend, of course, and it was found that when the numbers were turned into groups of individual people, particularly family members, students came away with a deeper understanding and a more meaningful experience. These techniques continue to be popular in Holocaust education programs across grade levels (Feinberg and Totten 2016.)

Finally, students came to understand the Holocaust better if they were given images that educated them but didn’t shock them. Having students leave the museum in tears usually meant the field trip struck too deeply into their sense of emotional vulnerability. Even more negative were the few attempts museum educators made to try to immerse students into experiential lessons, in which they were encouraged to participate in simulation games. Most effective was quiet listening to survivors telling their stories, with a structured, educator-led question-and-answer period afterward.
Into the Future

Museum educators who wanted to look to the future of their programs named two areas of particular interest. First was what to do when the survivors who now provide firsthand testimony to the students are no longer able to do so. Suggestions included training the children of survivors – the so-called Second Generation – to speak in their parents’ voice and embody their testimony.

Others focused on developing creative ways to help the children of Holocaust survivors talk about what it was like to grow up under the shadow of the Holocaust. Figuring out how the Second Gens (and Third Gens too) could take the place of the eyewitnesses whose personal testimony was consistently named the most moving, meaningful, and popular part of the museum programs presented the greatest challenge to keeping education programs vital and alive.

Other ideas for replacing live testimony were centered around engaging the new technology of holographic imaging that the Shoah Foundation at the University of Southern California is developing. This technology enables students to directly question survivors whose testimony is projected in three dimensions through holographic devices. Auditoriums that enable the 3-D projection of holographic images are currently being built or considered at several Holocaust centers in the U.S. to enable this kind of interaction in the future (USHMM 2018.)

The other area of interest concerned the problem of how to further extend the lessons of the Holocaust toward learning tolerance. Ideas to solve this problem included showing films and providing lectures that connect the Holocaust to contemporary genocides around the world, teaching students how to be globally minded and civically engaged in the world around them, and creating leadership development programs to help students create action plans they can implement in their schools and neighborhoods. Emphasis would typically be on inclusion, social justice, civic responsibility, understanding the bystander-upstander dichotomy, and working to put an end to the kind of social cruelty that has been exacerbated by the growth of social media.

Creating New Studies, Providing New Ideas

Like all research projects, this one was limited in scale and scope by the many constraints of time and space faced by all researchers. However, several emerging topics came to light during the research process that could extend the themes discovered in this paper into the future.

Two follow-on topics that would expand this research and add to its value are these: An investigation of how the programs of large urban museums with big budgets and copious staff compare to those of smaller towns and rural areas, and ideas of how these smaller programs can adapt some of the program components initiated by the successful larger ones to improve their offerings. And, finally, a study into how museum programs of all sizes could provide better articulation with social studies curricula in the secondary schools. Students on field trips to the museums would be more able to absorb the new material if they possessed deeper and greater knowledge in advance, as this would provide context and increase comprehension of the Holocaust and its causes and
consequences and, most important, the application of its profound lessons to today’s increasingly complex world.

**Works Cited**


An Analysis of STEM Learning Facilitation in Informal Educational Environments

Dr. David Burghardt and Dr. Deborah Hecht

Introduction and Context

As part of a National Science Foundation project, Wise Guys & Gals—Boys & Girls as WISEngineering STEM Learners, we researched the effectiveness of having personnel with little or no formal teaching background facilitate middle-school level engineering design activities. WGG introduces blended learning activities. Youth begin with a design challenge
that includes specifications and constraints for the solution. At key points, they are queried regarding their understanding as youth construct a model of their design and evaluate how well it meets the specifications and the constraints. WISEngineering\(^2\) is the online learning platform used to introduce youth to each design challenge. Through this virtual platform, youth acquire the knowledge and skills needed to complete the challenge. Design challenges include such activities as “design a speaker” or “build a prosthetic leg from newspaper.” Our study took place in partnership with Boys & Girls Clubs where Learning Facilitators, the Boys & Girls Club personnel who direct the activities, guided youth through the activities. Since a key to the success of the project were the Learning Facilitators, our study focused on their role.

Currently, the WGG project is collaborating with 16 Boys & Girls Clubs in three states. Each club has a Learning Facilitator who directs the activities. Learning Facilitators engage the youth in the activity, provide relevant materials, and support learners in their designs. At any point in the activity, they may need to answer queries from youth about the design challenge. In essence, they are the teachers in this informal learning environment. However, in terms of educational background, they often have limited, if any, STEM or teaching background. Some Learning Facilitators in our study were part-time undergraduate students, others had baccalaureate degrees, none were teachers. Of the 16 Learning Facilitators who participated in this research, only 50% reported having even some STEM background (e.g., managing STEM programs at diverse institutions, web design, etc.) Further, we experienced significant staff-turnover during our study. Each year there was up to a 50% turnover among Learning Facilitators. This presented a pressing need to provide strong professional development so all Facilitators, regardless of background, could implement each activity.

To meet this need for a robust professional development experience, we created both print and virtual resources for each activity. Learning Facilitators were provided access to short video guides and written guides. Both types of guides were accessible from smart devices or computers and viewable on phones. The written guides also contained links to additional resource materials.

This report presents findings from data collected from fall 2017 through spring 2018. It builds upon four years of studying WGG. Learning Facilitators engaged youth in 15 varied activities such as designing a speaker, designing a shoe or designing slime. Our sample included 425 unique learners and 16 Learning Facilitators. Some clubs arranged for a single cohort of youth to engage in multiple WGG activities while other clubs had different learners participating from activity to activity.

**Research Questions and Design**

This study examined the attributes necessary for good facilitation. The research questions are:

What factors enable Learning Facilitators to successfully implement WGG activities? What factors impede Learning Facilitators implementing WGG activities?
Data for the study were collected from and about Learning Facilitators using a variety of sources.

- **WISEngineering Data**: Following each WGG activity, Learning Facilitators were asked to provide written reflections about implementation of WGG and youth outcomes. The written reflections were completed immediately following youth completion of an activity and were recorded within the WISEngineering program. The analyses examined data within and across activities as well as over time for indicators of growth in understanding.

- **Facilitator Survey**: Learning Facilitators of WGG activities responded to a survey about their experiences with WISEngineering, implementation of the WGG activities, WGG professional development and youth engagement and learning from the experience. The survey included multiple choice and open-ended questions, providing facilitators an opportunity to provide individual answers. Responses were examined by question within and across clubs. Whenever possible, questions were grouped to develop a deeper understanding of the WGG experience. Since the number of data points is small (and completion was voluntary), most data were treated descriptively, telling the story of WGG at the club.

- **Facilitator and Club Leadership Interviews**: Club leaders and facilitators participated in interviews about their club’s approach to professional development, implementation and youth outcomes. Unlike the surveys that were completed individually, the interviews often include multiple people and explored topics in greater depth. The interviews were recorded, transcribed, and analyzed to identify underlying themes related to the goals of WGG. Underlying common themes were explored using qualitative coding method.

- **WGG Annual Report**: Every six months the Boys and Girls Clubs submitted data about their involvement in WGG, the number of youth engaged, and other questions related to planning and delivery. These reports included both descriptions of the WGG experiences as well as quantitative data about delivery. The reports were coded and the data entered into a WGG club-level database.

In examining the data, several factors emerged about those Learning Facilitators who excelled at conducting the WGG activities. These factors fell within two major themes: 1) Facilitator Preparation and Experience and 2) Engagement of youth. These are discussed below.

**Successful Facilitation: Facilitator Preparation and Experience**

In formal education, the level of experience and training of the teacher is often a strong indicator of program or curriculum success or at least the likelihood that a program will be successfully delivered. We initially believed that a background in STEM would be very useful for implementation of WGG. However, in analyzing the data, several excellent Facilitators had no
STEM background and whether the Learning Facilitator was a part-time or full-time staff member did not meaningfully contribute to success.

Of the 14 Learning Facilitators who provided information about their STEM educational background, approximately half reported minimal if any STEM background. Instead, there was a wide range of backgrounds among Facilitators including arts education, sociology, accounting, and general studies. Among the group with at least some STEM related background, most described experiences in information sciences and computer sciences. For instance, they often reported knowledge of how to use animation software and robotics. Only one of the seven had experience with engineering, a person who was pursuing an undergraduate degree in engineering. However, we found the level of experience at a club tended to shift frequently since Learning Facilitators turnover was common. Over the past four years, approximately 50% of the Facilitators were new each year. Furthermore, a STEM background did not necessarily provide an advantage. We found Learning Facilitators with and without a STEM background equally relied on the training videos and written support for implementing the activities with youth.

We were also interested in understanding how easy or difficult Learning Facilitators found it was to lead a WGG activity. Ratings were made on a 5-point Likert scale, where 1 was very easy, 2 somewhat easy to 5 being very difficult. Among Learning Facilitators with a STEM related background, six found the activities very easy and one found the activities somewhat easy, giving a weighted average response of 1.1. Among the Learning Facilitators who did not have a STEM background, two rated easiness as 1.0, four rated easiness as 2.0 and one rated it as 3.0. (The latter had an associate’s degree is General Studies.) The overall average for this group was 1.9, only slightly higher (i.e., indicating more difficult) than the STEM experienced group. Overall, 57% of the Learning Facilitators (8 out of 14) indicated that the activities were very easy to run; 36% (5 out of 14) indicated the activities were somewhat easy to run; and only one Facilitator, 7%, indicated the activities were neither easy nor difficult to run. None
reported the activities were difficult or very difficult. From this finding we deduced that the Facilitators could readily implement the activities.

Virtual facilitator training is effective

While a STEM background was not necessary, preparation was a key factor for successful implementation. In terms of preparation, the use of the printed Facilitator Guide was most often identified as a key to success. In particular, Learning Facilitators reported printing it out and having it available was important. The Facilitation video was more often used as a supplement rather than the main guide. Among those Learning Facilitators who struggled to implement the activities, they were more apt to rely on the video as the primary or sole source. Organization of the supplies and making sure all supplies were available was also important for success. Doing the project ahead of time, or doing elements of the project ahead of time was another key to success.

Since the WGG management team was aware that Learning Facilitators had very different STEM backgrounds it was decided to ask Facilitators to introduce easy and intriguing activities first (the order was determined based on pilot studies) and then introduce more complex ones or ones that took more time. In essence, we believed this would help scaffold Facilitators learning about how to deliver activities. This approach was expected to help Learning Facilitators to develop experience and expertise while also building youth engagement. However, several clubs examined the activities and decided on their own the order in which the activities would be delivered. Typically, the order was different from that recommended by the project. Clubs reported a variety of reasons for shifting the order, ranging from logistical to youth interest. Surprisingly, the order in which activities were delivered did not affect how successfully they were implemented or the level of youth engagement. In hindsight, allowing clubs to select the order gave the Learning Facilitators more control and perhaps increased their motivation to run the activities well.

We also found a basic understanding of technology was important. Facilitation required the use of technology. WISEngineering was created for delivery on a computer. Although the Boys and Girls Clubs that we worked with claimed they had computers for WGG, this often turned out to be untrue. Therefore, we adapted the WISEngineering software to run on tablets using
wi-fi. The project purchased tablets for clubs to use so there would be consistency across all clubs and helped each club set up the tablets. Learning Facilitators needed to be able to manage accounts, passwords, and monitor Wi-Fi strength. We developed strategies to deal with these issues, including creating videos and simplifying all instructions. The need for preparedness was a theme in this work as well. However, a series of challenges related to wi-fi strength, and tablet connectedness when left dormant for too long continued to frustrate users and project staff. Currently the project is creating a downloadable app that will run on personal smart devices. We expect this will further mitigate the technological problems by allowing Learning Facilitators and participants to use devices with which they are more familiar.

In summary, good preparation trumped a STEM background. The activities and the guides were created with this goal in mind. We found Learning Facilitators with no background in STEM or limited experience working at a Boys & Girls Clubs did just as well as those with experience. Implicit is the importance of the confidence that Learning Facilitators had in conducting the activities. Finally, we found from a project management perspective it was essential to continuously study implementation and what factors mediated success or challenges.

Engaging Youth

Building youth anticipation and interest was also a key strategy of successful Learning Facilitators. At Boys and Girls Clubs, Learning Facilitators are often tasked with engaging children in STEM activities that occur at the same time as non-academic activities such as basketball. The competition is challenging when the alternative activities are perceived as more fun and engaging. Creating interest among the youth in WGG was accomplished in a variety of ways and the approaches were often specific to individual clubs. For example, at one club, pictures related to the activity were posted on a public whiteboard. The pictures were designed to be provocative and engaging, such as showing athletes with a prosthesis in anticipation of the Prosthetic Leg design challenge. At another club, STEM professionals and their work associated with the content of the activity were featured.

Marketing the WGG activities was extremely important. Since most BGCs did not have a consistent cohort of children doing the WGG activities, this effort was on-going. Building interest in a prior activity often helped recruit youth for the next activity. Another successful strategy often reported by the clubs was sharing highlights of upcoming activities. In essence, clubs engaged youth themselves in creating a buzz as the activity began. Some clubs at the beginning of the activity began by engaging all youth participants in a group discussion about the design challenge as a way to build interest and sometimes encouraging competition, such as teams building a structure to support the greatest number of books.

As Learning Facilitators began delivery of an activity they reported it was often a balancing act to allow youth to find their own solutions without providing the a “correct” answer or too much direction. The type of engineering design solutions that WGG introduces do not have a unique correct answer. Rather they have a correct process. Successful Learning Facilitators provided feedback and encouragement while allowing for some frustration. This was critical for engaging
youth and typically led to youth being proud. The need to provide support, yet allow for frustration, sometimes contrasted with youth’s expectations developed from school experiences where a teacher helps students find the correct answer. Some successful Learning Facilitators described how as they developed confidence implementing WGG activities and allowing youth to experience some frustration, they extended the activities or adding more complexity to them. For instance, one Learning Facilitator commented about adding an additional specification to the WuGG shoe design activity. This additional specification related to walking in puddles as part of the testing and evaluation section. Another challenged the team to improve the volume of their speaker in the speaker design challenge.

Features of WISEngineering that Helped Engage Youth

Most of the participating clubs used the Badges and Certificates that are available with each activity as a tool for engaging youth. Each activity asks that the participant reflect on what they learned by doing the activity, and how they would improve on their design. Youth who completed this section and the majority of the other activity sections were awarded a badge for that activity. When enough badges were awarded, a STEM certificate was available that could be emailed to the youth or printed by the Learning Facilitator and awarded in person. Some clubs had ceremonies as part of their marketing strategy or a final end of the year ceremony to present these awards.

![Certificate of Recognition](image)

Another part of WISEngineering designed to help engage youth, are STEM career videos that are related to the engineering design challenge. Each challenge was introduced so the person doing the activity plays the role of an “engineer solving a problem.” A bioengineer designing a prosthetic leg, a mechanical engineer designing a rocket, or a civil engineer designing a highway are examples. We expected accompanying career videos would help engage the youth.
However, time constraints meant most clubs were unable to have youth view the STEM career videos during the club period. When time permitted, (e.g., if the activity was completed more quickly than anticipated) the videos would sometimes be viewed as a whole group activity. While viewing the video was not essential to completing the activity in a timely fashion, it was considered a useful feature.

To our surprise, several clubs had the youth view the Facilitator professional development video as part of their introduction of the activity and as a way to engage youth. The videos were not created to be entertaining, but rather to be informative for the Learning Facilitator. Yet, we found some clubs effectively used them as both a motivational element and as an instructional tool for the youth. While this did not remove the need for the Learning Facilitator to be well prepared and versed in the activity (meaning they needed to review the written or video guides first), for some clubs sharing the professional video with the youth was a valuable tool for engaging and preparing youth.

Learning Facilitators stressed that they found a connection between youth engagement and ease of use. Youth did not mind, and often enjoyed, complex design challenges. However, they did not want learning about the challenge, use of the technology or answering questions to be challenging. During our pilot work, we found the amount of reading required by WGG was often an obstacle. Children, and some adults, associate reading with school and they do not like to do it. Some reading however was needed to learn about the WGG activity and to complete the design challenge. Facilitator feedback during the first years strongly indicated the amount of reading required for the activities at that time was challenging and hindered successful implementation of the activities. Therefore, after the first year, we revised the WGG activities by decreasing the amount of reading by at least 50% and increasing the use of photos. Even with these changes, Learning Facilitators reported youth often rebelled when asked to read. A second effort was made to reduce the reading complexity and assure reading was at a level appropriate for a 10-11 year-old. Relatedly, as part of WGG, youth are asked to describe their understanding and how they would improve their design. While youth and Learning Facilitators often enthusiastically verbally discussed what they created, they were less enthusiastic when asked to write about the experiences. In response, we revised the WGG activities by reducing not only the amount of reading required but also the amount of writing. An added feature of the tablet was a voice recognition option so youth could speak their responses. We will study this tool during our final year of the project.

**Conclusions**

We learned that excellent facilitation of WGG activities does not require that Learning Facilitators have a STEM background or be a teacher. Excellent facilitation does require that the person be prepared. Preparation includes using the WGG Facilitator resources, having supplies ready, and often doing the activity before the youth. While success does not require that the Learning Facilitators have long-term experience working at a Boys & Girls Club, it does require the Facilitator consider what is reasonable for his or her particular club. Implicit in this finding is that the professional development materials be robust, varied, and effective. To
assure our materials met these criteria, they were developed with clubs in a variety of settings, from church basements to modern buildings dedicated to a given Boys & Girls Club. Another aspect of good facilitation is finding ways to engage youth: beginning with building anticipation and excitement about partaking in the activity and continuing with coaching children as they began and completed their designs. Successful facilitation was closely aligned with engaged youth. However, our research showed engaging youth was often related to how Facilitators promoted, introduced and conducted the activity.

The factors that most often impeded successful activity implementation related to technological issues such as maintaining login information (user IDs and passwords), and making sure the wi-fi connectedness was sufficient. Learning Facilitators needed to be familiar with the WGG activity, ideally by having done it, so if youth encounter a problem the Facilitator is knowledgeable enough to help. However, once again adequate preparation coupled with materials that were understandable and easily accessible, were key.

In summary, clubs varied in what they used to effectively engage youth, but having a variety of tools was essential and allowing clubs to select the most club-specific approach led to the greatest success.

Acknowledgement

The authors would like to acknowledge the support provided by the National Science Foundation through Award # DRL 1422436.


An Overview of a Comprehensive Plan to Facilitate Persistence to Degree Completion and Increase Retention of Online Student Populations

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Abstract

As concerns over the attrition and retention rates of our online learners continues to be an issue that needs to be addressed the office of Global Student Success, LeTourneau University, has begun the process of developing strategies designed to stabilize and ultimately increase retention. These strategies are geared towards providing opportunities for high impact educational, advising, and support practices which have been shown to increase student engagement and satisfaction (Kuh, 2008). This document will outline a number of retention initiatives that can be implemented at low cost in order to positively impact student retention. Discussed in this document are initiatives that research suggest institutions can utilize followed by the rationale for the use of these strategies as part of a comprehensive retention plan. Much of the data I have gathered would suggest that there are a number of factors including family dynamics, online isolation, and lack of college readiness (Russo-Gleicher, 2014) that lead to student attrition.

According to current research a comprehensive retention plan would need to address perceived student deficiencies and concerns through various methods i.e., learning communities, advising, early alert and intervention, orientation, and academic support services (Stewart, 2014),
to name a few. I am excited to report that as a university, specifically referring to online students, the institution where I am honored to work is already working to serve our students in many of the aforementioned areas. Our online learners are required to enroll in and complete an orientation course designed with the intention of familiarizing them with the university and distance learning in general; we currently utilize an early alert mechanism which connects students to our internal support staff as well as an outside vendor that provides tutoring and an essay drop off service to critique student’s work prior to submission. We are also looking at how learning communities might benefit our online students as well as exploring more ways to interact with these learners directly. The initiatives listed and discussed in the document are not intended to address every possible hurdle facing an online student but are designed to be part of a dynamic comprehensive plan to move a higher number of students to degree completion or goal attainment for those who are not degree seeking. This retention plan offers an overview of each initiative with many implementation details still needing to be fleshed out, based on the needs and policies of each institution, in order that this retention plan might adequately serve our global student population.
An Overview of a Comprehensive Plan to Facilitate Persistence to Degree Completion and Increase Retention of Online Student Populations

Initiative One

Purchase and deploy an early alert survey to assist in the identification of at-risk online learners.

A highly respected educational consulting organization has designed an online assessment for the sole purpose of identifying students who might possibly be at risk of failing to persist within their selected program. Currently the cost for this survey is relatively inexpensive, given the costs to any given school associated with students who do not persist to graduation, and can be administered to as many (preferably new) students as selected. Once this survey is adopted as part of a retention plan it can then be administered for each new student cohort. This instrument can be linked to an orientation or other class early in a student’s college career, where the learners could be forced to participate in this survey in order to progress to completion in the course. In conjunction with this survey institutions could also elect to deploy a mid-year assessment, as opposed to waiting a complete year to determine where these students are in relation to their perceptions of their academic abilities and actual academic experience. The use of information gleaned from the initial survey along with the data from the mid-year survey in conjunction with students’ actual academic performance could serve to guide academic support staff toward focused individual intervention efforts. The chart below shows the costs for the CSI
(College Student Inventory) along with additional surveys that can be deployed at various times during a student’s academic career. The unit that I lead is currently utilizing the Priority Survey of Online Learners (PSOL) which could effectively serve as our Second Year Student Assessment (SYSA) if we opted to deploy the CSI in the Fall of 2018


**Initiative One - Rationale**

As educators and administrators, we do not need volumes of research for us to understand that a prospective student who is ill-prepared to succeed might in fact drop out of school in a very short period of time. One researcher (Rovai 2003) stated that, “it is critical for institutions to recognize student characteristics and skills prior to admitting a student to an online program.” While I agree that it is important to understand the skill levels and characteristics of online students the current timing, for my institution and others I would suspect, of acquiring this knowledge as packaged and usable data is not until after they have possibly experienced failures
and maybe even left the learning environment. Across the Academy many colleges and universities admit students based on a minimum college transfer grade point average or successful completion of high school. There does not, at least for the institutions I have looked at, appear to be a system in place to accurately collect and disseminate data that would allow said institutions to understand fully who each of those new students are at the point of admittance. Current research shows that an effective way to assist students at becoming successful is by gauging their readiness before beginning a program (Richardson & Tarho, 2015). The reality is that as schools are working to remain viable there does not appear to be the luxury of telling students they will only be admitted if they can prove they are capable of being successful. Since it appears as though we are going to admit students without understanding their calculated risk of failure we must develop a method to access that risk and strive to mitigate it even if this does not happen until after the student has been accepted. The cost associated with developing a process for testing and validating a student’s readiness prior to admittance would most likely be seen as prohibitive for many of the smaller institutions so we must be creative and dedicated to early assessment and target intervention to develop that safety net to provide scaffolding for those learners not ready to be successful on their own.

Deploying this CSI as a student goes through the orientation course is a seamless way to get the student to participate and for support professionals to gather valuable, even if self-reported, information about how an individual perceives their skills and chances for success in their program of choice. Not only will this survey offer some insight into whether or not an individual feels strong in a particular area academically but will also shed light on their perception of self-regulation and self-efficacy. Knowing that an individual is motivated towards a specific goal and claims skills at self-regulating towards goal attainment can help us determine
where to best steer our limited resources (Bradley, Brown, & Kelley, 2017). With the follow-up survey alerting us as to whether a student’s self-perception was accurate and a semester of data to demonstrate progress we would be able to again identify those within a particular cohort needing academic intervention or additional support. A goal with early intervention is not only to increase persistence in an early course, but to hopefully keep the student engaged later on. Simply put “student withdrawal from individual courses may be an indicator of a future decision to leave the university altogether” (Cochran et al., 2014).

**Initiative Two**

**Enhance methods of early and increased instructor interaction and a methodology for tracking each teacher’s progress as related to student/faculty interaction.**

One of the issues that is repeatedly brought up in online learning workshops and face to face discussions is the difficulty in connecting with students and the need for the instructor(s) to be fully engaged. A strategy for addressing this issue is to charge each online instructor with the task of not only teaching the packaged content in the course but engaging with each student using methods aimed at fostering true connection between the student and the instructor and ultimately the institution. This component of the overall retention strategy can be housed in an institutions current Learning Management System (LMS) by using an add-on that specifically tracks the instructor’s interaction with each student through the already existing “Instructor Feedback” area. The desired outcomes for this component would be:

- Increase instructor awareness of online tutoring services
- Increase instructor awareness of early alert process
• Elevate accountability and enforce standards for instructor interaction and feedback quality

• Add a separate section embedded in the “Acceptance of Course Requirements” link to allow students to ask any questions they may have about course specifics and what to expect

• Require instructors to provide clearer guidance to students about the purpose of and expectations for interactive assessments

• Interact with each student using information mined from the student’s course introduction

• Post a video to each student referring to information from introduction

• Read the feedback from the analytics on each student to determine which student(s) is deemed a high risk to not persist.
  
  o This information can be mined from College Student Inventory and shared with instructors
  
  o This information would be added to materials that instructor has access to prior to course start

• Attempt to connect by phone or skype those students deemed high risk

• Offer several synchronous discussion opportunities throughout the course and possibly make it mandatory for each student to participate at least once.

• Personalizing email messages to students, deemed at risk, before they ask for help
  
  o Again, this would be based on information that we have provided to instructors prior to class start

• Acknowledge shared experiences like pursuing a degree while raising kids or being a single parent
• Occasional video clip of the instructor speaking to the class will enhance the presence and we can put a picture to the actual face of the instructor that we have been communicating with. (Christian et al., 2014)

• Initiate conversations about academic, career, and personal goals

Initiative Two – Rationale

*Intentional Interaction*

This is a component that can be implemented without a huge financial commitment and can be initiated almost immediately since one of the aspects of this is as simple as increased instructor engagement. There is currently a deficit that exists in our ability to connect with our online learners. This deficit is experienced by those of us that teach in the online environment each time we lose a student who fails to engage in the first week of a five or seven-week module. “In online business courses in particular, students rely on their instructors to build a learning community before they will begin to supportively communicate with each other” (Conaway, Easton, & Schmidt, 2005). Building a robust learning community will entail much more than engaging at the minimum level required by the leaders of an academic area. Ensuring that instructors are engaging authentically with each student, as opposed to just posting announcements, in my experience, can be an effective way to help an online learner feel connected to the instructor and to the institution.

*Synchronous Events*

One possible way to increase the depth of connection with students is through synchronous discussions. Recent research shows that 75% of undergraduate and 86% of graduate
students “were willing to log in for a synchronous discussion during their online coursework” (Clinefelter & Aslanian, 2015). This would lead one to believe that even though choice or circumstance may have led these students to select an online educational delivery format there remains a desire for connectivity and increased interaction. A second benefit of increased and intentional interaction by faculty with students is the opportunity to encourage “goal engagement” by the online learner. Students who actively work towards the attainment of a goal exhibit better performance in college and have been shown to have higher job and life satisfaction (Hamm, Chipperfield, Parker, & Heckhausen, 2018). The type of interaction proposed here may also help students persist when faced with obstacles as they strive to achieve academic milestones (Hamm et al., 2018).

According to the National Center for Education Studies (NCES) the six-year graduation rate (in 2016 for 2008 starting cohort) was approximately 60% for all four-year non-profit universities (NCES, 2017). These numbers include all undergraduate students who began their degree pursuit in 2010 (National average) and 2011 (LETU). Studies have shown that the six-year graduate rate for online learners is less than those in face to face courses (NCES, 2017). Although there are many reasons that an individual may not persist to degree completion that we have no control over, we can and must increase the level and quality of the interaction with students as we seek to encourage students to persist, elevate the richness of the online environments and ultimately raise graduation rates.
**Initiative Three**

**Increase the awareness and proficiency of online instructors in regard to the capability and functionality of our Learning Management System.**

Institutions should consider earmarking funds to increase the level, amount, and availability of training for online instructors on the use and functionality of their institutions’ Learning Management System (LMS). The LMS must be viewed as not only a means of delivering content and facilitating student assignment submissions but a venue for the instructor to create a social presence even in an online environment. The instructor who is successful at developing a “social presence” has the ability to project his or her personality into a course and create the sense that he/she is physically present (Kehrwald, 2010). I would suggest that for an instructor to be allowed to teach (or allowed to continue teaching) in the online environment he or she must not only be trained in the use and functions of the LMS but must prove this by completing an end of course (LMS training) assessment demonstrating knowledge and proficiency as part of an enhanced credentialing process. This should not only apply to those adjunct instructors but for regular faculty who are also teaching in the online environment. Each instructor must score high enough on this proficiency exam to be credentialed to teach in the online environment. Instructors would also need to engage in continued training throughout their careers in order that they are adept in the use of this LMS and stay abreast of new developments.

**Initiative Three – Rationale**

*LMS Functionality*

From the data that I have collected from an informal polling of my colleagues I have determined that many are not using the learning management system to anywhere near its
capacity or intended use. One of the instructors I spoke with states that she uses a forced completion protocol to ensure that her students do not move forward in a course prior to completing certain assignments. This is a great option to ensure that a student understands material that is critical to his or her overall success in a course. When I shared this option with another instructor he stated that he was not aware that we had the capability to do that. He went on to remark that if he knew that our LMS had this function he could have probably saved a few students from failures in past courses. Several other adjunct instructors that I conversed with were not aware that it was possible to do this or post video feedback for student assignment submissions. This is not a scientific study but does speak to the need to ensure that instructors are getting the most out of the tools at their disposal. Although there does not appear to be an LMS that can replicate or replace face to face interaction, the one that we use (Canvas) has capabilities that many of us are not taking advantage of.

Credentialing

I have discovered that the credentialing process for instructors from institutions that I have visited consists of not much more than ensuring that they have degrees conferred in the areas that they are teaching. I have also found through conversation and my own experience that the use of the LMS, in many cases, is limited to canned instruction videos posted within the system, unedited instructor posts in the unit overview area, and entering grades in the gradebook. I think that this strategy of increasing familiarity and use of the functions of our LMS is one that will need to be implemented over time and will involve several areas within the university. We will need to change how we look at our LMS, from that of a vehicle for educational product delivery to being just one component in the academy that connects students with staff, faculty, learning, and the university as a whole. The LMS can be used not just as a tool to educate but a
means to connect and retain students who can persist to degree completion. Ensuring that proficiency in the use of the learning management system is part of the credentialing process raises the possibility of consistency in content delivery and the quality of instructor feedback.

*Adjunct/Faculty Input*

There are several groups of individuals who teach in the online environment and the expectations and uses of various learning management systems might be quite different for each of these groups. Some universities have staff members teaching courses, full time faculty instructing online, and off-campus adjunct instructors. In a study involving these various types of instructors one outcome was that students taught by a non-tenured instructor in the online environment had a higher second-class failure rate than their counterparts (Ran, 2017). In reading this research one has to wonder if one of the variables might, in fact, be that the instructor who is not attached to the university has less access, familiarity, and interaction with those charged with teaching the intricacies of the learning management system. A second issue that bears looking into is the development of a method for online instructors to have input into, not only the development of the course material, but also on expectations and pedagogy, and selection and use of the LMS. A recent study on the perceived value of tool used for online delivery would suggest that faculty buy-in is important in order to get the most effective usage of any learning management system (Laverty et al., 2012).
**Initiative Four**

**Develop face to face meeting opportunities for our online learners to create community and the possibility of organic geographical cohorts.**

*Engagement Opportunities*

Online learners are sometimes in the same geographical area as the school where they are enrolled in courses. For example, the institution where I work has educational sites several other cites and this is not uncommon for many colleges and universities. In fact, we have hundreds of current and former students who are just a short drive to our education sites. Some of our online students are also traditional students studying in the classroom with other students but taking a course or two online. Many institutions have students who are states and even countries away pursuing a degree while serving in the military or functioning as a stay at home mom or dad. Here at LeTourneau University many of our online students in Spring 2018 resided in the state of Texas. Universities must expend resources to the leverage the power of student connectivity when there are large numbers of current and former distance learners living in a given geographical area. There are most likely other institutions that have pockets of students in particular geographical regions. We need to leverage this advantage by inviting those students to meet with school administrators, instructors, department chairs, and others from their university. The profile of the online learner is quite diverse and yet the online delivery can at times be deployed as a one size fits all educational delivery vehicle with little opportunity for authentic relationship. Colleges and universities should begin the process of developing face to face meeting opportunities which might include LMS introductory sessions, a light meal, and connecting students and staff across our main and satellite campuses.
Institutions can also host separate events where they invite a large number of students in a given geographical who are not close to one of our educational sites. These events need to coincide with the beginning of fall, spring, and summer semesters so that school personnel have the chance to interact with students as they begin their academic pursuit as well as those who might be further along in their educational journey. These gatherings need to function as more than just a meet and greet but have significant and meaningful content allowing the student to walk away knowing that they are a valued member of the school where they are taking courses online. These face to face meetings would also be a great time to connect students who live in close proximity to each other with the idea of creating and maintaining their own peer to peer support groups.

Organic Geographical Cohorts

Research shows that the learning process in both face to face and the online environment is enhanced by peer collaboration (Horspool and Lange, 2012). Institutions could develop, for these students living in close proximity to one another, a document outlining several peer collaboration strategies that highlight the benefits associated with peer support. The document would include the following:

- The number of students in their discipline in the same area
- A method for them to opt into (and out of) peer collaboration groups
- Suggestions for face to face group meetings
  - Local coffee shops or libraries
  - Periodic meetings at LETU sites
- Blog spaces housed within the LMS
• Separate FB page created by and for students specific to Schools
• Email chains with limited memberships

**Initiative Four – Rationale**

A number of years ago, I was that student enrolled in online courses interacting in a way that was quite foreign to me. My online educational experience began at a time when the university believed in and used the learning cohort model. Within the cohort model I was able to interact with a small group of likeminded individuals who helped to support each other while we all pursued our degrees. There were four members in my cohort and each now holds a position of increased authority and responsibility in our fields.

One of the many issues facing the adult online learner today, since many institutions do not use a cohort model, is not having that group to bond with (Stewart, 2014) to be that place of support as these students juggle family, careers, and an academic pursuit. I managed to become accustomed to the nuances of e-learning, but this is not everyone’s experience. I do not recall a time during my academic pursuit when I had the opportunity to meet some of those who served as my instructors nor do I recall any invitation to the campus other than when it was time for graduation. I believe that we could possibly lower the level of anxiety of some of our learners by introducing them to some of their instructors and even having a half day, “*this is what to expect when taking classes online*”, type of gathering. Students whose anxiety levels are lower may be able to focus more (this is the therapist in me speaking) on their course completion, academic success, and long-term goal attainment. What would it mean for students to be able to see their instructors as people as opposed to just someone on the other side of the computer posting grades, feedback, and possibly the occasional video? The events that schools could invite these students to (targeting but not limited to new online learners) could be designed as follows;
• A time to meet and greet with light refreshments
• Opening remarks delivered by high ranking university official
  o Maybe a VP of Global Operations or Global Dean
• Remarks by other administrators and instructors
• Introduction to an academic advisor (or several advisors)
  o Presentation of how to’s for online processes
• Recent graduate(s) sharing the following;
  o tips for success
  o unexpected hurdles
  o dealing with family, stress, time management
• Giveaways from the school with school logo – Pens pads, etc.
• Instructional designer (or someone well versed in the LMS) providing an overview
• Response to FAQ’s (submitted prior to these gatherings)
• Questions from students

Initiative Five

Increase opportunities and type of interactions, while enhancing the quality, between online learners and their Academic Advisors.

We are all well aware that the average distance learner is not someone who graduated from high school in the previous semester. In fact, many online learners are full-time employees with spouses and children to consider when thinning about furthering their education. There are also single mothers and single fathers, grandparents raising children, and individuals with
financial and health issues who are distance learners. According to U.S. News, as of April 2017, 84% of today’s online bachelor’s students are employed. This information does not even begin to adequately describe our students or the students from other institutions, as we know that some of them are working more than one job while caring for an elderly family member; some are experiencing emotional and relational hardships; and there are students dealing with career issues all while attempting to pursue a college degree. From his seminal research in 2006, Vincent Tinto would conclude that online course offerings were growing but the dropout rate was considerably higher than that of face to face courses (Lee, E, Pate, J, & Cozart, D, 2015). This dropout rate not only causes hardships for the online learners but can affect the survivability of post-secondary institutions. Learners who drop out of classes, only to restart at a later date take longer to reach degree completion which can make the attainment of the degree much costlier (Bidjerano & Shea, 2016). It is not a stretch to conclude that there are probably a number of former college students who have dropped out after weighing the costs and benefits of continuing their education against future earnings based on degree completion.

Strength Based Advising

As stated above, the typical online student did not recently graduate high school and many of them need additional academic and/or emotional support. Older students come into college having experienced success and failures in life which could possibly impact how they perform as students. One concept that could be helpful for these students is ensuring that academic advisors are skilled in using strength based academic advising approaches. This approach came from the
research of Shreiner and Anderson (2005) with additional research demonstrating its efficacy in the decade to follow (Laumer, Marttinen, Morrow & Soria, 2017). These researchers have explored the outcomes for students and advisors when the interactions between the two go beyond course selection assistance and sending reminders of important dates. They hypothesized that advisors using this approach would help students to be motivated and engage at a higher level (Laumer et al., 2017). It stands to reason that for online learners, conversations and emails with their advisors may be the most intimacy that they will have with anyone in the university. Interaction with advisors would be the most obvious and maybe the only place to impact how a student sees themselves in relation to academia and whether or not they feel there is a reasonable chance for success. The results of this aforementioned study (Laumer et al., 2017) revealed that students who had ongoing conversations about their strengths with their advisors were more likely to graduate. One of the advisors interviewed for the study claimed that it allowed for the student to view the advising relationship as a partnership towards their goal attainment.

Advising System

A second component that will be crucial in achieving the goals of this initiative is the investment in an advising system. As the face of the university and the one voice that an online student will hear most over their time at the school it is essential that advisors have easy access to all student and pertinent university information. As of today, many advisors (and other university personnel) are asked to input and access information in a number of places. This differs from one school to another, but some examples are listed here.

- Degree audit tracking system
• Student Data Tool – Student account information
• Separate system for Student interactions
• A system that tracks student contact information and Changes
• Saved emails – Interactions with and concerning students
• Saved Screen Shots
• Saved Texts
• Separate system that tracks suspensions and other academic status changes

When an advisor needs to access an old email she or he will need to look in a separate place than if they were looking for a degree audit or saved course substitution request. Should an advisor need to enter a note about a student complaint they will need to enter it into the system but will keep the original email for future reference. A robust advising system would allow anyone with certain permissions to access information that they have a need to see. Imagine a system that would allow a narrative to be created for each student from acceptance through to degree completion. Advisors should be able to log into one system to retrieve or enter data relating to any of the students that they advise. This system would cut down on the time it takes to locate, store, manipulate, or retrieve data allowing more time for more frequent and authentic interactions with their students. A state of the art advising platform would allow for the following:

• Alerts to be automatically raised about student academic issues
• Advisors and instructors can receive automated texts/emails
• Advisors can schedule appointments through the advising system
• Predictive analytics can help identify at risk students
• A narrative is developed for each student from the point of acceptance to graduation
• Stakeholders will have access to all pertinent student information
• Advisors/instructors able to commend student for performance

**Interactions**

A third component designed to increase the quality, number, and type of interactions between online learners and their Academic Advisors is to create opportunities for face to face interaction. It is common knowledge that many online doctoral programs have built-in residency requirements. This time on campus allows students to interact with various staff and faculty and to get to know their advisor or mentor better. There are a number of ways that one could design opportunities for advisors to interact with their advisees since there is no on-campus requirement in most online programs. As institutions who adopt this approach begin planning events for online students to attend at each of their sites, leaders need to ensure that there are opportunities for advisors to be present. In our own programs and programs at other institutions students sometimes report anxiety over “what they perceive as low levels of interaction or assistance…” (Exter, Kormaz & Boling, 2014). We can also take this a step further by holding school specific workshops or gatherings periodically facilitated by the advisor in conjunction with adjunct(s) currently teaching in the programs being supported by these advisors.
Initiative Five – Rationale

The rationale for increasing the opportunities and type of interactions, while enhancing their quality, between online learners and their Academic Advisors is quite simple. The structure of communication between the university and the online student has the advisor serving as the main point of contact during a student’s academic career. In our own system online students tend to reach out to advisors for everything from assistance with course scheduling to complaining about the nature of an online assignment or to praise an instructor. Since our courses are delivered online and much of the interaction with the advisor is via email or telephone, this relationship can become impersonal unless steps are taken to facilitate different avenues and methods of communication. A study by Baker, et al. (2016) mentions the possibility of developing peer to peer relationships, however, their research would show that connectivity to advisors and instructors is deemed more important to online learners than connecting with other students. Although we may be tempted to deduce that students have opted for the online environment because they do not desire human interaction, the research would suggest the opposite. As stated earlier, there are a number of reasons that a student would choose the online environment including, but not limited to, lower cost per course, flexible study and assignment completion scheduling, and distance from the university to name a few. We know that dropout rates of online students are a difficult challenge for post-secondary institutions (Lee & Choi, 2011), so one of the ways that we might address this is to ensure that we are connected to these students more fully by creating authentic relationships that move beyond the computer keyboard and the telephone.
**Initiative Six**

**Provide adequate academic and career guidance support.**

*Academic Support*

We know that it can be difficult to adequately intervene with a distant learner who elects to only engage at a minimal level. Although the university I work for and other higher education institutions offer academic support, it may at times be difficult to encourage students to utilize the resources available. In a 2017 paper on academic support for online learners many components are discussed that may aid student’s perception and adoption of the use of academic resources (Rennar-Potacco, Orellana, & Salazar, 2017). This research discussed the various ways to deliver academic support to students, but also discussed a unique method to drive students towards the help available. This study refers to a “coupon incentive program” as a means of motivating students to seek academic support. This might be an initiative worth investigating since we, as instructors, know that many times a student will either not reach out for help or ask for help when it is too far into a course for them to find success. By incentivizing the student with credits for engaging with student support personnel or outsourced tutoring vendor it might be possible to get the students accustomed to using the support that is being offered. The credits earned by a student could be used to add points to an interactive assessment within a predetermined set of courses. This incentive program could be used early in the student’s academic career as a means to introduce and familiarize him or her to the efficacy of tutoring and then eliminate the incentive after the first or second semester, as hopefully the student would be seeking support on their own or has become proficient in their academics and no longer requires assistance.
Career Guidance

In a quick survey of university websites, it would appear that much of the career service offerings are designed primarily for residential students. These students can receive help crafting resumes, set appointments for face to face meetings with a career advising specialist, and attend career fairs hosted by the school that they attend. Although the staff in career service offices for traditional students will respond to distance learners, and they do have access to the web tools, online students cannot get the same level of service that an on-ground student would receive. For most distance learners there is not an opportunity for walk-in service, they are often times too far away to attend the career fairs, and the staff of the career services office is generally limited. In a 2017 report on distance learning it was reported that as of Fall 2015 there were 6 million students taking at least one course online (Allen & Seaman, 2015). Noel Levitz’s 2014 -15 report on online learners shows that 78% find career services important yet only 65% were satisfied with the services offered. Although one could deduce that at 78% this does not seem to be an area of great importance, I would argue that conclusion by offering that the population of online learners are mostly already employed so the fact that 78% are still interested in career service could actually be viewed as a relatively high percentage. There are several models a school could opt to use in the delivery of career services. Academic Advisors could be certified in this area providing their advisee load was kept at a level that would make this feasible. Since delivering career advice and guidance would ultimately consume more of an Advisors time it would be crucial to monitor their work load in order that they might be able to spend adequate time with students as they seek this new service. A second option would be to train those who are already charged with providing academic support as this would certainly be seen as a new level of service that would support students’ academic and vocational goals. Still, a third option would be
to hire someone specifically for this area and possibly give this individual other responsibilities until the workload required a full-time focus.

**Initiative Six—Rationale**

*Academic Support*

As discussed earlier in this paper, a lack of college readiness is one of the reasons that many new students fail to persist towards degree completion. Knowing that we will be instructing and advising many students who are ill prepared for the rigors of post-secondary academic programs must guide us to encourage these students to seek support in our efforts to facilitate early success, thereby raising hopes of degree completion. For our online learners, early success may encourage self-efficacy and self-regulation (Bradley, Browne & Kelley, 2017) which can serve to elevate a student’s belief in their ability to be successful. Increasing the use of online tutoring and other academic resources has been challenging despite our attempts to encourage our students to use these services employing various strategies. The institution where I teach reaches out to students using social media, publishes an in-house electronic newsletter, has advisors that encourage the use of academic resources, and yet some of the very students that need the academic support still fail to avail themselves of it. We also utilize an early alert system, whereby instructors can report low performing/engaging students whose advisors can then follow up with. The academic advisors are well-versed in what is offered in the support center and in our online tutoring and have relationships with many students and yet some still fail to persist. The coupon incentive program may be a creative way to engage students early with the hopes that they will become accustomed to and remain engaged during their academic career.

*Career Guidance*
Career advising and mentoring in the university where I work is also an area where there is room to expand service to online students. In a Fall of 2017 Priority Survey of Online Learners (PSOL) administered at LeTourneau university one of the questions referred to the importance of career advising. Over 90% of the responders indicated this to be an important educational component, while only 74% of those responding reported satisfaction in this area. These numbers are not unlike the larger survey referred to earlier in this document. These numbers indicate that our students, and students across other institutions, are interested in determining how the education they are receiving might impact them from a vocational perspective. Many of today’s online learners are using LinkedIn, email, job forecasting and job search sites to assist in reaching goals associated with their academic pursuit and their lives. Institutions would better serve their students by creating a robust career advising presence that would serve as the hub for information linking these students’ academic pursuit to real-life goal attainment. Research would suggest that this is not a cost prohibitive initiative as there are national organizations that teach and certify career advisors.

**Conclusion**

This is an overview of a comprehensive student retention model and is not intended to cover every aspect of a complete strategic online student retention plan. There are many details that would need to be worked out in order that an institution might construct a fully functioning retention and support model from a holistic approach to adequately serve the online learner, thus leading to outcomes that could positively impact retention. Most of the initiatives discussed in this draft are not inherently expensive undertakings but must have the support of upper level administration and involve offices across an entire college or university system. This new way of
thinking has the potential of having a huge impact on retention, lowering the attrition rate of students, and ultimately attracting more students who would benefit from the type of support and engagement outlined in this document and showcased as part of a school’s comprehensive student support system. Applicants today are savvy shoppers and might in fact be inclined to select a school knowing that there was a structure in place to support their success and entry into the workplace, for younger students, and job transition for working adults. The landscape of e-delivery of educational content and the profile of online learners has and continues to change and the Academy must change with it in order to keep pace. There was a time when only a few institutions offered content in a virtual environment, but that is not the case today as most universities have an online component. In order to remain viable in a crowded marketplace, while continuing to offer programs whose outcomes lead too well-educated, market prepared individuals who are ready to engage in the workplace, we must continue to rediscover what works for the students that we are educating at any given point in time.

I have given a brief overview of a number of areas that need to be enhanced and others where new service needs to be initiated. One of the areas I left out was the idea of enhancing services offered to students with disabilities, this too can be addressed within the area of student support. I have discussed early student readiness assessment, increased instructor capability and interaction, and face to face meeting opportunities between academic advisors and online learners. I have also attempted to bring attention to the importance of leveraging already existing technology to increase instructor online social presence and facilitate increased interaction between students and educators. Finally, this document addresses the need to formally delve into the career guidance area by training our support staff, our Advisors, or hiring someone to adequately provide career advice and mentoring. There are many initiatives being discussed and
employed throughout the academy designed to address the needs of a growing and diverse population of online learners. Although no institution is equipped or staffed to undertake every strategy that is available, it is imperative that well developed initiatives with stated outcomes be employed to achieve maximum results in the areas of attracting and ultimately retaining students. Each initiative outlined in this plan will need to be analyzed from a cost/benefit perspective, have objectives and implementation steps added with outcomes assigned to every initiative. Finally, ongoing assessments will need to be developed to understand the efficacy of this plan and design future initiatives and/or alterations to current work as the online environment dictates.

*Note: most of the research used in support of this plan was completed between 2014 and 2018. This was intentional as I wanted to use recent data to construct this comprehensive retention initiative.*
References


Baker, M., Chiasson, K., Mahar, P., Schroeder, S., & Terras, K. (2016). Students’ Desired and Experienced Levels of Connectivity to an Asynchronous, Online, Distance Degree Program. Online Learning 20 (3) 244 - 263.


Online Support in High-Risk STEM Courses. Quarterly Review Of Distance Education, 18(3), 1-17.


TITLE: Is the New J6Case Study Design Efficient and Effective? What Teachers Say

PAPER SESSION: Teacher Education

2-3 SENTENCES: When teaching adults, we know that engagement, authenticity and relevancy are essential factors to andragogical learners. Meaningful interactions encourage effective outcomes. While the case study approach includes these motivational factors, the deconstruction of traditional cases have been too time-consuming in an already overfilled teacher education course or PD session. A more time efficient and effective model needs to be created. Thus, welcome to the J6Case Design!

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ABSTRACT:
Is the J6Case Study Design Efficient and Effective? What Teachers Say
Seminal theories such as Albert Bandura’s “Self-efficacy Theory”, Lev Vygotsky’s “Social Development Theory” and Malcom Knowles’ “Adult Learning Theory.” report research findings that andragogical learners, including educators, identify with specific learning approach preferences: adults appreciate learning environments that provide opportunities to share experiences with colleagues. Educators like to give advice and voice their opinions based on classroom experiences as well as research from journals and educational newsletters. Adults are goal-oriented and value end results. Most importantly, educators are pragmatic problem-solvers. So, what better approach than authentic and relevant case studies that educators can both deconstruct, and construct, if they would like? One reason for the lack of case studies in classrooms is the time factor. Syllabi and PD plans are jam-packed with objective requirements. More courses seem to pack-in more objectives, so time is sparingly parsed. As a result, traditional time intensive cases studies are not a favored – or practical – approach, but should be.

Thus, an essential reason for the more streamlined J6Case Design is to provide an efficient and effective framework for collaborative discussions. Adapted from the question-focused framework used by journalists with their 5 W’s [who, what, when where, why] and H [how]. educators can apply the journalistic approach to case studies. Similarly, both journalists and educators need to identify and collect facts and report what they have discovered. Questions including the following ones need to be answered: What happened or what was the issue in a particular event or situation? Who was involved? When and where did the event or situation take place? How and why did the event or situation occur? So, we are following the traditional journalistic five W’s and one H; however, unlike journalists, educators of case studies, need to not simply report the facts as objectively as possible; instead, educators need to analyze and interpret through their various cultural lenses, the facts they have collected in order to identify and resolve an authentic dilemma within a collaborative context.
Case studies, for educators, have a much more valuable goal beyond the solution as an end-product identified by the six journalistic questions; case studies are the centerpiece for dynamic discussions that are enriched through the multiple, diverse perspectives that occur during the collaborative process. Furthermore, this simple framework can be used to construct educator-personally-experienced dilemmas as well as the more traditional deconstructed prewritten cases in a more efficient and effective manner. Thus, a case studies approach illustrates that the process is as equally important as the end-product. And the traditionally lengthy case process can become more targeted and less time-consuming, but as rewarding to all involved in the J6Case Design.

This author created and piloted J6Case Design in four 2018 teacher education courses with preservice and inservice teachers to test the efficiency and practicality of the J6Case Design. This current HICE presentation will introduce the design to a larger audience and share the results of an assessment conducted through a data collection and analysis to reveal the Design's effectiveness. So, in this conference session not only will the efficiency and practicality of the J6Case Design be presented but also a value-added assessment by the educators who used the J6Case Model for the first time.
1. Title of the submission:
Development of Effective Teaching Methods and Materials for Q & A sessions in Academic Presentations Based on the Needs of Non-native English-speaking Scientists

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6. Abstract:
Conducting an effective academic presentation in English is an essential skill for scientists. However, it is a particularly challenging task for non-native English-speaking scientists, especially novice members. In addition to paper sessions, interactions at Q & A sessions are full of challenges. With the features of spontaneous conversation, they pose great challenges such as handling unpredictable questions, confrontational questions, and dealing with comments that point out flaws in the research. In spite of these difficulties, little research has been done on Q & A sessions. Accordingly, training programs to improve skills for Q & A sessions are scarce even though they are urgently needed. In response to these circumstances, this study aims to develop effective teaching methodologies and materials based on the genre knowledge to improve skills for Q & A sessions in English that meet the needs of non-native English-speaking scientists. The data for this study was collected through a focus group interview with seven non-native English-speaking scientists at a prestigious scientific institute in Japan and analyzed using the modified grounded theory approach to identify their needs and problems when handling Q & A sessions. From the results of the analysis, four stage-based targets were identified as necessary skills to effectively handle Q & A sessions. The targets consist of being able “to understand questions”, “to answer questions”, “to persuade a questioner”, and “develop Q & A sessions that spark a fruitful discussion”. The analysis also revealed what problems non-native English-speaking scientists tend to face in Q & A sessions. These problems contain both language issues and non-language issues, such as cultural and research area differences. The author considers effective teaching methodologies and materials for Q and A sessions to assist non-native English-speaking scientists in achieving the four stage-based targets identified in the analysis. How to apply these teaching methodologies in classroom teaching for students in universities is also discussed.
Abstract

To provide the optimal environment for learning, student engagement involves more than things students do. It involves ways in which we respect who they are and what they bring to the classroom. On the observational level, student engagement is behavioral - the most basic element of student engagement which involves things students do such as taking notes, participating in discussions, attending class regularly, and being prepared for class. On the intellectual level, student engagement is cognitive which involves things students do to demonstrate mastery of content such as active discussions, labs, written assignments, and assessments. On the emotional level of student engagement, there is respecting students’ values and interests. To respect student values and interests, embrace diversity and culture in the classroom. Students should find value in the course by connecting what is being learned to their lives in some relevant way. To make valuable connections, learn who students are and what they bring to the classroom, reflect on who we are and what we bring to the classroom, and explore content in ways that can be directly applied and understood in the context of students’ real life situations and backgrounds. Students
do not arrive to classrooms as blank slates. They bring with them many years of cultural norms, generational diversity, different preferences for processing information, varying backgrounds, interests, dislikes, habits, linguistic diversity, community experiences, fashion, family structures, expectations, and so much more. Culturally responsive teaching, which address achievement gaps, involves using students’ culture as an integral part of making connections with content. In culturally responsive teaching, areas to explore are teacher awareness of self and others, how students learn, equitable practices, and rapport in the environment. Ways to be inclusive of and responsive to culture will be addressed such as acknowledge differences, be motivated to be inclusive, go beyond one’s own culture, preferences, assumptions, and biases to create and maintain an environment that respects diversity. Everyone in the classroom, no matter what they look like or how they appear, is different in some unique way. Teachers and students come from different backgrounds, geographic locations, and experiences. Differences are what make classrooms rich for learning. Gone are the days, when students have to rely on teachers and textbooks as the sole source of information in the classroom. With increased access to technology and the proliferation of information conveniently and instantaneously available online, students will need more than lecture about content and definitions provided in textbooks. Connection to the content in relevant and more personalized ways is a productive way to actively engage our current students and prepare them to be innovators and change-agents in a globalized society.
Title: Building Family Science Professionals: Towards a Reflexive Process Through Student’s Development of a Philosophy Statement

Abstract: Students, professors, researchers, and practitioners in the field of family studies have struggled to form a cohesive professional identity. Because of the diversity of names within family science departments across universities (i.e. Family Ecology, Family and Child Studies, Human Development and Family Studies, Family and Consumer Sciences), as well as the multiple disciplines that converge in the study of families (i.e. Psychology, Counseling, Human and Child Development, Sociology, Education), students in this field may have various conceptualizations of this work. Students have a variety of interests when they decide to pursue a degree in family science and through the process of developing a professional philosophy statement, they are guided through reflection and critical self-inquiry around skillsets, beliefs, and values. Such reflexivity may not only serve to orient them toward a specific professional career (i.e., therapy, research, education, policy, administration), but may also help them identify within that career as they grow professionally. This poster explores the potential for undergraduate students’ professional development through the use of a philosophy statement process. Adapted from the educator preparation literature, a philosophy statement may be one way for family science professionals to develop a foundation to practice, and an orientation to one’s own specific practice within their specific career context. We argue the application of developing one’s philosophy statement for family studies undergraduate students to develop professional identity and practice.

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Proposal for Hawaii International Conference on Education

An examination of American and British teachers and their perception regarding preservice training on gender equity and bullying/cyber-bullying awareness.

Submitted by Sherrie Carinci, Ed.D
Professor, California State University, Sacramento

Our country’s future educators are being trained in classroom management techniques, developing teaching strategies, and understanding the pedagogical style that will work best in the classroom. Though there is minimal research on the subject, it is this scholar’s opinion that educators are not entering the classroom prepared to teach using gender equitable teaching approaches (Carinci, 2009; Olivieri, 2011, United Nations Educational, Scientific and Cultural Organization, 2015). Gender inequities still exist in today’s classroom in teacher’s interaction patterns with students, lack of females represented in school curriculum, and issues of harassment and bullying affecting students on school campuses. The UNESCO 2015 Report states “Moving forward towards gender equality is to address gender issues in the educational process, and more specifically, to mainstream gender in teacher training and Teacher Education” (p 28). Educators need to recognize that the discussion of gender, both female and male, and the subject of bullying/cyber-bullying needs to be paramount when training future teachers.

Research suggests that nominal training is being offered to Kindergarten through twelfth grade educators on gender equitable teaching approaches and most teachers are not aware nor have the training on the importance of gender inclusion methodologies and its impact on the learner (Carinci, 2009; Sanders, 2002, UNESCO, 2015). Due to the lack of training on equitable approaches, educators are not prepared to make the needed changes in methods of assessments, curricula choices, interaction patterns, or teaching strategies that would foster a gender equitable learning environment (Sadker, D., & Silber, E. S., 2007). Although there is a
lack of extensive case law in the area of bullying and cyber-bullying, many districts have taken it upon themselves to take responsibility for monitoring, preventing, and disciplining cyber-bullying situations among their student populations (Willard, 2007). However, few teachers are trained in how to prevent and address cyber bullying in their classroom and schools.

This study examined American and British kindergarten through 12th grade educators and their perception on the amount of preservice and on school site training they received on the topics of gender equity and bullying/cyber-bullying. The study was conducted in spring 2018 and included 49 teachers from Northern California and 31 teachers from London, England.

**Preservice Training on Gender Equity**

An equitable classroom is a community of collaborative learners who are able to freely express their voice, are present in the curriculum, and are provided various assessment strategies (Olivieri, 2011). Teachers should be aware of their students’ academic needs and conscious of gender bias, actively working to prevent it by implementing gender equitable teaching approaches. It is vital that gender equity training be offered to educators throughout the academic system, in order to meet state teachers’ training standards. The California Commission on Teacher Credentialing (CTC) standards adopted September, 2001 states:

**Standard 5 – Equity, Diversity and Access to the Core Curriculum**

5(d) The program provides ongoing opportunities for each candidate to systematically examine his/her stated and implied beliefs, attitudes and expectations related to gender, and to apply pedagogical practices that create gender-fair learning environments.

Though the CTC Standards (2002) acknowledges for the first time the need to train preservice teachers on the issue of gender fair teaching practices, other studies conclude minimal training is being offered to preservice teachers (Kuruvilla, 2014).
Research indicates that when teachers are given instruction on equity issues, the material usually focused on stereotypes, interaction patterns, and the under-representation of females in math and science curriculum (AAUW, 1999). What is absent from teacher training are practical solutions to gender bias and methods to make the classroom more equitable (AAUW, 1999; Campbell & Sanders, 1997; Sanders, 2002). The lack of attention or absence of gender equity training being provided at all levels of education to faculty, indicates there is a need for the topic to be addressed in preservice teacher preparation programs.

Preservice training on Bullying/Cyber-bullying

Educators teaching in the kindergarten to 12th grade levels have many lofty goals and objectives for their students. One such mission is to guide our students in their social and emotion development and focus on the common core curriculum objectives, while engaging our students to be innovative thinkers and agents of social change (Carinci & Wong, 2009; Pierce, 2003). Our current school system helps our teachers gain an understanding of issues related to curriculum and the importance of students learning, yet other factors are hindering student success. Though there are numerous social issues which are affecting students learning, cyber-bullying has become a widespread problem among our student population and has entered into the school environment.

Many states are passing anti-bullying legislation that their schools must comply with due to a recent increase teen suicide rates and numerous high-profile incidents of bullying ending in tragedy (Breguet, 2007). The state of California acknowledges the serious problem of bullying in our schools by implementing California’s Education Code Section 35294.2, subdivision (g) (2001) which states:
The State Department of Education shall develop model policies on the prevention of bullying and on conflict resolution and make the model policies available to school districts. A school district may adopt one or both of these policies for incorporation into its school safety plan.

The California Education Code on bullying indicates that California’s school districts are not officially obliged to take decisive steps toward combating bullying in their schools. The approval and implementation of bullying prevention policies by California’s school districts is entirely voluntary. Yet, teachers are faced with dealing with bullying and cyber bullying on a daily basis but do not have the skills or training to address this serious issue which is directly affecting their students. Due to budget cuts, many schools cannot afford to hire an expert in the area of bullying and cyber bullying to provide training and resources for their teachers. Many schools, especially low- income and Title 1 schools, go without any support on how to deal with bullying and cyber bullying between students in their schools.

“Cyber-bullying is a completely new form of bullying, made possible by our youth culture’s preoccupation and expertise with computer technology (and other forms of technology as well)” (Anderson, 2012 p 40). Cyber-bullying is defined by Hinduja and Patchin (2009) as “willful and repeated harm inflicted through the use of computers, cell phones, and other electronic devices” (p. 5). Unfortunately, cyber-bullying has extended the scope of harassment to students who would most likely be a traditional schoolyard bullying, yet are namelessness and faceless due to the Internet. The increased use of technology and anonymous sharing (and criticism) among today’s students, and the largely unidentified nature of the Internet “create[s] a volatile combination” that has taken bullying to a whole new (dangerous) level -- cyber-bullying (Hinduja & Patchin, 2009, p. 15).
Garrett (2003) reports, “Bullying generally begins in the elementary grades, peaks in the sixth through the eighth grades, and persists into high school” (p. 11). Few schools in our country are not dealing with issues of bullying in one form or another. Bullying is particularly pervasive during the middle school years, however few teachers have received training in preservice preparation programs or on site at their schools on how to deal with this problem in the school setting (Anderson, 2012).

It is assumed preservice teacher training programs are providing skills and techniques for future teachers on the topics of gender equitable practices and bullying/cyber-bullying awareness. This study examined, when and if, teachers in their preservice preparation received any amount of training on these topics.

Benefits of Research

One goal of this study was to provide data which indicates whether teachers are receiving training on gender equitable teaching approaches and bullying/cyber-bullying. The second intent of this study was to examine the difference in the amount and quality of instruction on these topics between American and British educators. The data collected in this study adds to the body of research on teacher preparation programs and their emphasis, or lack thereof, on gender inclusions strategies and bullying and cyber-bullying awareness.

Methodology

The teachers who participated in this study were distinct in terms of gender and education levels. The data in Table 1 – 3 provides an overview of the participant’s country, gender, and education level.
The American teachers in this study were from various schools in Northern California ranging from elementary to high school grade levels. The British teachers who participate in the study were from one school in London, England that serves students from 7\textsuperscript{th} to 12\textsuperscript{th} grade.

\textit{Data Findings}

A survey using quantitative and qualitative methodology was designed for the data collection for this study. Seventeen Likert scale questions were included in the survey with fourteen opened ended questions. The t-test for Equality of Means was used to determine which questions indicated statically significance between American and British educator’s responses. Group analysis of mean scores were also examined for questions that indicated similar responses that were noteworthy of this research. Though several opened ended questions were asked, the research only included five of the questions which focused on gender equity training and
bullying-cyber bullying awareness. Using the snowball sampling, participants were enlisted to participate in the study based on word of mouth, knowing someone who is currently a teacher and requested they participate in the study (Creswell, 2015). Qualitative responses were examined using a thematic analysis approach, noting themes in teachers open ended responses (Babbie, 2017).

Data analysis

Using t-test for Equality of Means determined the following questions indicated statistically significant difference in responses between the American and British teachers:

1. There is a correlation between one’s gender and their choice of career.

<table>
<thead>
<tr>
<th>There is a correlation between one's gender and their choice of career.</th>
<th>Equal variances assumed</th>
<th>77</th>
<th>.004</th>
<th>-.572</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal variances not assumed</td>
<td>73.745</td>
<td>.002</td>
<td>-.572</td>
<td></td>
</tr>
</tbody>
</table>

The British teachers responded at a higher level with a mean of 3.97 compared to American teachers’ mean of 3.40. British teachers’ responses indicate that more teachers in this group believed there was higher correlation between one’s gender and their career choice.

2. Teachers treat males and females the same in the classroom.

<table>
<thead>
<tr>
<th>Teachers treat males and females the same in the classroom.</th>
<th>Equal variances assumed</th>
<th>77</th>
<th>.043</th>
<th>-.482</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal variances not assumed</td>
<td>57.092</td>
<td>.049</td>
<td>-.482</td>
<td></td>
</tr>
</tbody>
</table>

American teachers had a lower level response, mean 2.92, as compared to British teachers’ responses showing a mean of 3.40. British teachers’ responses indicated that more teachers in this group thought teachers treated males and females equally in the classroom.
3. My school site provides ongoing training on issues dealing with cyber-bullying.

<table>
<thead>
<tr>
<th>My school site provides ongoing training on issues dealing with cyberbullying.</th>
<th>Equal variances assumed</th>
<th>77</th>
<th>.000</th>
<th>-1.134</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal variances not assumed</td>
<td>76.829</td>
<td>.000</td>
<td>-1.134</td>
<td></td>
</tr>
</tbody>
</table>

British teachers responded at a higher level with a mean of 3.61 compared to American teachers’ mean of 2.48. The British teachers’ responses indicated that teachers in this study received more training in their school site on the subject of cyber-bullying. American teachers scored significantly lower in on this question.

**Mean Scores Analysis**

**Group Statistics**

<table>
<thead>
<tr>
<th></th>
<th>Country of Respondent</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender bias exists in classrooms today.</td>
<td>United States</td>
<td>49</td>
<td>3.29</td>
<td>.913</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
<td>31</td>
<td>3.55</td>
<td>.961</td>
</tr>
<tr>
<td>Teachers need gender equity training.</td>
<td>United States</td>
<td>49</td>
<td>3.39</td>
<td>1.017</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
<td>31</td>
<td>3.61</td>
<td>1.086</td>
</tr>
<tr>
<td>Current classroom curriculum is equitable for both genders.</td>
<td>United States</td>
<td>48</td>
<td>3.42</td>
<td>.919</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
<td>31</td>
<td>3.55</td>
<td>.850</td>
</tr>
<tr>
<td>There is a correlation between one's gender and their choice of career.</td>
<td>United States</td>
<td>48</td>
<td>3.40</td>
<td>.893</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
<td>31</td>
<td>3.97</td>
<td>.706</td>
</tr>
<tr>
<td>Children's gender roles are influenced by parents.</td>
<td>United States</td>
<td>48</td>
<td>4.33</td>
<td>.883</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
<td>30</td>
<td>4.37</td>
<td>.809</td>
</tr>
<tr>
<td>Children's gender roles are influenced by peers.</td>
<td>United States</td>
<td>48</td>
<td>4.13</td>
<td>.959</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
<td>30</td>
<td>4.27</td>
<td>.868</td>
</tr>
<tr>
<td>Children's gender roles are influenced by teachers.</td>
<td>United States</td>
<td>48</td>
<td>3.65</td>
<td>.887</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
<td>30</td>
<td>3.23</td>
<td>1.104</td>
</tr>
</tbody>
</table>
Parent's raise children differently according to their gender.  

<table>
<thead>
<tr>
<th>Country</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>3.98</td>
<td>.692</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3.90</td>
<td>.746</td>
</tr>
</tbody>
</table>

Teachers treat males and females the same in the classroom.  

<table>
<thead>
<tr>
<th>Country</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>2.92</td>
<td>.975</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3.40</td>
<td>1.070</td>
</tr>
</tbody>
</table>

Exposure in early education of positive gender role models impacts future life choices.  

<table>
<thead>
<tr>
<th>Country</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>4.06</td>
<td>.747</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>4.32</td>
<td>.653</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>4.9</td>
<td>.975</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3.0</td>
<td>1.070</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>2.91</td>
<td>.686</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2.94</td>
<td>.814</td>
</tr>
</tbody>
</table>

When analyzing the mean scores for American and British responses the following questions scored in the lower level (mean 3.0 or lower) for both groups:

I received gender equity training in my pre-service teacher training

<table>
<thead>
<tr>
<th>Country</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>2.38</td>
<td>1.178</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1.94</td>
<td>.998</td>
</tr>
</tbody>
</table>

Student bullying is an issue at my school site.

<table>
<thead>
<tr>
<th>Country</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>3.55</td>
<td>.959</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3.45</td>
<td>1.028</td>
</tr>
</tbody>
</table>

My school site provides ongoing training on bullying prevention.

<table>
<thead>
<tr>
<th>Country</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>3.04</td>
<td>1.224</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3.48</td>
<td>.811</td>
</tr>
</tbody>
</table>

My school site provides ongoing training on gender equitable teaching strategies.

<table>
<thead>
<tr>
<th>Country</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>2.17</td>
<td>.834</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2.48</td>
<td>.851</td>
</tr>
</tbody>
</table>

My school site provides ongoing training on issues dealing with cyberbullying.

<table>
<thead>
<tr>
<th>Country</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>2.48</td>
<td>1.091</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3.61</td>
<td>.667</td>
</tr>
</tbody>
</table>

I received training on how to deal with bullying during my pre-service teacher training.

<table>
<thead>
<tr>
<th>Country</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>2.58</td>
<td>1.217</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2.97</td>
<td>1.048</td>
</tr>
</tbody>
</table>

Please rate your knowledge of equitable teaching practices.

<table>
<thead>
<tr>
<th>Country</th>
<th>Mean</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>2.91</td>
<td>.686</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2.94</td>
<td>.814</td>
</tr>
</tbody>
</table>
My school site provides ongoing training on gender equitable teaching strategies.

American mean 2.17  
British mean 2.48

I received training on how to deal with bullying during my pre-service teacher training.

American mean 2.58  
British mean 2.97

Please rate your knowledge of gender equitable teaching practices.

American mean 2.91  
British mean 2.94

Though these responses that had no statistical significance when comparing groups, both American and British teachers indicated a low level average mean (lower than mean of 3.0).

Three of the four questions with low mean scores focused on teachers preservice and school site gender equity training and knowledge. These scores indicate that both groups received very little gender equity training in their pre-service teacher preparation and on site school training.

Another question with a low level mean scores indicated that both groups in the study did not receive large amounts of training on bullying during their pre-service teacher preparation.

The question which score lowest level mean was “I received gender equity training in my pre-service teacher training” with American teachers mean score of 2.38 and British teachers had an even lower level mean score of 1.94. This question received the lowest mean score (British 1.94) out of all questions asked in the survey.

Open ended survey responses

Using thematic analysis in reviewing teachers open ended comments, the British and American teacher’s comments were similar to the quantitative data results. When teachers were asked “What type of training, if any, would you like to receive to help be a better educator and service provider for your students?” the most common response from British educators was to
receive more training on gender equity strategies. Though some American teachers did note wanting more gender equity training, the most common response from American teachers was to obtain skills to deal with bullying and technology. American teachers did note needing gender equity training but not as common as a response when compared to British teachers comments. When comparing open ended responses from both, American and British teachers, it appears that the British teachers received ongoing and in-depth training on bullying issues which impact their students. The data indicates that British teachers have received bullying awareness training at their school site and not during their pre-service training.

Conclusion

The findings of the data concluded that the discussion of gender issues and gender equity awareness is missing from both American and British preservice and school site teacher training. The findings for teacher training on issues of bullying and cyber-bullying was more positive but is not occurring during preservice teacher training but is happening more often at the teachers school sites.

Research suggests that teacher behaviors is largely influenced by how teachers themselves were taught (UNESCO, 2015). The lack of training to our future educators on gender equity or bullying awareness indicates that teachers are not coming into the profession of teaching prepared to address issues that permeate our classrooms. Although our teachers have knowledge and influence on speaking out about policies, laws, traditions, attitudes, and beliefs, that hinder equitable progress, gender competencies and bullying awareness is not mandatory or highlighted as a key professional skill that teachers from either country must possess.
References


2019 Hawaii International Conference on Education Paper Submission

Title of the submission: How Effective is National University in Preparing Students to Be Educational Administrators and School Leaders?

Topic area of the submission: Educational Administration

Presentation Format: Paper Session

2-3 sentence description of your presentation which should not exceed: This paper will describe Educational Administration Fieldwork and Intern course experience, which supervises application of theoretical concepts in practical settings. It will also analyze student completed candidate program evaluations, completed by the student candidates, which evaluates the university effectiveness in preparing them to be successful school leaders. Fieldwork and intern course experience and accompanying courses will also be designed to prepare students for the state-mandated California Administrator Performance Assessment (CalAPA) for the 2019-2020 school year.

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Full Paper: How Effective is National University in Preparing Students to Be Educational Administrators and School Leaders?

Abstract

School administrators are most likely to be successful in their respective positions when applying the theoretical concepts in from their courses into practical school fieldwork or intern settings. Candidates complete a portfolio of administrative activities demonstrating competency in areas identified in the California Professional Standards for Educational Leaders as sanctioned by the California Commission on Teacher Credentialing for awarding of the preliminary
administrative services credential. A triad consisting of the University Supervisor, the Site Mentor/Administrator, and the candidate, develops a plan at the onset of the class. This plan ensures that the activities in which the candidate is engaged are aligned in a sequence so that they coincide with the theory learned in the courses the candidate will take. As the candidate has courses scheduled in advance, the triad has advance notice of the course learning outcomes and can plan accordingly. This paper will describe Educational Administration Fieldwork and Intern course experience, which supervises application of theoretical concepts in practical settings. It will also analyze student completed candidate program evaluations, completed by the student candidates, which evaluates the university effectiveness in preparing them to be successful school leaders. More recently, this fieldwork and intern course experience and accompanying courses will also be designed to prepare students for the state-mandated California Administrator Performance Assessment (CalAPA) for the 2019-2020 school year.

**Literature Review**

How does one define leadership as to what was, what is the current trend, and most of all, what could be in the not too distant future? If we are to believe that leaders are well prepared to address the challenges of said title where do we commence the journey? How do we establish an orientation for these leaders in the development for enhancing our institutions? Ladies and gentlemen, it takes leadership to recognize leadership! As such, National University’s Faculty for Education Administration has addressed requirements of the California Administrative Performance Standards for Educational Leaders through a variety of professional experiences to enhance observations and perceptions.

**Creating a Vision of Learning and Growth**

Despite the helpful studies to date, there remains a tremendous gap in the development and implementation of “shared vision” relative to school leadership and organization knowledge based on how is it that people come to understand one another and get anything worthwhile completed. The field still knows relatively little about how administrators, teachers, or students actually make sense of their worlds. Surely, their understanding of their worlds, the sense they make of their experience is a critical guide to how they respond to the events and circumstances in which they find themselves. The perspective held of the other is at the center of leadership, and the ability to communicate, collaborate, and problem. Leadership is a social-emotional constructed relationship. Social, historical, and cultural contexts are essential
considerations in the study of a shared vision as to leadership in schools. As such, it is imperative to emphasize that all children and young adults deserve and are entitled to the right to learn. This, in spite of possible cultural, racial, linguistic differences, and diverse socio-economic backgrounds.

It is paramount for school leaders to see needs as they are, not as they are presented through outward behavior. Sometimes this new vision requires leaders to strip away people's layers of pretense and get down to the basics of why and how they want to organize themselves within the school community. If schools are to nurture learning and change, organizations of the stakeholders including students, teachers, parents, administrators, custodians, and secretaries must allow everyone to grow without fear of being ridiculed or demeaned for expressing needs. This stripping-down process is complicated. Stakeholder may initially hide their needs from each other for many reasons, typically due to fear, embarrassment, inadequacy, mistrust, anger, frustration, etc.

When leaders ask stakeholders to be more open, honest, and truthful about their needs, they must be prepared to handle the strong emotions that emerge when people discover that the environment is safe to do just that. This process can be adversarial (Bridges, 2012). It also allows some to abuse the openness that is a prerequisite for truthfulness. Stakeholders can be hurt by openness and disengage into defensiveness, or they will withdraw overtly (or covertly) from participating at all. Far too often, the school leader becomes the lightning rod for all the pent-up resentment and hostility that has not been addressed. This type of situation may call for external assistance as staff members begin to work through the conflict in the school, conflict brought on by unmet needs (Combs, Miser, & Whitaker, 1999).

Creating a Collaborative Culture of Teaching and Learning

The essential goal of a collaborative learning culture is to build communities of instructional leaders (administrators) and teachers who continuously engage in the study of their craft; develop the shared language and common understandings necessary to pursue collegial study of new knowledge and skills; and provide structure for follow-up and follow-through. Formative walkthroughs promote these actions when they are paired with collaborative feedback, used in the context of professional learning targets, and focused on both professional learning and student learning. Formative walkthroughs are about the learning of all parties within the school: administrators, teachers, and students. In a collaborative culture, feedback typically takes the form of professional
conversations, and follow-through looks at evidence of both teaching improvements and student achievement.

Puig and Froelich (2006) found that quality coaching that includes formative feedback could be instrumental in helping educators better understand the need for evidence-based change and improvement in their practice (as cited in Moss & Brookhart, 2015). For instructional leaders, teacher feedback is not about volume of observations or length of written feedback: it is about bite-size actions steps that allow a teacher to grow systemically from novice to proficient to master teacher (Bambrick-Santoyo, 2012).

How do instructional leaders ensure that teachers develop a shared understanding of curriculum that reflects student content and performance expectations? How do instructional leaders ensure that the use of professional expectations and standards to guide, support, and supervise are present to improve teaching and learning? Instructional leaders involved in observing and coaching teachers, the teachers being coached and those who coach them, must stop admiring the overt instructional practices and begin looking for what students are actually doing, saying, making, and writing during lessons. They must agree on a new metric or critical attribute. As such, the critical attribute of successful professional learning must be improved student learning. The critical attribute of successful coaching must be improved student learning. The critical attribute of effective school administration and instructional leadership must be improved student learning (Moss & Brookhart, 2015).

**Analyzing the Organization**

A business maxim holds that every organization is perfectly structured to achieve the results it achieves. We could say the same of schools. Moreover, when outcomes are particularly problematic, as is true for many large urban school districts that lose most of their students before graduation, attaining substantially different results in our schools will require more than just education leaders and teachers “trying harder” within traditional bureaucratic constraints. Such a shift typically requires new organizational structures (Darling-Hammond, 2010). These traditional bureaucratic structures as established for the institution of public education were forged within corporate America between 1890 and 1910, when the realm of big business was modernized. As the organization was the primary form of that era, it was also the primary shaper.
The organization is, or should be, a social architect. However, this translates that its executives must also be social architects. As such, the organizations must honest and ethical institutions. If one wished to redesign society along more humane and functional lines, then the organization must be redesigned along those same lines (Bennis, 2003). The organization needs leaders as opposed to managers to bring about sweeping and profound alterations as to structures for personalization in American society.

Where do we begin to transform and cultivate a safe, productive, creative learning and working environment? Here and now, we need such leaders. “There continuing crisis in government, health care, as well as public education. Wall Street and Washington seems sometimes to have been overtaken by outlaws,” (Bennis, 2003, p. 184). Once an industrial giant, America’s principal business is now service, which has never been worse. Increasing number of homeless wander the streets and no one seems to have a clue how to address this matter. Gangs control large areas of the inner cities and the threat of international terrorism in now part of our everyday life since September 11, 2001. If America is to regain significance and face its myriad of challenges, leaders, the real thing, not copies must show us the way (Bennis, 2003). Once again, where do we begin to transform and cultivate a safe, productive, creative learning and working environment? In building and maintaining structures for personalization, the answer may well be in those Kindergarten and/or primary grade classrooms and throughout the system.

Designing a System of Collaboration

Let us begin with a concept, whether we believe it or not that cooperation and collaboration grow exponentially more every day. In the flat world, shrinking world where technology and cultural complexity increase at an accelerating rate, there exist fewer arenas in which individual action is warranted and possibly tolerated. Recognizing the need of consensus, whereby one builds ownership amongst the stakeholders we must access our skills in creating an environment conducive to productivity. We must do so much more than just talk about teamwork as the call for a model of effective action in the 21st Century. Yet, too often, we continue to advocate it in a culture, which people strive to distinguish and separate themselves as individuals. History has shown us repeatedly that groups of individuals, often without conscious design have successfully blended individual talent and collective effort to create something world altering in nature (Bennis, 1997).
Evaluating Aspects of Ethics

Warren Bennis, widely known as a modern leadership guru, had identified six personal qualities of a leader. In no particular order, they can be brought forward as to creating a foundation in establishing and evaluating all aspects of ethnics relative to a leader’s public persona. **Integrity** meaning the alignment of words and actions with inner values. It means sticking to these values even when an alternative path may be easier or more advantageous. A leader with integrity can be trusted and will be admired for sticking to strong values. They also act as a powerful model for people to copy, thus building an entire organization with powerful and effective cultural values.

**Dedication** relative to spending whatever time and energy on a task is required to get the job done, rather than giving it whatever time you have available. The work of most leadership positions is not something to do 'if time'. It means giving your whole self to the task, dedicating yourself to success and to leading others with you.

**Magnanimity**, such as a magnanimous person gives credit where it is due. It also means being gracious in defeat and allowing others who are defeated to retain their dignity. Magnanimity in leadership includes crediting the people with success and accepting personal responsibility for failures.

**Humility**, such as recognizing that you are not inherently superior to others and consequently that they are not inferior to you. It does not mean diminishing yourself, nor does it mean exalting yourself. Humble leaders do not debase themselves, neither falsely nor due to low self-esteem. They simply recognize all people as equal in value and know that their position does not make them a god.

**Openness**, as being able to listen to ideas that are outside one's current mental models, being able to suspend judgement until after one has heard someone else's ideas. An open leader listens to their people without trying to shut them down early, which at least demonstrates care and builds trust. Openness also treats other ideas as potentially better than one's own ideas. In the uncertain world of new territory, being able to openly consider alternatives is an important skill. **Creativity**, as being a divergent thinker, able to get outside the box, and take a new and different viewpoint on things (Bielaszka-DuVernay, 2009).

Analyzing the Infrastructure to Improve Policies

Across the nation, there is a growing consensus that schools must change in
fundamental ways if they are to accomplish the goals we now have for them: teaching our very diverse student population for higher order thinking and deep understanding. The system we work in today was invented a century ago for another time and another mission, the batch processing of large numbers of students for rote skills and the education of only a few for knowledge work. It was never designed to teach all children to higher-ordered thinking levels. Caring and dedicated teachers, administrators, and parents work hard every day within that system to educate our children for more ambitious thinking and performance skill and yet their efforts are often stymied by outmoded institutional structures, most notably the large, impersonal, factory-model school.

A growing number of educators and policymakers believe that existing assembly-line schools that inhibit our students’ and teachers’ potential need to be replaced by schools that are better designed to support teaching and learning. Moreover, we have evidence that schools with emphasis on structures for personalization are indeed better for our children: All else equal, they produce higher achievement, lower dropout rates, greater attachment, and more participation in the curricular and extracurricular activities that prepare students for productive lives (Darling-Hammond, 2010). There is real potential for this movement to transform the educational landscape in America for the better. This agenda for change is an ambitious one, much more daunting than any of the single solutions frequently proffered in the name of reform. Rebuilding the system of U.S. public education so that it can provide a genuine right to learn is not a task for publicity hunters or the faint of heart. Exceedingly difficult work will take many years of struggles and setbacks as well as insights and epiphanies to accomplish. Nevertheless, the rewards will be reaped at every step along the way with every child who experiences greater accomplishments and ability to contribute to the lives of others (Darling-Hammond, 2001). School designers are likely to be more successful if they can access the lessons learned from the reform efforts of the past several decades. A number of districts that have been extraordinarily effective and have helped other districts to replicate their success have important lessons to offer, based on the elements they hold in common.

Effectiveness of Student Application of Theory Into Practice as Demonstration of Educational Administration and School Leader

For this Program, candidates complete a portfolio of 12 administrative activities (two per course learning outcome that demonstrates competency in areas identified in the California Administrative Performance Standards for Educational Leaders. What are the specific Course Learning Outcomes (CLOs) for this
fieldwork/intern course? Upon satisfactory completion of the course, students will be able to:
1. Create a vision of learning and growth for all students that is shared and supported by the school community
2. Create a collaborative culture of teaching and learning informed by professional standards and focused on student and professional growth.
3. Analyze the organization, to cultivate a safe and productive learning and working environment.
4. Design a system of collaboration that includes families and other stakeholders to address diverse student and community interests and mobilize community resources.
5. Evaluate aspects of professional and personal ethics, integrity, justice and equity that are conducive to leading a school or school system.
6. Analyze the larger political, social, economic, legal, and cultural contexts affecting education to improve education policies and practices.

A triad consisting of the University Supervisor, the Site Mentor/Administrator, and the candidate, develops a plan at the onset of the class. This plan ensures that the activities in which the candidate is engaged are aligned in a sequence so that they coincide with the theory learned in the courses the candidate will take. As the candidate has courses scheduled in advance, the triad has advance notice of the course learning outcomes and can plan accordingly. (An example student plan to be included in PowerPoint. Exhibit)

How good is National University doing in preparing students to become school administrators/leaders? How can National University make their Program more effective for this preparation? How well are students performing in their preparation? Only student perceptions and evaluations can make this assessment. Three assessment tools are used (Examples of Assessments to be included in PowerPoint exhibit: 1) Program Evaluation by Candidate, 2) Candidate Self-Evaluation Form, 3) Site Supervisor Candidate Evaluation Form, and 4) Field Experience Form

Conclusion

What are the results of these assessment tools? Much of these results are determined by the university supervisor effectiveness and interest in the students. Much of the training effectiveness is determined by the professional relationship between the student and the site supervisor. The ability of the student to find that first administrative position is dependent on the contacts and networking the
student has with colleagues within his/her school/district, and/or professional contacts with Association of California School Administrators and other professional organizations. Leaders will need the opportunity to experience, observe, and perceive in the development of a shared vision within the profession, which can be guided by evidence to create productive schools. As demonstrated, policymakers need to take responsibility for their role in creating a context that enables education leaders the flexibility for the adoption of successful practices throughout the system. To date this is an area that has been increasingly overregulated and held in a stranglehold, which prevents school district leaders from adopting the successful practices implemented at the local level of administration.

References


Abstract

This qualitative study investigated how early childhood educators (n=17) in a large urban city in the northeastern United States used personal character strengths to address workplace challenges. Educators most frequently used the strengths of kindness, leadership, fairness, hope, love, self-regulation, perseverance, forgiveness and humility to address challenges. After writing a plan of action to apply character strengths, teachers reported a 71% success rate in fully or mostly resolving the challenge addressed. Using this method appears to encourage the modeling and teaching of character strengths to children, particularly kindness, forgiveness, social intelligence and teamwork. Early childhood educators, and the children they serve, are both likely to benefit from professional development activities connecting character strengths to the workplace.

Introduction

Early childhood is a crucial time to develop character strengths because young children internalize societal values and behaviors in preschool (Dereli-İman 2014; Miller, 2016; Ülavere, 2017) and adults in the children’s lives have important roles in observing their behaviors and promoting character strengths in them (Lottman, Zawaly, & Niemiec, 2017). Early childhood educators play a crucial role in the development of young children’s character strengths because seeing positive role models is essential to the process (Park, 2004; Steen, Kachorek, & Peterson, 2003). Early childhood educators are most suited to nurture character strengths because they regularly practice socialization with young children and are competent at engaging with them (FitzSimons, 2015).

Lottman, Zawaly, and Niemiec (2017) have emphasized that it is important for early childhood educators to be able to recognize their own character strengths and nurture development of them among young children and proposed a character strengths intervention for early childhood educators that consisted of four phases: (1) teachers learn their own character strengths, (2) teachers recognize character strengths among young children, (3) teachers nurture those character strengths among young children, and (4) teachers support parents with developing those skills.

Problem and Purpose

Existing research on the character strengths of early childhood educators is limited (Gradišek, 2012) and how they recognize their own character strengths, consciously apply them
in their day-to-day work with children and co-workers, and what outcomes they experience in doing so are unknown. This study intended to fill these gaps.

The purpose of the current study was to examine the relationship between applying character strengths in the early childhood workplace and in-service educators experience resolving related challenges. Additionally, we wanted to understand how early childhood educators practice of applying character strengths to workplace challenges relates to supporting children’s character strength development. To study these questions, we engaged 17 early childhood educators in an activity that asked them to identify their character strengths, apply them to workplace challenges and report related results.

**Theoretical Framework**

The practice of character strength development is central to the field of applied positive psychology. Positive psychology is the science of actions and qualities that make up well-being, contentment, satisfaction, optimism, and happiness, with a focus on character strengths and virtues such as love, courage, perseverance, spirituality, wisdom, responsibility, altruism, moderation, work ethic and others (Seligman & Csikszentmihalyi, 2000). The goal of positive psychology is to build up positive qualities and actions that combine to allow for the optimal flourishing of individuals, communities and societies.

Positive psychology has been translated into a framework for ‘positive education’ that focuses on the development of character strengths in children and their experience of positive emotions, engagement, accomplishment, purpose, relationships and health (Norrish, Williams, O’Connor & Robinson, 2013). Positive psychology is actualized by individuals using their character strengths, which are morally valued psychological traits that have universal recognition (Norrish et al., 2013; Peterson & Seligman, 2004). Each person has developed these capacities to some degree, or has them in potential, to promote optimal growth, flourishing and performance. The Values in Action (VIA) survey (Park & Peterson, 2006) operationalizes 24 universal character strengths (e.g. bravery, kindness, fairness), and can be completed online to create an individual’s character profile which ranks the extent to which a person values and applies these traits (viacharacter.org). A body of research has investigated the efficacy of the VIA classification of strengths on life satisfaction, health and wellness, achievement, mindfulness, relationships and other outcomes, in the workplace and with children and youth (Via Institute on Character).

The current study extends the positive psychology movement into the arena of early childhood education under the assumption that the application of one’s character strengths to the numerous challenges faced in the early childhood workplace is worthy of exploratory study and may also assist educators in their efforts to develop a perspective for nurturing character strengths, and related social-emotional competencies, in young children.

**Method**

**Participants**
Participants included 17 early childhood educators from in a large city in the northeastern United States. Sixteen of the 17 educators were working actively with children for at least 10 hours per week as lead or assistant teachers, center directors or family care providers. One participant was a mentor to other teachers and worked with children for less than 9 hours per week. The majority were at least 40 years old (65%), female (100%), Black or African-American (53%), held a bachelor’s or master’s degree (65%), worked as a lead or assistant teacher (70%), had 10 or more years of teaching or child care experience (59%), worked full-time teaching children (82%), and taught at least two age groups of children (94%).

**Intervention**

In 2017, we facilitated practice-targeted professional development (Pianta et. al, 2014) in the form of a course for in-service early childhood educators to examine the efficacy of a variety of supports related to social-emotional learning, including the use of positive guidance principles, developing closer teacher-child relationships and learning to apply character strengths at work. The current study investigates the component of that course that asked teachers to apply character strengths to work-related challenges and reflect on the results. By encouraging educators to engage in this character application and reflection activity systematically, weekly for 10 weeks, we sought to assist educators to identify and apply their character strengths in ways that would reduce job stress and prepare educators to model and teach character strengths to children.

First, participants completed an online questionnaire to identify their unique character strength profile based on the VIA classification of strengths (Park & Peterson, 2006), ranking the extent to which they value and practice 24 unique strengths. Second, participants discussed how these 24 strengths were relevant to their work during class sessions. Third, participants completed a character strength journal template as a repeating assignment to facilitate their practice with applying character strengths to the workplace. During each class session we discussed the meaning and importance of several character strengths, gradually working through a discussion of the 24 strengths during the course.

**Instrument**

The researchers created a planning and reflection worksheet called the Character Strengths Journal Template (CSJT) to facilitate 1) identification of a challenge related to work or their role as a teacher, 2) matching character strengths to the challenge, 3) writing an action plan to apply the strengths to the challenge and 4) describing the results they experienced after addressing their challenge by applying related character strengths. Participants were encouraged to complete one template each week during the professional development course. A total of 87 Character Strengths Journal Templates were collected during the intervention period from 17 educators. Of the 87 submitted templates, 70 related to teacher’s workplace challenges and were selected for data analysis.

**Research questions**
1. Which character strengths do early childhood educators report using to address workplace challenges?
2. Which character strengths do early childhood educators report using most frequently to address workplace challenges?
3. What types of challenges do early childhood educators address by applying character strengths?
4. How successfully do early childhood educators report solving workplace challenges when following a character strength application activity?
5. How do early childhood educators match character strengths to various types of challenges?
6. How are children involved in learning character strengths in relation to teachers’ own practice of character strengths in the workplace?

Data Analysis

Content analysis (Dey, 1993; Gray, 2018) and thematic analysis (Braun & Clarke, 2006) approaches were used. Raw data (handwritten templates) were transcribed into a table. Quantitative content analysis was then used to summarize the frequency of character strength terms. The template provided initial categories for further analysis (e.g. challenges, strengths, action plan, results). These sections of the template were analyzed using open coding to produce subcategories, paying attention to both properties (e.g. challenges with coworkers versus challenges with children) and dimensions (e.g. the level of difficulty of a challenge / the extent to which a challenge was resolved).

A thematic analysis approach was then used to identify patterns within the data whereby codes were clustered into themes related to each subcategory. For example, the category of “challenges” was pre-set by the researcher. We asked participants to describe a current challenge or need they were facing at work which they would plan to resolve by applying personal character strengths. The subcategories of ‘challenges with coworkers’ or ‘challenges with children’ were inductively derived and specific types of challenges were coded and clustered to produce emergent themes, such as the challenge of teaching social-emotional skills to children. Axial coding was used to recognize relationships between the types of challenges teachers described and the character strengths used to address them, paying attention to context, actions, interactions and consequences (Gray, 2018). We created a data matrix to match challenges with corresponding strengths and recognize relationships. We sought to enhance the validity (trustworthiness) of the findings by using detailed (thick) descriptions (Altheide & Johnson, 1994).

Results

Breadth and Frequency of Character Strengths Used

Table 1 shows that 40 character strengths were used among the 17 educators. Kindness, leadership and fairness were the most frequently used. On average, each educator used nine unique character strengths and applied two or more strengths to each specific challenge.
Challenges in the Workplace

Teachers addressed a substantial number of challenges (n=70) in the workplace, falling under four broad categories: 1) working with children (42/70), coworkers (17/70), parents (4/70) and themselves (4/70). Typical challenges in these categories included children’s misbehavior, coworker disunity, the need for parental support and managing one’s own negative emotions.

Challenges by Degree of Difficulty

We coded the challenges teachers reported by degree of difficulty: low, moderate and high, following criteria set for these three dimensions related to the stress the teacher felt with the challenge and the complexity of its solution. Table 2 presents these results.

Matching Character Strengths to Challenges

Table 3 summarizes how universally each character strength was applied. Some strengths were applied to challenges involving both children and adults (coded universal), but other strengths were primarily used when the challenge involved either children or coworkers. These strengths were coded as either child-focused or coworker-focused.

Resolving Workplace Challenges

We analyzed the results section of the template to determine if the educator reported a successful resolution to her challenge (Table 4).

Children Learning Character Strengths

We found that children were also learning character strengths, as reported by teachers on the templates. Brief examples follow.

Forgiveness

A child hit a teacher in the face with a toy. The teacher used this opportunity to intentionally model forgiveness saying, “I showed him I as not upset and that he was forgiven. The child apologized and continued to play without hurting anyone else.”

Kindness

A girl refused to put on her coat to go outside. Teacher modeled kindness by praising the other children who did put on their coats. The teacher then had the children practice kindness by fetching the girl’s coat and helping her with it.
Discussion and Conclusion

The purpose of this study was to investigate the relationship between an enabling professional development activity and early childhood educators practice of character strengths in the workplace. We found that completing a character strength planning, action and reflection activity multiple times during a 12 week course appears effective in helping in-service early childhood educators 1) match relevant character strengths to specific circumstances, 2) practice applying character strengths to workplace challenges, 3) resolve a wide range of workplace challenges, and 4) model and teach character strengths to children, coworkers and parents.

The current study represents a valuable contribution to the early childhood education literature by describing how educators apply a wide range of character strengths to various workplace circumstances while also beginning to reveal the link between teachers’ own use of character strengths and their modeling and teaching of these traits. Teacher educators may wish to include a similar method in their professional development activities to promote the well-being and character development of early childhood teachers and the children they serve.

References


**Tables**

Table 1

*Strengths used by teachers to address specific challenges, ordered by frequency of use.*

<table>
<thead>
<tr>
<th>Strength</th>
<th>Frequency</th>
<th>Number of Teachers Using this Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Kindness</td>
<td>16.00</td>
<td>8.00</td>
</tr>
<tr>
<td>2 Leadership</td>
<td>13.00</td>
<td>8.00</td>
</tr>
<tr>
<td>3 Fairness</td>
<td>12.00</td>
<td>8.00</td>
</tr>
<tr>
<td>4 Hope</td>
<td>11.00</td>
<td>6.00</td>
</tr>
<tr>
<td>5 Love</td>
<td>11.00</td>
<td>7.00</td>
</tr>
<tr>
<td>6 Self-regulation / Self-control</td>
<td>11.00</td>
<td>6.00</td>
</tr>
<tr>
<td>7 Perseverance</td>
<td>10.00</td>
<td>8.00</td>
</tr>
<tr>
<td>8 Forgiveness</td>
<td>9.00</td>
<td>5.00</td>
</tr>
<tr>
<td>9 Humility</td>
<td>9.00</td>
<td>7.00</td>
</tr>
<tr>
<td>10 Creativity</td>
<td>8.00</td>
<td>6.00</td>
</tr>
<tr>
<td>11 Gratitude</td>
<td>8.00</td>
<td>5.00</td>
</tr>
<tr>
<td>12 Judgement</td>
<td>8.00</td>
<td>7.00</td>
</tr>
<tr>
<td>13 Patience&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8.00</td>
<td>5.00</td>
</tr>
<tr>
<td>14 Perspective</td>
<td>8.00</td>
<td>5.00</td>
</tr>
</tbody>
</table>
Table 2

<table>
<thead>
<tr>
<th>Degree of Difficulty</th>
<th>Number of Challenges</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>High difficulty</td>
<td>15</td>
<td>21.43</td>
</tr>
<tr>
<td>Moderate difficulty</td>
<td>40</td>
<td>57.14</td>
</tr>
<tr>
<td>Low difficulty</td>
<td>15</td>
<td>21.43</td>
</tr>
<tr>
<td>Totals</td>
<td>70</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 3

Applicability of character strengths to challenges by audience type.

<table>
<thead>
<tr>
<th>Applicability</th>
<th>Character Strengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal. These strengths were used frequently to address challenges with both children and adults.</td>
<td>Kindness, leadership, fairness, hope, perseverance, humility, gratitude, judgement, spirituality, honesty, love of learning, prudence, social intelligence</td>
</tr>
</tbody>
</table>

a Trait not on the VIA classification

challenges in the workplace.
Child-focused. These strengths were almost entirely used to address challenges with children. They were rarely reported to address challenges with coworkers.

<table>
<thead>
<tr>
<th>Love, self-regulation, forgiveness, creativity, patience, perspective, appreciation of beauty and excellence</th>
</tr>
</thead>
</table>

Coworker-focused. These strengths were almost entirely used to address challenges with coworkers.

<table>
<thead>
<tr>
<th>Teamwork, bravery</th>
</tr>
</thead>
</table>

Table 4

*Frequency with which workplace challenges were resolved by early childhood teachers using the character strength planning and action method*

<table>
<thead>
<tr>
<th>Was the challenge resolved by the teacher?</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully resolved</td>
<td>38</td>
<td>63</td>
</tr>
<tr>
<td>Mostly resolved</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Partially resolved</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td>Not resolved</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Totals</td>
<td>60&lt;sup&gt;a&lt;/sup&gt;</td>
<td>100%</td>
</tr>
</tbody>
</table>

<sup>a</sup>Seventy challenges were submitted but 10 reported no results data and were therefore excluded from this resolution analysis.

Table 5

*Character strengths children were learning, organized by frequency.*

<table>
<thead>
<tr>
<th>Character Strengths Learned by Children</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forgiveness, kindness</td>
<td>7</td>
</tr>
<tr>
<td>Social intelligence, teamwork</td>
<td>6</td>
</tr>
<tr>
<td>Fairness</td>
<td>5</td>
</tr>
<tr>
<td>Love, self-regulation</td>
<td>4</td>
</tr>
<tr>
<td>Responsibility</td>
<td>3</td>
</tr>
<tr>
<td>Care, empathy, patience, peacefulness, perseverance, perspective</td>
<td>2</td>
</tr>
<tr>
<td>Courtesy, dependability, gratitude, hope, humility, independence, initiative, judgement, leadership, love of learning, order</td>
<td>1</td>
</tr>
</tbody>
</table>
**Title:** STEM labs as an ethnographic field of study

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**Introduction**

In the United States, female students became the majority at college nearly 40 years ago, but the gender gap has been persistent within all STEM fields (Anderson, 2014). When it comes to women of color, the gap is even larger. STEM careers are predicted to be some of the most in-demand in the context of the Fourth Industrial Revolution (Global Gender Gap Report, 2016). Thus, the American workforce needs employees with strong scientific and technological competence (Morella, 2002). However, in the United States the demand for STEM workforce continues to outpace the supply (Gasman, Nguyen, Conrad, Lundberg, & Commodore, 2017). Lack of participation of female and minority STEM students and professionals has been identified as one of the factors contributing to the phenomenon (Code.org, 2018).

Although there is a negative stereotype about females’ lower math and science abilities than boys, girls’ higher performance in math than boys has been witnessed in the United States. Busch-Vishniac and Jarosz (2007) stated, “studies have proven that women and minorities are as capable of mastering science and engineering as majority males. They are certainly no less intelligent or industrious. Thus the low numbers of minorities and women in science and engineering are the result of factors other than intelligence” (p.249). Researchers have been identified psychological, environmental, organizational, socio-cultural, and historical factors contributing to gender imbalance in STEM (Cannady, Greenwald, & Harris, 2014; UNESCO, 2017).

For STEM students in American higher education, labs play an important role in their research experiments and investigations, academic success, and career aspirations in STEM because the majority of their research experiments are done in their labs (Rooney, 2014). Also, if they are considering a career in academia or a research job, previous lab experience is crucial (Tafilaku, 2014). Unlike humanities students, it is important for STEM students to build group work competence in their labs because most engineers and scientists will need to work in labs collaboratively with each other in their professional careers (Murthy, 2017).

**Theoretical Framework**

Utilization of intersectionality as an analytic tool helps to provide a more expansive lens for addressing the complexities of educational equity and explanation for inequality and fair play in organizational power structures (Collins & Bilge, 2016; Romero, 2018). “Intersectionality is a
way of understanding and analyzing the complexity in the world, in people, and in human experience” (Collins & Bilge, 2016, p.25).

Objective/Research Questions
The purposes of this study was to investigate: (1) how diverse STEM labs are structured, (2) how STEM labs work, (3) what makes a lab ‘a lab,’ (4) what justifies STEM labs as a field for study, and (5) why it is important to study STEM labs from gendered, raced, classed, global, sociological, and anthropological perspectives.

Methodology

Study Sites
This study takes place at seven STEM labs at a STEM focused private non-profit comprehensive research university located in the North Eastern region of the United States.

Participants
The participants of this study are seven female STEM faculty members who have been running their own labs for at least four years and their undergraduate and graduate students. Both female and male students are included in this study.

Research Design/Data Collection
Multiple case study methodology was used for this study (Creswell, 2012; Yin, 2014). The data include (1) one-on-one interviews with faculty members, (2) one-on-one interviews with students, and (3) field notes/observation notes. The triangulation of the data strengthens the validity and reliability of the study (Merriam & Tisdell, 2015).

Data Analysis
Using a qualitative analysis software, MaxQDA, the data will be coded based on overarching themes (open coding). After overarching themes and patterns are established, axial coding will be conducted with a more focused approach. Then the findings are compared across cases/labs and analyzed through a framework of intersectionality.

Preliminary findings and implications will be discussed.

References
Introduction

The gender imbalance and underrepresentation of minorities in STEM have been persistent in the United States although female students became the majority in American higher education nearly forty years ago (Anderson, 2014), the Science and Engineering Equal Opportunity Act of 1980 mandates equal opportunities for both men and women in education, training, and employment in scientific and technical fields, and the National Science Foundation supports, assesses, and measures increase of female participation (UNESCO, 2015).

The demand for STEM workforce continues to outpace the supply in the Unites States (Gasman, Nguyen, Conrad, Lundberg, & Commodore, 2017). According to the Bureau of Labor Statistics by United States Department of Labor (2018), some of the fastest growing occupations in the United States are those that are related to STEM such as solar photovoltaic installers (growth rate of 105%), wind turbine service technicians (growth rate of 96%), and statisticians (growth rate of 33%).

Lack of participation of female and minority STEM students and professionals has been identified as one of the factors contributing to the phenomenon (Code.org, 2018; Margolis & Fisher, 2002). Minority populations in the United States have grown dramatically in the recent years and they are predicted to be the majority in the future (Chappell, 2017; Chappell, 2015), but minority populations and females have been persistently underrepresented in the STEM workforce (National Girls Collaborative Project, 2016).

Between the years of 2014 and 2015, women of color earned the following percentages of bachelor’s degrees across all STEM fields—Asian women: less than 5%, Latinas: less than 4%, and Black women: less than 3% (Catalyst, 2018). Minority women earned the following percentages of bachelor’s degrees in STEM fields: approximately 5% in math and statistics, 5% in computer sciences, and 3% in engineering (National Girls Collaborative Project, 2016). Ceci, Williams, and Barnett (2009) stated “what we do know is that female students’ grades in college mathematics classes are as good as those of male students when they take comparable math courses. The aptitude of the subset of such students who go on to become STEM scientists, however, is unknown” (p.221).

Cannady, Greenwald, and Harris (2014) mentioned that the knowledge of how to navigate the higher education system may be as important as academic aptitude (Cannady et al., 2014). This theory is supported by Kincheloe (2003) and Ohanian (1999) who stated that students’ success in school is strongly correlated with parents’ highest education and family wealth. They argued that children who have college educated parents are more likely to be taught how to navigate the system in higher education and succeed in academia than first generation students.
Even if a college student succeeds in completing a degree program, the pipeline to career paths is not straightforward (Cannady et al., 2014). People who make career choices in their adulthood consider other factors such as marriage, raising children, and family-work balance (UNESCO, 2017; Pollack, 2015). This theory is supported by Unkovic, Sen, and Quinn (2016) who stated that women who have a perception that STEM careers are more demanding than other careers and that it will be difficult for them to juggle between work and home responsibilities might not pursue a career in STEM fields. Also, people’s identities are constantly reconstructed based on their new knowledge and experiences. “Identity is a concept that figuratively combines the intimate or personal world with the collective space of cultural forms and social relations” (Holland, Lachicotte Jr, Skinner, & Cain, 1998, p.5).

Sandberg (2013) quoted Pattie Shellers who said “Careers are jungle gym, not a ladder” (p.53). In a ladder metaphor, there is only one way to get to the top and if you fall down from the ladder you have to climb up the same path in which you came. On the other hand, in a jungle gym metaphor, people are allowed to move up or down, left or right, and on or off and to explore their paths more creatively. The jungle gym metaphor represents women’s career paths better than the ladder metaphor because women are more likely to encounter barriers when they start their careers, switch them, and reenter the workforce after taking some time off due to family responsibilities.

Moreover, taking agency of their own lives including career paths even if they occasionally struggle gives them a sense of independence and fulfillment. Furthermore, on a ladder, climbers are stuck when there are people above him/her and people at the bottom do not have good views as much as people at the top, but these metaphors do not represent the reality. In the workforce, some employees get promoted to higher positions faster than others and not all people at the top positions in organizations have more fulfilled lives than people at lower positions. The jungle gym provides 360 degrees of great views, so people at the middle and low have good views, meaning that they are satisfied with their positions.

**Objective/Research Questions**

The purpose of this study is to answer to the following questions: (1) how do STEM students respond to training and mentoring in their labs and construct meanings about their own identities in relation to their lab environments and experiences? and (2) In what ways are these experiences reshaping STEM fields to be more inclusive and motivate students’ interests in pursuing careers in STEM?

**Methodology**

**Research Sites**

This study takes place at seven female-led labs in male-dominated STEM colleges/departments at Nathan University located in the North-Eastern region of the United States. Nathan University is a STEM-focused comprehensive private non-profit research university that offers diverse STEM programs at undergraduate to doctoral levels.

**Participants**

Seven female faculty lab leaders in male-dominated STEM departments and their students are the participants of this study. Four of them are white and three of them are racial/ethnic minorities. Two of them had their majority of education outside the United States. They represent the following departments: biomedical engineering, mechanical engineering,
civil, architectural, and environmental engineering, materials science and engineering, and physics. There is no exclusion of participants in terms of race, ethnicity, socio-economic status, international/immigrant/domestic status of both faculty and students. All academic levels—undergraduate, master’s, and doctoral levels—of students are included. Also, both female and male students are included in this study.

Research Design

A critical ethnographic collective case study methodology was used for this study. It allows me to investigate not only individual participants’ experiences and meaning making about their identities but also atmosphere and shared culture of their labs in comparison to other labs. It also helps me evaluate each participant’s perception of his/her lab more objectively in light of others’ perception of the same lab. A pure ethnography may allow me to investigate shared culture of a few labs independently in more depth, but a collective case study allows me to investigate each lab as a case and use a comparative framework to show how collectively they represent wider trends.

Data Collection

In order to develop thick description and to triangulate the data (Maxwell, 2013; Merriam & Tisdell, 2015; Yin, 2014), this study relies on the following data: (a) one-on-one interviews with female faculty members/lab leaders, (b) one-on-one interviews with their students, (c) notes from participant observations at their labs (this includes informal conversations outside lab settings), and (d) related document review. Multiple data sources allow me to analyze the phenomenon from diverse angles and examine it with a holistic approach.

Data Analysis

Drawing on the work of Stake (1995), four stages of analysis for a collective case study guide data analysis of this study. The first stage focuses on understanding the context, the participants, and lab activities in each case with a holistic approach. The second stage involves open coding (Merriam & Tisdell, 2015). The third stage focuses on establishing themes and patterns across codes within each case. The last stage involves a cross-case comparison to investigate how the cases are different and similar and represent wider trends of social justice issues in STEM.

Preliminary findings and implications will be shared in the presentation.

References


At the Crossroads of Studenthood & Motherhood: Abstract

While issues related to teenage pregnancy often receive attention from public policy makers and social service advocates, the implications of adolescent motherhood are frequently overlooked by the various subfields of education research. Adolescent literacy experts commonly focus on motivation, and at-risk profiles while early childhood specialists attend to targeted intervention strategies. Meanwhile, literacy researchers covering the gamut from birth through adulthood, ruminate over the impact of socioeconomic status (SES) on student engagement, working tirelessly to develop strategies for closing the achievement gap. Rarely do education researchers focus their lens in a way that enables them to consider how the failure to meet the distinct literacy needs of pregnant teens and adolescent mothers impacts these young girls’ ability to maximize their potential, and sets the stage for generational cycles of academic struggle.

Informed by research in the areas of critical pedagogy, new literacy, and multiliteracies, as well as investigations into social justice and systemic practices of marginalization, the author poses suggestions for reframing the way educators talk about programs designed to meet the learning needs of adolescent mothers, while also considering educational policy implications for both young mothers and the children they are raising.

Statement Regarding Use of Pronouns:
I acknowledge that there is a gender spectrum and that myriad pronouns exist that I can use when referring to individuals in my writing. Given the nature of the subject matter, I refer to childbearing adolescents with terms of “she” and “mother” as consistent with physical attributes of reproduction, with the acknowledgement that childbearing individuals may identify under a broad array of identities including male, trans, and gender-neutral.
Submission Title: **Recess and Standardized Testing: Implications for Development, Learning, and Policy in K-6**

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Abstract

The focus of current educational policy increasingly centers on accountability, achieved by mandating curricular standards and utilizing high stakes standardized tests. Although the intention of such practices is to reduce the achievement gap and improve education, it has other implications for children’s overall development. In particular, efforts to increase instructional time spent preparing for and completing standardized tests may result in children experiencing reductions in the frequency and duration of recess in grades K-6. Unstructured recess provides documented benefits for children’s cognitive development, achievement, physical development, and social/emotional development. This paper considers literature describing recess and trends toward its reduction and/or elimination. According to research, current policies surrounding state and national educational standards, and concomitant standardized testing, have implications for children’s overall development. Policy makers, schools, educators, and advocates for children should consider this research when making critical decisions that affect the health, achievement, and holistic development of all children.

Keywords: Recess, Assessment, Standardized Testing, Play, Policy
Standardized Testing and Recess:

Implications for Development, Learning, and Policy in K-6

Education in the United States is at a crossroads. Schools and teachers must make decisions to enhance children’s holistic development while working diligently to meet state and national standards of accountability. Teachers cater instruction to be developmentally appropriate, differentiate instruction for increasingly diverse classrooms, promote healthy and positive social/emotional development, and help students and schools achieve on high stakes standardized tests. Taken together, schools and teachers must reconcile incongruities between research-based practices, public opinion, and policies. Amidst this balancing act, the stakes are high: school funding, hiring, and test scores are linked to each decision. This combination of factors makes it increasingly important to ensure that policy aligns with research-based evidence about developmentally appropriate practice.

In particular, teachers must prepare students for high stakes standardized testing, resulting in increased instructional time devoted to testing and test preparation. A typical student takes 112 standardized tests between kindergarten and 12th grade (Hart et al., 2015), and this does not account for non-mandatory, teacher-administered assessments. In order for such testing to occur within the confines of a limited academic year, other areas necessarily receive less time and attention. For example, recess time has deteriorated in recent years, which may have lasting developmental implications (Caplan & Igel, 2015).

What is Recess?

Recess is when children receive scheduled time during the school day for unstructured, child-directed play, where children may choose their activities and with whom they interact.  

1Recess differs from physical education. Physical education is a teacher-led curricular area with academic standards and instruction. Physical education and recess are both necessary, with each providing unique benefits for
Recess and Assessment

(Murray & Ramstetter, 2013, p. 183). Recess provides an essential break from concentrated academic challenges and allows children to benefit from free play, which is vital for cognitive, social, emotional, and physical development during the early childhood and elementary years (Bohn-Gettler & Pellegrini, 2014). Decreasing or replacing unstructured recess with structured play, physical education, or extra academic time can reduce opportunities for cognitive, physical, social, and emotional development. Unstructured recess provides children with opportunities to interact creatively, develop their imagination, and freely interact with the world around them. Such opportunities are not always prevalent in classrooms (Ginsburg, 2007; Murray & Ramstetter, 2013). Furthermore, evidence indicates that recess improves attention, behavior, and achievement (Bohn-Gettler & Pellegrini, 2014). Hence, free play during recess is a healthy and “fundamental component” of child development (Ginsburg, 2007, p. 187).

Reduction of Recess

In the United States, there are inconsistent policies regarding the frequency, duration, and implementation of recess. In 1989, about 90% of surveyed school districts reported having some form of recess lasting anywhere from fifteen to twenty minutes, one or two times a day (Pellegrini, 1995). Priorities in schools have evolved since this survey, and in 2001, “nearly forty percent of the nation’s 16,000 school districts have either modified, reduced, or are considering eliminating recess from the daily elementary school schedule” (National Association of Early Childhood Specialists in State Departments of Education (NAECS), 2001). In 2016, only eight states required daily recess (Centers for Disease Control and Prevention and SHAPE America - Society of Health and Physical Educators, 2017). Although a systematic survey of recess is needed, there appears to be a trend toward reducing or eliminating recess (Caplan & Igel, 2015).
On the surface, the reasons for reducing recess appear valid: managing behaviors, reducing bullying, and allocating more time to academic endeavors. However, research indicates that reducing recess is counterproductive to these efforts. Recess actually improves attention, behavior, and achievement (Murray & Ramstetter, 2013), especially for children with Attention Deficit Hyperactivity Disorder (Ridgway, Northup, Pellegrin, LaRue, & Hightshoe, 2003). Reducing recess does not necessarily reduce bullying. Bullying most frequently occurs when students are unsupervised (Chmelysnki, 2006). Bradshaw, Sawyer, and O'Brennan (2007) found that only 6.2% of bullying occurs during recess / playground time. Although efforts should certainly be taken to reduce bullying during recess, providing supervision during recess can help reduce bullying while still allowing for unstructured play (Chmelysnki, 2006).

A primary reason why many schools reduce recess is to increase school accountability and devote additional time academic testing (Skrupskelis, 2000). The number of schools reducing recess for achievement reasons increased since the implementation of important policies (Caplan & Igel, 2015). Nationwide, recess time has decreased by almost 20%, with the reasoning that it allows more time to focus on math and reading (Brusseau & Hannon, 2015). Advocates for reducing recess reason that it takes away time from instruction, interrupts concentration, and disturbs class routines. Schools with lower achievement scores may be especially likely to devote additional time to academic work at the expense of recess (Bohn-Gettler & Pellegrini, 2014). However, it is necessary to examine whether allocating increased time toward assessment, which would then decrease time spent in recess, actually improves achievement on standardized tests.
Policies Measuring Student Achievement

High stakes standardized tests evaluate students, teachers, and schools on proficiency with state academic standards. Required standardized testing was implemented as a component of the No Child Left Behind (NCLB) Act of 2001 to hold schools, teachers, and students accountable for meeting state standards in reading, mathematics, and science. NCLB, the Common Core State Standards movement, Race to the Top grants, and the Every Student Succeeds Act (ESSA) have placed standardized testing at the center of public education in the United States. Each policy mandating testing has had concomitant effects on the frequency, duration, and structure of recess.

In 2001, NCLB was authorized to increase accountability and close the achievement gap. NCLB required schools to implement high stakes standardized tests, which were used to make decisions about students, teachers, schools, and districts, and to measure proficiency on state standards. Under NCLB, states needed to test students in reading and mathematics annually in grades 3-8 and once between grades 10-12. States also needed to test students in science once in each grade bands of 3-5, 6-8, and 10-12 (U.S. Department of Education, 2004). Individual schools, districts and states were required to publicly report test results for the aggregate student population and for specific subgroups of students (Klein, 2016). The main measure used to gauge student achievement under the NCLB Act was the percentage of students scoring at or above the proficient level on standards-based state tests.

Revisions to federal policies (i.e., ESSA) continued to maintain the significance of high stakes standardized testing in public education through grants and legislation (U.S. Department of Education, 2009). Race to the Top grants created competition for federal funds based on accountability criteria, and included incentives for teacher evaluations based upon high stakes
standardized tests, more intense student data systems, the adoption of rigorous common
standards, progress toward personalized learning, and vigorous turnarounds for under-achieving
schools. In order to compete in the Race to the Top grant process, one third of a teacher’s
evaluation was tied to standardized test scores (Hagopian, Ravitch, & Kohn, 2014). The
emphasis on student proficiency in math, reading, and science has shifted curricula across
schools districts. As a result, schools are dedicating more classroom time to reading,
mathematics and science instruction, while decreasing time in other curricular and non-curricular
areas (Rothstein, Jacobsen, & Wilder, 2008). When such increases occur without extending the
school day or year, it results in reductions in non-tested subjects, including the arts.
Additionally, the high stakes testing climate and the perceived need for increased academic
instruction often led to the reduction of recess.

**Implications of Policies on Schools and Students**

As described, policies, grants, and standards initiatives are primary contributors toward
the current assessment-driven climate. The usage of high stakes standardized tests has made
significant impacts on states, communities, districts, schools and students. Importantly, when
considering how to best help children thrive, the benefits of an increased focus on standards and
assessment should outweigh the risks associated with reducing time allocated to recess.

Research indicates that schools try to align curriculum, instruction, and assessments with
state academic standards. Testing allows states to monitor whether all standards are covered,
provides consistency across schools and states, and provides information about areas of
improvement for schools. Some argue this allows schools to foster the development of students’
test taking abilities (e.g., concentration, following directions) (Wolf, 2007).

Although good intentions underlie standards and tests, in practice, such high stakes tests
can have a lasting impact on curriculum, schools, and students. Teachers are increasingly limited by standardized curricula catered toward test content (Cody, 2016), and spend larger amounts of time teaching test-taking strategies (Hagopian et al., 2014). Test scores are publicly reported and linked to rewards and sanctions such as school funding, administration, and employment. Hence, teachers can suffer ramifications if student tests scores are low, including the loss of their job (Shavelson et al., 2010). Although teaching effectiveness is crucial, a primary issue is that low test scores are not always attributable to poor teaching. Factors such as socioeconomic status, access to resources, cultural bias, student mobility, special needs, and English learning, are directly associated with students’ test scores, yet these factors are beyond the control of teachers. This poses a tension between how standardized test scores are used versus the validity of the scores. Although test scores should not be the only source for judging academic achievement, many decisions are based solely on these scores (Chudowsky, Chudowsky, & Kober, 2007).

The intention of standardized tests are to motivate students, determine whether students mastered grade level standards, and identify and promote early intervention (Wolf, 2007). However, the amount of pressure being placed on high stakes tests leads students to experience test anxiety and isolation (Segool, Carlson, Goforth, von der Embse, & Barterian, 2013). Schools are increasingly giving standardized tests to younger children – even as early as Kindergarten – when the reliability and validity of testing for young ages is questionable (Moreno, Maloney, & Brown, 2010).

It is critical to consider whether evidence-based practice drives policy decisions. The evidence indicates that standardized testing is not necessarily beneficial to students’ well-being, learning, and achievement, whereas recess and free play are directly associated with
achievement, social skills, physical development, and well-being.

The Benefits of Recess

A primary reason why recess benefits students is that children have the opportunity to engage in unstructured free play that is supervised, but child-directed (Pellegrini, 2009). Children develop and learn important social and motor skills, making free play critically important for healthy development (Bohn-Gettler & Pellegrini, 2014).

**Cognitive Development Enhancement.** Free play allows children to make meaning and connections with new information (Pellegrini, 2009). Furthermore, short breaks between learning sessions allows the brain to process, encode, and consolidate content in long-term memory (Brusseau & Hannon, 2015). Recess affords distributed practice (as opposed to massed practice), which improves focus, alertness, learning, efficiency, productivity, achievement, and memory, and decreases boredom (Toppino, Kasserman, & Mracek, 1991). Switching from one academic task to a different academic task is not enough of a break to provide the aforementioned benefits: a true break requires a physical and social change to prevent habituation (Ginsburg, 2007; Toppino et al., 1991). Therefore, for optimal learning, students need breaks from academic rigor.

**Behavior Improvement.** Student attention and learning improve after recess, but waiting longer periods of time in between recess periods can decrease this effect (Murray & Ramstetter, 2013; Pellegrini, 2009). Children allowed more than 15 minutes of recess in a day demonstrate improved behavior over students with less or no recess time (Murray & Ramstetter, 2013). One potential reason for the link between recess and attention is explained by novelty: focus improves for new and different stimuli. Because recess provides breaks from school work, the novelty of schoolwork increases upon returning to the classroom, which increases attention, interest, and
behavior regulation (Dagli, 2012).

**Social and Emotional Development.** During recess, child-directed play facilitates building social skills (Chmelynski, 2006) by teaching children how to “encode and decode social and emotional cues, take turns, and inhibit impulsive and aggressive responses” (Pellegrini, 2009). During play, children must learn to cooperate, share, problem-solve, role-play, negotiate, and exert self-control in authentic ways (Murray & Ramstetter, 2013). All of these social and emotional benefits help children build friendships, which facilitate adjustment to school, overall health, and achievement (Bohn-Gettler & Pellegrini, 2014; Pellegrini, 2009).

**Physical Benefits.** Free play is often physically vigorous (Kraft, 1989), benefitting muscular and bone health (Pellegrini, 2009), endurance, strength, and coordination (Dale, Corbin, & Dale, 2000). Sitting for more than an hour is considered excessive physical inactivity (Chmelynski, 2006). In school, however, children often sit for long periods of time without breaks (Murray & Ramstetter, 2013). Such inactivity can have health consequences nearly equaling the severity of smoking or obesity (Brusseau & Hannon, 2015).

**Achievement.** Each benefit of recess directly influences achievement. Physical activity improves intelligence, mathematics, and literacy skills (Fedewa & Ahn, 2011). In addition to the benefits of distributed practice (Toppino et al., 1991), free play and peer interactions enable children to build cognitive and problem-solving skills, create and follow negotiated rules, and become self-directed (Bohn-Gettler & Pellegrini, 2014; Waite-Stupiansky & Findlay, 2001). Social skills on the playground predict unique variance in academic achievement (Pellegrini & Bjorklund, 1997). The language children utilize during open-ended peer negotiations is as sophisticated as instructional language, containing variety and depth of vocabulary (Isbell & Raines, 1991). Hence, free play promotes language development and perspective-taking skills,
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which directly relate to achievement (Bjorklund & Pellegrini, 2000).

Another reason why recess is important for children’s overall learning and achievement is that it allows students to engage in higher-order thinking and complex problem solving. This is in stark contrast to how modern curricula often focus on test-taking strategies and assessment-related content. Approximately 80% of teachers reported they increased time spent on tested subjects, and nearly 50% stated that they decreased time on non-tested subjects. In addition, 71% of districts opted to decrease time spent in other curricular areas to allocate more time for the test subjects of reading and math (Madaus, Russell, & Higgins, 2009).

High-stakes standardized tests often contain multiple choice questions in an effort to improve reliability and validity. However, it is difficult to assess higher-level thinking (such as analysis, synthesis, and creativity) with multiple choice questions (Kohn, 2000; Madaus et al., 2009). Multiple choice testing takes away from children being able to apply their knowledge in real-world settings. Arguably, real-world settings do not involve answering multiple choice questions, but instead require solving problems by applying knowledge to critically analyze complex situations in collaboration with others.

Although students and achievement scores certainly benefit from quality instruction, the evidence suggests that recess does not detract from achievement, but instead improves achievement (Castelli, Glowacki, Barcelona, Calvert, & Hwang, 2015). In a national longitudinal study of 22,000 kindergartners, students with recess three times a day, three times a week for 45 minutes or longer had higher scores than students with recess only once a week for 1-15 minutes (Dagli, 2012). In looking to research in other countries, a recent study with Danish students found that short breaks improve test scores (Sievertsen, Gina, & Piovesan, 2016). As another example, students in Finland receive 15 minutes of unstructured break time for every
hour of the day, and they have some of the highest global education scores and ratings (Bendici, 2017). Hence, removing recess time in an effort to improve achievement is counterproductive, and may instead jeopardize children’s achievement and holistic development (Bohn-Gettler & Pellegrini, 2014; Ginsburg, 2007).

Conclusion

Because of the benefits of recess for overall development of children, the United Nations High Commission recognizes recess as a fundamental right of every child (Ginsburg, 2007). According to NAECS (2001), recess should be used as a tool for furthering students’ education (NAECS, 2001). Corroborating this view, researchers document a variety of evidence regarding how recess and free play are required for healthy child development (Ginsburg, 2007; Murray & Ramstetter, 2013).

When comparing how recent legislation and assessment practices influence the amount of time children can spend in recess, incongruities between research and practice are apparent. Assessment-driven policies have directly influenced the daily lives of students and teachers in schools across the country. Although the rise of standards-based curriculum and assessment is rooted in good intentions to close the achievement gap, the evidence does not suggest gains in that direction. The United States is experiencing a decrease in unstructured recess on account of more time devoted to teaching to state mandated standards and requiring federal high stakes standardized tests. The incongruity lies in the long-term holistic benefits that unstructured recess provides to students. Policy makers, schools, and advocates for children should consider this research when making critical decisions that affect the health, achievement, and development of all children. High stakes testing and curriculum mandates should be balanced with research-based and developmentally appropriate practice to support holistic development. In short, recess
should be a regular part of the school day for all young students K-6.
References


Hart, R., Casserly, M., Uzzell, R., Palacios, M., Corcoran, A., & Spurgeon, L. (2015). Student


doi:10.1073/pnas.1516947113

parents (pp. 124-126): American Press.


A Study on Active Learning in Language Education

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Abstract

We conducted an actual education in British primary school and introduced Jishobiki (JB), which is already successful educational method in japan to use dictionaries effectively with tagging, as a way to learn English as a native language. By interviewing the teachers who tried the method, we found potentials that JB can improve students’ motivation in the context of active learning, and also can apply JB to language educations other than Japanese and English language.

1. The aim of this study

The aim of this study is to clarify what kind of outcomes and problems will be revealed in United Kingdom, Japanese primary schools when introducing "Jishobiki (JB)" to improve vocabulary skills and active learning habits. Specifically, we continually practice JB at primary schools in the UK, Japan and Singapore, and interviewed among teachers and children about their effects and challenges.

According to the new course of study in Japan, the foreign language education will be introduced to elementary schools in Japan. What has been largely affecting the construction of logical framework of foreign language education in Japanese school education is CEFR. However, the logical framework of the foreign language education in japan is ignoring plurilingual and pluricultural aspects, which are the original concept of CEFR, and putting too much importance only on English. Not only that, it ignores the motivation that people in Europe can have, who are usually in the environment where multiple languages are spoken.

In this framework, we can’t discuss how to make an environment where multiple languages are spoken or how to improve the motivation.

2. What is “Jishobiki (JB)”

We have been conducting the studies to achieve a goal: to apply “Jishobiki (JB)”, which is an already successful educational method in japan, to the language
education, in terms of the motivation and active learning. This project has proved that the JB is successful in learning non-Japanese languages, and observed how the method can be used well. We conducted the actual education in British primary school and introduced JB as a way to learn English as a native language. It becomes clear that JB can function well in learning English. By interviewing the teachers who tried the method, we can see the different attitude toward active learning between Japan and Britain. British school makes the time of JB and has helped the children to learn better in other subjects as well as in English. When we introduce JB to foreign language education, the effect will be increased if we combine CLIL method to JB.

3. Consideration

The same educational model was practiced in Japan, UK and Singapore and the difference in features was clarified in the following points.

(1) About JB from "Introduction period to deployment period"

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<th>Introduction period</th>
<th>Deployment phase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UK</strong></td>
<td>· Tackle various situations for one week after introduction class (during lesson, play time)</td>
<td>· Classes focusing on a dictionary in part of spelling and grammar lessons once a week. In addition to that, we recommend putting a dictionary on the desk throughout the week and using a dictionary. · Provide incentives. · Work in the morning “Reading for 30 minutes”.</td>
</tr>
<tr>
<td><strong>Japan</strong></td>
<td>· After the introductory lesson, we will focus on various subjects, even on holidays.</td>
<td>· Work on each subject.                                                           · Work during your own free time.</td>
</tr>
</tbody>
</table>

First is the introduction and deployment of JB. Regarding the introduction of an educational model that is not in the curriculum, it is common to design to adapt to each existing education systems.

When introducing JB in Japan, there are many things to deal with during each subject’s lessons that are within the responsibility of the teacher. In the case of the UK, we handle it in various situations inside and outside the class. It is considered that
Britain is more discretionary to teachers than Japan.

The educational effect of JB in the educational context of the UK is seen as improving the ability of spelling, and it is associated with improving class content by using a dictionary once a week among English classes.

In addition, Britain is actively accepting incentives for learning outcomes. In the introduction period, in Japan, I was working on learning dictionaries in the classes of each subject mainly in Japanese. However, in the UK, starting with using the dictionary for fun inside and outside the class, as I became familiar with English while giving spelling and grammar lessons and incentives, I could see that they were actively continuing outside the subject. That is, in Japan and the UK, the way of presenting the purpose for drawing a dictionary is different.

(2) "Short-term benefits" and "long-term benefits" of JB

Next is a comparison of "short-term benefits" and "long-term benefits" of JB felt by a teacher in the UK and Japan.

<table>
<thead>
<tr>
<th></th>
<th>Short-term benefits of JB</th>
<th>Long-term benefits of JB</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>• To cultivate curiosity about words and the subjectivity of children.</td>
<td>• To master correct spelling in English learning.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Increase interest in synonyms.</td>
</tr>
<tr>
<td>Japan</td>
<td>• It is effective for reading comprehension of Japanese language literature teaching materials.</td>
<td>• Deepening learning of subjective words.</td>
</tr>
<tr>
<td></td>
<td>• The interest in the vocabulary of each subject increases.</td>
<td>• It will become of interest to children and so they will continue to voluntarily learn.</td>
</tr>
</tbody>
</table>

In the case of Japan, as a short-term benefit of JB, we see that reading comprehension of literary teaching materials in the national language and interest in vocabulary in each subject such as mathematics has improved. And as a long-term benefit, there is a tendency to new learning habits using dictionaries and subjective learning postures.

On the other hand, the way to capture with a British teacher is the opposite. As "short-term benefits", "curiosity and subjectivity of children's language" is cited, and as a long-term benefit, "effect on spelling abilities" is cited.

In Japan, educational attitude training is the practical purpose, however in the UK emphasis is put on deepening and expanding vocabulary skill. Japanese teachers are tied to the curriculum and lessons of each subject, but their emphasis is to improve the
motivation for children's learning.

In contrast, British teachers have curriculums and lessons for improving vocabulary skills, but their handling of it is more flexible. For British teachers, motivation is a "tool" for acquiring ability.

And, as a long-term benefit of JB, I discuss the development of vocabulary skills, encouraging active activities, improving reading comprehension ability, and using dictionaries in research activities.

(3) "Teacher's view on Children", "View of teaching materials" seen in introducing JB

Finally, “teacher’s view on children», "view of teaching materials" seen at the introduction of JB.

Table 2  "Teacher's view on Children", and "View of teaching materials" seen in introducing JB

<table>
<thead>
<tr>
<th></th>
<th>Teacher's view on children</th>
<th>View of teaching materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>· Interest in differences in classroom capacity.</td>
<td>· Appeal of the dictionary as a teaching material corresponding to the ability difference.</td>
</tr>
<tr>
<td></td>
<td>· High interest in developing children's abilities</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>· There is a great amount of stress that the teacher is holding about the course progress of each subject and the course plan execution of each subject.</td>
<td>· The Japanese dictionary has a general versatility as a teaching material that can also deal with the vocabulary of each subject other than national language.</td>
</tr>
</tbody>
</table>

Japanese faculty are stressful about the lesson plans and progress of each subject, and there is worry that the lesson will not be established for children to use dictionaries freely.

Meanwhile, British teachers are highly interested in the ability difference in the classroom, and have great interest in JB which is effective regardless of superiority or inferiority of ability. Japanese teachers think that they must manage classes and feel that there is a need to positively position the significance of JB in each subject.

UK faculty are thinking about that in a big way, but in acquiring knowledge skills of spelling, which is a big task in elementary school English education, great expectation is given to JB.

(4) "View of vocabulary education" seen in JB introduction

The word "root word" appears in an interview with teacher Miss Cafferkey in "What is the long-term advantage of JB".

T 6: In the long term, I'm hoping it will improve their spelling. Every time you learn a
rule, every word you come across after that does not abide by the rule. They are
beginning to understand the spelling patterns.

In vocabulary education, British teachers are interested in that they can encounter
"root words" by repeating reading dictionaries with JB”. To deepen the understanding of
English vocabulary and to expand vocabulary, attention to the root is extremely
effective, and there is an advantage that the root is easily found in the arrangement of
the vocabulary of the dictionary. National Curriculum UK has "Glossary for the
programmes of study for English (non-statutory)” and "root word" is mentioned on page
93-94. The usefulness of focusing on "root words” is recognized among faculty members
through National Curriculum UK.

For British teachers, sticky notes where the found vocabulary is written and
attached to the dictionary is a ‘reagent’ of vocabulary extension and extension, and as a
way of accepting dictionary learning as vocabulary guidance in the UK. In the British
language you can catch a glimpse of cultural and pedagogical features.

4. Conclusion

As a next step, our team is planning to conduct an empirical research about
native language education (Chinese and Tamil language) in the schools where have
whole educational system in English in Singapore and Thailand.

References
Fukaya & Edmund Lim, Kohata (2011). Linking Jishobiki with the Teach Less Learn
More (TLLM) Pedagogical Approach: Tokyo, Association of Lesson Studies
International Conference 2011, University of Tokyo.
Education.
MOE. (2002). *Tamil Language Syllabus Primary*. Singapore: CPDD, Ministry of
Education.
Scientific Literacy for All: A Case Study Teaching Science to Women Who Are Incarcerated

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Abstract:
In 1989, the American Association for the Advancement of Science (AAAS) report titled, “Science for All Americans” described the scientific knowledge and skills that are needed by adults in the 21st century to be scientifically literate (Rutherford, Ahlgren, 1989). Scientific literacy is the ability to ‘do’ science’; that is, it means a person has the knowledge and understanding of scientific concepts and processes and can use them for personal decision making and participation in civic affairs. Nearly thirty years after the AAAS report was completed, the goal of scientific literacy for all has not been achieved, especially for a particular population: the men and women that are incarcerated in prisons and jails.

Even though there are over 1.5 million people incarcerated in U.S. prisons and jails (Carson, 2018), and 90% of these facilities have educational programs (Harlow, 2013), there are very few documented courses that focus on teaching inmates basic science practices. These are practices or science skills used by a scientifically literate person to make informed decisions in everyday life.

Given the goal of scientific literacy advocated by AAAS, and the necessity for all citizens to be able to make intelligent and informed decisions, a need exists to provide educational experiences, especially those related to science to this population of U.S. citizens.

This case study explored the challenges and benefits of teaching a three-credit undergraduate level science course at a state correctional facility for women from the perspective of the instructor and the students. The course was designed for people who have had little or no previous experience in science and was held over a nine-month period. It utilized a laboratory approach to the study of the concepts, processes and value of science as well as the components of the nature of the scientific enterprise. One of the course texts focused on the skills used to answer questions scientifically (Rezba, et al, 2007) while the second book provided a historical and gendered context to women’s contributions to the sciences (Des Jardins, 2010).

The course culminated in a final project in which the students demonstrated their understanding of science processes by designing, conducting and presenting the results of a science experiment. The women needed to use the science skills they had learned throughout the year to develop a
testable hypothesis, create a procedure to test the hypothesis, collect and record data, analyze the
data and determine if their hypothesis was supported. This was no small task to complete in a
prison environment, but the women showed great creativity in their research and presented their
experiment in a poster session held in the spring program completion ceremony for all students
taking a course that year.

The course also contained a strong reflective component in which the students identified and
analyzed how their past science related experiences impacted their present feelings towards
science and current decision-making processes. This last feature of the course was particularly
relevant to the women since many of them stated at the beginning of the course that their
motivation for enrolling in the course was to first improve their attitude towards science and
success in a science course, and then to positively influence their children’s experiences with
science.

There were numerous challenges encountered for the instructor, not the least of which was a
complete surrendering of any control over the environment outside of the classroom due to
security procedures and the exercise of power over the insiders and the instructor.

Despite the challenges and logistical issues such as lack of technology and constraints on the
supplies that could be brought inside, the experience was transformative for the instructor, both
professionally and personally. Once the classroom door was closed and class began, we were a
learning community that was very similar to the one traditionally encountered at the university.
The students were engaged, excited to learn and were very appreciative of the fact that the
instructor was willing and enthusiastic about teaching in a prison setting. The women remarked
that the class challenged them intellectually in an environment that normally was unstimulating.
They often brought in information from science related articles they had read, or television
shows they watched. At the end of the class many of the students noted that they now found
learning science less intimidating and that they felt more comfortable judging the validity of a
finding from a scientific perspective. The women also expressed a hope that additional science
courses such as biology be offered to them in the future so that they could continue to be
challenged intellectually.

References

New York, NY: The Feminist Press at CUNY.

Kendall Hunt.
Developmental Achievement versus Standardized Growth: Common Curricula & The Not So Common Student

Introduction

The process of teaching and learning is being influenced more by standards developed outside a given classroom than by the students in that room. This research challenges the presumed value of standardization in public education, especially the notion that student achievement is synonymous with performance on summative criteria insensitive to the unique characteristics of every child.
Due to a multitude of human variables, no student is *standard* and none can therefore be standardized. By its very nature, a standards-based education generates gaps among students with different backgrounds. The infusion of *common* standards, curricula, pedagogy and assessments greatly challenges a teacher’s ability to diversify instruction in order to effectively address the needs of individual students.

A truly effective learning environment is a place where no student feels disadvantaged by his or her unique background, but instead is empowered by it. School leadership and staff must therefore help every child connect personally with the curriculum, his or her teacher(s), peers and school.

The overarching question driving this study: “How do educators effectively meet the individual needs of highly diverse students in this era of standardization?” In other words, how do we maintain the human element of teaching, which is so critical to positive adolescent development?

**Changing Landscape**

The American public education enterprise continues to reflect societal interests and needs. The demands on public education have become greater and more complex.

**Education reform.** Throughout the history of American public education, curricular reform efforts have involved a frequent shifting between “rigor” and “relevance” (Steinburg, 2010). Focused on rigor, contemporary public policy intimately links teacher and whole-school performance with measures of student proficiency based on academic standards (Schaffhauser, 2010).

As a result, public education is increasingly being driven by data (Davis, 2008). Although school personnel devote a great deal of time and attention to standards-based student achievement scores, such data typically reveals little if anything about the individual student and his or her interests, aptitudes and aspirations. Rarely does it offer feedback about the formative process of learning which is unique for every child.

A narrow focus on standards-related data dehumanizes education. Learning is a highly individualized process, not a factory line production. Educators cannot be expected to produce a standard product because no two children are the same—and never will be. The current approach to educator accountability is flawed because standardization emphasizes conformity and thus falls short of guaranteeing each student the opportunity to achieve at his or her highest possible level.

**Instability.** The stability of today’s families has been immensely impacted by national, state and/or local economic insecurity (Hacker, et al., 2011). Especially in larger communities, schools have experienced fluctuating enrollment throughout the academic year as families search for employment and/or a place to live. Some students
will enroll in two or more schools in a given year or spend each grade in a different institution.

When children move from one place to another, it is often difficult for them to develop and maintain critical academic and social skills (Institute for Family Studies, 2015; McFarland, 2011). Concrete and meaningful connections with peers and teachers are severely compromised.

**Diversity.** For various reasons, a number of public school systems have been experiencing changes in their student demographics (National Center for Education Statistics, 2017; Stevens, 2015; Howard, 2007). This is evidenced by the expansive role of student services, which encompass: poverty, race and ethnicity, language, disabilities, substance abuse, teen pregnancy, and sexual orientation.

**Additional Responsibilities.** American public schools have had a long tradition of *in loco parentis* whereby school officials are expected to assume parental status and responsibilities while students are in their charge (Stuart, 2009). Recently, there has been a cultural resurgence of this doctrine. In addition to delivering instruction, educators are faced with teaching children proper behavior, ensuring student attendance, addressing physical and mental health needs, and assisting with student and family welfare (Volmer, 2012; Resnick, 2006).

**Decreased Funding.** Traditional support for public education has become less stable in many communities (Mckinney, 2917; Leachman, et al., 2016). Local and state aid has not kept pace with even baseline expense (Scott, 2012). In fact, several public school districts across the nation are grappling with a significant decrease in revenue. To help balance the budget, some have reduced staff. This has resulted in increased class size and thus a higher student-to-teacher ratio.

In other words, schools are expected to do more with less during a time of societal instability. The impact, of course, is realized in the classroom. While being held accountable for standardized measures of achievement, many public educators are experiencing a steady increase in class size, diversity, and student need.

**Action Research**

This study was initially conducted during the 2010-11 regular academic year. It has since been replicated with similar results. The following is from the original research.

Examined are two team-taught 10th grade social studies classes. Both groups of students were highly diverse. The classroom teachers intended to increase student academic achievement by purposefully addressing individual student backgrounds, interests, abilities and needs. Curricular standards were utilized as a framework for instruction. Student data was collected throughout the school year, which included: attendance, discipline, and academic performance. In addition, student feedback was solicited near the end of the second semester.
Student Profile

Individual student data was collected at the beginning of the 2010-11 academic year, and whenever a new student joined either class.

Average class size was 32 students. The majority were from low income families. About one-quarter of all students had a disability, and nearly 20% did not speak fluent English.

| Low Income | 63 % |
| Special Education | 23 % |
| English Learners | 18 % |

The majority of students were non-white. Of these, 30% were Hispanic. Other racial/ethnic groups included African American, Asian, and Native American.

| Caucasian | 45 % |
| Hispanic | 30 % |
| African American | 10 % |
| Asian or SE Asian | 10 % |
| Native American | 5 % |

Student reading lexiles, as measured bi-annually via the Scholastic Reading Inventory (SRI), ranged from 150 (Below Basic) to 1350 (Advanced). The average lexile score for the combination of both classes was 700 (Low Basic). SRI identifies suitable reading proficiency for 10th graders between the lexiles of 1000 and 1200.

Entering the 10th grade, 28% of students from both classes were credit-deficient. Also, 44% were habitually truant as freshmen. According to the Wisconsin Department of Public Instruction, a “habitually truant” student is absent from school without an acceptable excuse for part or all of five or more days on which school is held during a semester (Wisconsin Department of Public Instruction, 2012).

Both classes were team-taught by the same staff (i.e., social studies teacher, special education teacher, and student teacher). Given such a wide range of student backgrounds, skill levels and aptitudes, the following principles were formulated by the teacher team:

1. **A highly productive learning environment begins with us.**

Education is NOT about programs but always about relationships. It is therefore critical that teachers consistently model positive interaction, teamwork, trust and respect. To effectively serve a diverse group of students, differences among the teacher team were viewed as assets (e.g., training, experience, interests).
2. **Students will always be our focal point.**

“What does the student need from each of us in order to achieve?” was the central question. All persons in a classroom play a vital role in the learning process, students and teachers alike. As such, everyone is obligated to help each other succeed. Teachers cannot expect their students to effectively collaborate and learn together if they as professionals do not.

The mission of the teacher team was to establish a culture of positive relationships whereby respect and caring are highly valued. Everyone was intentionally made to feel welcomed. Since many students lived in extreme poverty, the teacher team also believed it was important to provide for such basic needs as school supplies, nutrition, and emotional security. This became infectious, as students began to reach out to each other. They even raised an incredible amount of food items for the Salvation Army.

Students were encouraged to assume ownership of the class. They could decorate and post messages in designated areas. Additionally, students were given opportunities to engage in open discussions about a variety of topics, including how to improve their educational experience. This not only led students to experience academic success, but fostered the development of new skills that could be carried over into other disciplines.

3. **Instruction will be highly individualized.**

Although core standards provided curricular structure, this course was designed to fit the students—versus making them adjust to the course. The teacher team was concerned that placing highly diverse students in a “standard” type of learning environment would significantly disadvantage some individuals, if not most.

To ensure the achievement of every student, and thus the whole group, student data was gathered and analyzed to create individual profiles. Information included: assessed academic skill levels (especially reading), transcripts (courses and grades), student services provided (e.g., ELL, special education, social services, health), attendance and discipline records, as well as any personal background information (e.g., participation in co-curricular activities, career goal and/or jobs held, ethnicity, family).

The individual profiles emphasized student strengths, but also highlighted limitations and needs. From this, the teacher team was able to personalize instruction. Gaps were bridged in student backgrounds (e.g., language, culture, socioeconomic level) and academic skills (e.g., literacy, content, and context). Corridors were constructed to help students effectively navigate academic standards as well as the school’s middle class norms and “hidden rules.” Students were placed in learning situations where they could fully utilize their individual strengths. The profiles also enabled the teacher team to identify potential problems, and thus be prepared to provide assistance.
4. **Maximum student participation for every lesson.**

Brain research indicates there is increased meaningful, remembered learning when students are actively and interactively engaged, comfortable socially and emotionally, intellectually challenged, and in enriched learning environments (Richardson, 2003).

Each lesson was designed to balance rigor with relevance. Achievement targets were established for every student and for the whole class. Instruction was focused on the incremental development of higher-order thinking skills. Achievement targets were therefore continually being raised one notch above current level of performance.

In addition, each unit of instruction included something every student could relate to (i.e., background, personal interest, aspirations). By also providing students a degree of input and choice, the goal of the teacher team was to have each student find purpose and meaning in his or her learning experiences.

While establishing a culture of mutual respect and strong peer support, students were encouraged to work with and proactively assist one another. This included peer-to-peer readings, small group projects, simulation exercises, and study group sessions.

Multi-modal strategies were used to deliver instruction (e.g., auditory, visual, tactile), including a variety of classroom technologies. The teacher team also made an effort to utilize academic interdisciplinary connections that reinforce student learning both within and outside of this particular course.

5. **Multiple ways to demonstrate learning.**

An individualized approach to instructional delivery demands flexible measures of achievement. Given the view that every student serves as his or her own norm, the teacher team was keenly focused on every student’s progressive development along the course continuum. Whole class performance data tends to lose sight of the individual student, and the teacher team did not want to risk doing that.

Students were provided a variety of ways to demonstrate what they have learned. All criteria subject to evaluation (i.e., grading) included clear instructions, guidelines and/or rubrics. The teacher team constantly solicited student feedback to make certain everyone understood what to do. For performance-based activities, student progress was determined by the quality of their projects, primary source research, summative reflections, and discussion.

Students actively engaged in tracking their own progress. Proactive planning discussions were held with those who began to fall behind. Together, the teacher team identified what was happening, why, and how to improve the situation.
The teacher team also posted weekly whole class achievement (i.e., grade average). This proved to be a tremendous motivator, especially as progress improved. The class set its own goal, and they were eager to see the bar move upward each Friday.

Approach to Instruction

The teacher team made a conscious effort to not disadvantage any student on the basis of his or her ethnicity, socioeconomic background, aptitude, academic skill level, interests or needs. Although employing a vast array of instructional approaches to ensure individual student achievement, the primary focus was on content literacy, constructivism, and project-based learning.

Content area literacy:

Many students struggle with understanding course content. Differences in reading level, language, culture, experience and other factors often lead to misinterpretation. Simply being presented with the correct explanation is usually not sufficient (Klein, 2008).

Content literacy is the ability to use reading, writing and speaking to construct and retain knowledge (Misulis, 2009). Students learn how to use information in an effort to understand and reason about content area concepts. Teachers provide appropriate background information and then guide students on how to effectively read, write, communicate and think.

Although not reading specialists, the teacher team offered students direct, explicit content literacy instruction. Graphic organizers for each unit were generated jointly by us and the students. The teacher team also employed the following strategies:

- Preparation (e.g., text preview and exploration);
- Organization (e.g., text framing; main ideas, key vocabulary, essential details);
- Elaboration (e.g., connecting text with student background knowledge); and
- Monitoring (e.g., students tag what they do not understand).

Constructivism:

According to the theory of constructivism, we “construct” understanding and meaning through our experiences and by reflecting on those (Brooks & Grennon, 1999). We become creators of our own knowledge by asking questions, exploring, and assessing what we know. In the classroom, then, students are placed in situations that require them to solve problems, building upon what they already know.

Instruction focuses on key concepts and is aligned with the student’s level of development, which includes pre-existing conceptions (Palmer, 2005). Students seek information, form opinions, make decisions about the relevancy of information, and
apply concepts to new situations. Teachers build a bridge between what students already know and what they are to learn (Gagnon & Collay, 2006).

The teacher team provided students with a problem to solve. As they worked in small groups, our role was to coach, moderate and suggest. Students were also asked to reflect on their learning. Elements of constructivism that were employed:

- **Engagement**—stimulate thinking and help students access prior knowledge (e.g., demonstration or video clip);
- **Exploration**—time to think, plan, investigate, and organize information (e.g., reading authentic document);
- **Explanation**—reflective activities which help students clarify and modify their understanding (e.g., structured questioning);
- **Elaboration**—students apply their understanding to a real-world situation; and
- **Evaluation**—task guidelines and scoring rubrics.

*Project-based learning:*

Students need to make a true hands-on connection with their academic activities in and outside of the school environment. Although many learning experiences are hands-on, much of what actually takes place remains at a surface level (e.g., note taking, test preparation, completing worksheets). Deeper learning occurs via true application.

Yet, we can never fully replicate real-life learning experiences in a classroom for every student (Boss & Krauss, 2007). Project-based learning (PBL) attempts to fill this void by giving students structured choice based largely on their past and present experiences.

Providing students “voice and choice” is perhaps the most imperative element of PBL. Students are given a *voice* in projects to choose, and how they will reach agreed upon learning objectives or targets. The *choice* feature emerges when students determine the way to share their learning process with others (Buck Institute for Education, 2012).

Students are therefore granted the opportunity to propose projects unique to their interests or lives, which are also aligned with key course content. When provided these elements, students are able to retain what they have learned versus forgetting the bits and pieces of teacher-driven instruction (i.e., rote memorization).

The role of the teacher team, then, was to largely facilitate and guide. Students received help with generating challenging questions, structuring their tasks, and reflecting on what they learned from the experience. Throughout, the teacher team made certain the projects remained focused on the concepts being investigated and were thus connected with course content. Some projects involved the whole class, while others were done in small groups or individually.

**Results**
During the course of the academic year, both class sections experienced a significant improvement in work completion, grades, attendance and behavior.

1. Both classes finished the 10th grade U.S. History curriculum in March. Every standard (and benchmark) was achieved. The teacher team then focused on preparing students for the 11th grade and beyond.

2. The collective grade average for both classes at the completion of the second semester was 92%. Only one student did not pass, which was his choice.

To place this in proper perspective, the average rate of failure at this school was about 30% during the 2010-11 academic year. In other words, 30% of the student body did not pass at least one academic course per semester. More stunning is the fact that the failure rate in some other social studies classes ranged from 40-60%. Yet, our two classes were highly impacted by student diversity and need (e.g., academic, language, behavioral, socioeconomic).

3. From the first semester to the end of the second semester, the truancy rate among students in both sections decreased by 27%. In fact, unexcused absences were rare by the start of the second semester.

4. NO student received a disciplinary referral. In-class behavior interventions decreased by 50%. Class was rarely interrupted due to a behavior issue.

At the end of the 2010-11 school year, students were asked to complete surveys about their classroom experience. The return rate was 100%. Results:

- 93.2% preferred student-led activities (i.e., constructivism mixed with project-based learning) because they left feeling more prepared for the “real world.”

- 89.3% preferred projects as summative assessment tools versus traditional tests because they felt the projects allowed them to truly “show what they had learned.”

- 6.8% would have preferred a more traditional model classroom, with homework, textbooks, tests, pre-packaged curriculum, and the like.

At the end of the survey, students were encouraged to offer constructive feedback and comments on what they liked or disliked about the class and curriculum. Notable quotations directly from students include:

- “Projects are a great way to comprehend material because they not only ask you to fill in the blank, but to exploit that blank and give it a story.”
• “I preferred student-led activities because in reality, most of us have 2 years left of school, after which we make 99% of the decisions.”

• “I love the way the class was taught this semester. It taught us how to live the stories that we read. Also, we were able to learn things using our different way and point of view.”

• “I LOVED the projects idea! I agree most people are great test takers, but learn more with hands-on activities. Overall, the projects are fun and interesting!”

**Implications for Teaching**

Again, both classes included several students deemed “high risk.” Many were already credit-deficient by the start of their sophomore year. Some could barely read, much less speak English. There were those with extensive disciplinary records. What could have been a labor-intensive disaster turned out to be a tremendous success. Why?

*Individualized Instruction:*

Standards and benchmarks served merely as the curricular framework. Planning of instruction was based on an ongoing assessment of student backgrounds, interests, strengths, and needs (individual and whole group profiles). Every lesson was therefore designed to “fit” the students. No student was forced to fit the lesson. Achievement targets were designated for every student, always one notch above his or her current level of performance. This approach required us to be flexible, as we were constantly making adjustments based on student development.

For instance, our students had an extraordinary range of reading levels. Our focus on content literacy allowed each student to identify and understand key concepts (i.e., separating “need to know” from “nice to know”). As a result, one did not need to master reading in order to comprehend content and achieve at a high degree.

*Sustained Engagement:*

Engaging students and keeping them engaged is no simple feat, especially with large and diverse classes. Knowing the students and adjusting instruction to them worked very well for the teacher team.

Engagement efforts were carefully planned. Each unit of instruction included something every student could personally connect with (e.g., culture, language, values and beliefs, present living situation). Most important, the teacher team wanted students to realize they have something of value to contribute.
Of course, not everything in the curriculum attracts all students all of the time. The teacher team realized that some students will not feel entirely connected with all of our lessons. By generating enthusiasm for an activity, the teacher team was able to raise student curiosity and interest. Enthusiasm is contagious. Teachers cannot expect students to be engaged in a lesson if they themselves are not engaged.

In addition, instruction was designed to be reasonably challenging in order for students to experience genuine success and thus gain a true sense of accomplishment. As the learning activities became increasingly complex, all students were assured of the teacher team’s belief in their ability to achieve. The main purpose of having students track their progress was for each to realize their strengths and assume greater ownership of the learning process. This worked, as students continuously set higher achievement goals for themselves and even for the whole class.

*Supportive Learning Environment:*

The learning process is personal and social. Students thrive in environments where they feel accepted, nurtured, and safe. Relationships are far more important than standards and packaged programs.

The teacher team was committed to creating a classroom culture that was highly respectful of every individual, a welcoming place where all knew it was safe to express themselves and be who they really are.

For instance, a number of students had a long history of truancy and many were credit-deficient. The teacher team made certain everyone was given a new slate. Even if someone was having an off-day in class, the teacher team assured him or her that tomorrow will be a fresh start. By not focusing on past issues, students were better able to move forward.

This did not mean a free-for-all, however. Parameters, expectations and consequences for stepping over the line were clear, reasonable and fair.

*Strong Sense of Community:*

Despite living in the same area and attending the same school, students have different interests, abilities and family backgrounds. At the beginning of the school year, the teacher team noticed they tended to socialize and work with peers “more like them.” If allowed to continue, social skills development would likely be restricted (i.e., peer interaction, communication, and collaboration). Ultimately, this would severely limit learning opportunities. The teacher team wanted students to identify with the class and thus achieve a greater understanding of the relationship between self and others.
To prevent students from congregating into separate groups, seating assignments were carefully planned. Students were also placed in a multitude of situations where they met, worked with, and depended on others outside their clique. Furthermore, each group activity was purposefully designed to make certain every student was given equal responsibility. As this evolved into class culture, the teacher team was better able to move from planned grouping to random partnerships.

The teacher team also continuously modeled caring and respect for one another. For instance, some of students lived in extreme poverty. No one was punished for not bringing the basic “school tools” to class. Instead, the teacher team had plenty of pens, pencils and notebook paper on hand. Nutritious snacks were also available for anyone who was hungry. Students were never expected a student to say “thanks,” but they always did. The teacher team treated every student with respect, and this example carried over from peer-to-peer.

Similarly, the teacher team focused on the strengths of students who happened to have a disability. Students of color and those learning English were encouraged to share their perspectives and insight. The learning experiences of high-ability students were enriched. As a result, both classes evolved into accepting, nurturing and supportive communities.

Positive Teacher-Student Interaction:

In addition to fostering positive interaction among peers, the teacher team developed an appropriate and effective relationship with every student. Especially in highly diverse classrooms, students will check to see if all are treated equally or if some are being favored over others. In fact, students will often test this!

Trust and respect have to be earned. To accomplish this, provide support whenever it is needed and remain positive even while your buttons are being pushed. Also, clarify your role as the teacher and stick with that. Do not venture into the grey area between teacher and friend, as it becomes too complex and confusing for students. When just one student perceives you as a friend, this can cause problems within the group. You care about each student, but cannot be a pal.

Effective Staffing:

Large, diverse classrooms require more than one instructor. In team-taught classrooms, teachers must function as equal peers. Since the class belongs to the students, there is no need for adults to compete for title or control. Together, you are the collective resource students need the most. Model a highly collaborative environment, and work together to create a culture of positive relationships.

Conclusion
A system of legislated learning is similar to a factory production. It is calibrated, standardized, data driven, and includes quality control mechanisms. Product outcomes determine an employee’s merit and drive marketplace competition despite the fact that public education has always been a non-profit enterprise.

As a result, curriculum and instructional practices are influenced more by standards developed outside the classroom than by the students in that room. A sustained effort to meet the required standards moves instruction along a relatively flat plane, toward the standard middle. This may be a reason why standard scores of student achievement, nationally, appear to have remained relatively flat.

At the policy level, academic rigor is viewed as means by which students are to attain improved student achievement outcomes. However, education experts often disagree on the definitions of rigor and achievement (Center for Public Education, 2012).

A focus on standardized achievement data risks losing sight of the individual student. Such data does not take into account the wide variety of personal factors which influence student development (e.g., interests, aspirations, strengths, language, culture, life at home). Furthermore, standards-based achievement measures do not assess such important skills as critical thinking (Steinburg, 2010). This type of data therefore lacks utilitarian value for teaching and diversifying instruction.

According to Valenzula (1999), subtractive schooling occurs when the dominant culture views the culture of other students as deficits to be overcome, rather than assets to build on. In addition to underestimating ability, this view can diminish a students’ sense of culture and thus his or her social capital.

An assets-based approach to learning focuses on the strengths every student already possesses (Glickman, et al., 2014). From this study, the authors found the following “4-Rs” as essential to ensuring every student is provided a meaningful education:

- **Relationships** (encourage, foster, support and reward learning);
- **Relevance** (what each student finds personally relevant);
- **Rigor** (challenging and achievable on an individual basis; next reachable notch);
- **Resources** (what education leaders must provide teachers and their students).

Academic standards served as the curricular framework, and instruction was highly individualized. The teacher team focused less on student proficiency with the standards, and more on formative development. Student achievement significantly increased as a result.

For students to develop at their highest possible level, they should not be expected to conform to us or to the curriculum. Instead, WE must adjust to our students. If not allowed to develop at his or her own rate, nor assume ownership of the learning process, students are at risk of not realizing their full potential. This can easily cause learning gaps, frustration, and eventual shut-down behavior.
Student achievement is much more than a prescribed label. Achievement is personal, and its measure must take into account an individual’s progressive steps (e.g., academic, social, behavioral). The true meaning of learning is not where one ends, but rather the journey he or she has taken to achieve each milestone. When students realize this, and experience genuine success, they will be inspired to assume greater ownership of their education.

References


Howard, G. (2007). As Diversity Grows, So Must We. Educational Leadership, 64 (6), pp. 16-22.


Developments of Motor Control Function in Primary School Ages and Junior High School Ages

Topic Area: Curriculum, Research and Development
Presentation Format: Poster

Abstract: The authors developed a novel method to measure the performance of motor control function. The task is called as Visual Synchronization Task. This research measured whole pupils with the visual synchronization task in a primary school and a junior high school. This paper presents the clear view of the developments of motor control function in primary school ages and junior high school ages. In primary school and junior high school ages, the gender difference is apparent. Girls shows more progress than boys. The development of motor control function slowdown in junior high school ages.

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Developments of Motor Control Function in Primary School Ages and Junior High School Ages

Topic Area:: Curriculum, Research and Development

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ABSTRACT

The authors developed a novel method to measure the performance of motor control function. The task is called as Visual Synchronization Task. The task needs only 15 seconds to complete, and is safe and noninvasive. This research has 651 pupils as subjects in a primary school and a junior high school, and measured 1544 tasks. This paper presents the clear view of the developments of motor control function in primary school ages and junior high school ages. In primary school and junior high school ages, the gender difference is apparent. Girls shows more progress than boys. The development of motor control function slowdown in junior high school ages.

Introduction

We hope to have a subjective model of the developments of children. Physical development is represented with the height. However, no subjective model of psychological developments is proposed.

There are many motor tasks that measure the abilities of motor functions of a human. They are the Purdue pegboard task, a seal affixation task, a tray carrying task, etc. [1] [2] [3]. These tasks estimate the ability of a motor function of a human with the results of the tasks. There is no observation of the process of the tasks.

There are also some synchronization tasks used to measure human abilities. For example, they are synchronization of finger taps with periodically flashing visual stimuli and synchronization with an auditory metronome. In these tasks, the timing between the stimuli and the action is measured. There is no observation of the process of the tapping [4] [5] [6] [7] [8] [9] [10].

Recently, many cheap and easy measurement methods for the movements of a human body have been developed. For instance, some of these sensors are a Kinect sensor, and a Leap motion sensor [11] [12]. There are many applications that use those sensors for controlling computers. For instance, there are many video games that use those sensors for controlling an avatar in the games [13].

The human hands are the parts of a body that can make the most complex movements. This paper proposes the method that measures the precise movements of hands.
synchronizing the movements of hands on a display. The synchronization needs visual perception of the displayed hands’ images and precise control of the arm muscles. The process includes the perception of motion about a hands’ image presented on a display, the perception of motion about subject’s hands, motor recognition with muscular sensation, and recognition of processing delay in a subject’s brain.

The authors have proposed the new synchronization task and the evaluation method. The resulting measure is very sensitive. With this measure, we can observe the performance of the motor control function. The authors’ previous work shows the developments of motor control function of boys and girls in primary school ages [15].

This paper presents the model of the developments of motor control function in primary school ages and junior high school ages. The model shows that the difference of the developments of motor control function between genders and ages.

First, we discuss the new visual synchronization task with visual presentation, and non-smoothness measure that represents the performance of motor control function. Then, this paper shows the non-smoothness measure experiments in two primary schools in Japan. Next, we discuss the experimental results. And last, we conclude this work.

New visual synchronization task and performance measure

Visual synchronization task

Our new synchronization task requests to subjects to synchronize the movements of both hands with the displayed movie. Of course, there are many alternatives to hands. However, we make many hands’ movements without dangers. A hand is an organ that can make the most complex movement in a human body. The performance evaluation system estimates the difference between the displayed hands’ movement and the measured hands’ movements of the subject.

The displayed movie shows the hands’ rotation. The angle of the rotation is controlled as a sine curve. A finger tapping task requests to a subject to tap a finger synchronizing to impulsive stimuli such as a flash of a light or a tic tac sound of a metronome, and measures the difference between the time of the stimuli and the time of a tapping. Our proposed motor
function performance evaluation system measures the movements of subject’s hands and evaluates the difference between the displayed hands’ movements and the hands’ movements of a subject.

To complete the visual synchronization task, a subject looks at the displayed hands, recognizes movements on the display, generates motions, feels and looks his hands’ movements, recognizes the movements of his hands, and synchronizes two movements. The proposed visual synchronization task needs many kinds of brain activities. Figure 1 shows the relations among the elements included in the visual synchronization task.

![Figure 1. Relations among elements included in the visual synchronization task.](image)

On a trial, our visual synchronization task measures about 100 pairs of rotation angles of both hands in each rotation. The finger tapping task measures one difference of time between the stimuli and the tapping. In a single rotation, the proposed visual synchronization task has 200 times measurements than the finger tapping task.

An infant aged 6 to 7 years-old can rotate his hands quickly. To complete the proposed visual synchronization task, a subject must control the rotation angle as the displayed movie. This is more difficult than a simple rotation of hands.

The angle of displayed hand’s rotation is controlled as a sine curve in a time series. As a result, the angle of rotations is described as (1).
\[ \text{Angle}(t) = \sin(at + c) \times b \]  \hspace{1cm} (1)

In (1), \( a \) is the parameter that defines the speed of rotations. In our experiments, \( a \) is set to \( 2\pi \). \( b \) defines the range of rotation angle. In our experiments, \( b \) is set to 90 degree. The function \( \sin \) spans from -1 to +1. As a result, hands rotate 180 degree. \( c \) defines the phase. In our experiments, \( c \) is set to \( \pi/2 \).

If a subject makes complete synchronization to the displayed movie, the resulting observed rotation angle of hands also shows the same curve defined as (1).

**Trial**

One trial is constructed from 15 cycles of hands rotations. One cycle needs one second. Therefore, one trial needs only 15 seconds. With the preparations, one trial only needs 60 seconds. This enables to measure whole pupils in a school in a very short period. Our experiments took two days at a school.

**Non-Smoothness Measure**

We describe a proposed non-smoothness measure as NSM. We define NSM depending on the definition of noise in signal theory. With the precisely controlled hands motions proposed on a display, we can define NSM clearly. The definition of NSM is (2).

\[
\text{NSM} = \sum_{x=2}^{t/4} m_x/m_1
\]  \hspace{1cm} (2)

In (2), \( t \) is the number of measurements in a cycle of rotation. \( m_x \) is the absolute value of the x-th term of the result of Fourier transform. \( m_1 \) is the power of the lowest frequency. This represents a one cycle of a hand’s rotation. If the rotation of a hand follows the stimuli images precisely, the \( m_1 \) carries all the powers of the hand’s rotation. Other terms carry no power. In the case, the NSM defined as (2) is 0.

In our experiments, we measure the rotation angle of hands at every 1/100 second. So, we have 100 measurements in a cycle of rotation. We calculate the NSMs at both hands. In a cycle, we have a pair of NSMs. In a trial, a subject makes 15 times of hands’ rotations. A
subject needs some time to synchronize his hands’ rotations to the displayed movie. So, we ignore first three rotations. As a result, we have 12 pairs of NSMs at each trial. For evaluating the performance of a trial, we select the minimum of the moving average of continuous three NSMs of each hand for the representative value of the performance of a hand. In the selected two representative NSMs, we select the minimum one for the representative value of a session. This representative NMS is called session NSM. The session NSM is described as sNSM in the following [14].

**Visual synchronization task in two schools**

We measured NSM of all pupils in the years 2017 and 2018. Table 1 shows the number of pupils in the schools. The total number of subjects is 651. The schools are middle size in Japanese standard. Pupils in Japanese primary schools are from 7 to 13 years old, and the months from birth are from 73 to 150. Students in Junior high school are from 13 to 16 years old, and the months from birth are from 144 to 180. In a primary school, 4 times of measuring experiments were executed in April, September of 2017, January and April of 2018. In a junior high school, a measuring experiment was executed in April of 2018. The total number of the trials of visual synchronization task is 1544.

The primary school is in a suburbs of a local city. The junior high school is in a countryside. There is a difference of environments between two schools.

One trial of the measurement needs 15 times of rotations of hands. Each rotation takes one second. The one trial needs only 15 seconds. We made two or three trials simultaneously. There is no need to take much time for the visual synchronization task.

In the experiment, there are some failures and errors. The majority of causes of the failures and errors are the spatial relation between subjects’ hands and the measuring sensors. The used sensor measures the position of the hands and fingers precisely. However, there is a limitation about the spatial relation between the sensor and the measured hands. In the failures, we guide subjects to keep the proper position of the hands.
### Table 1. Basic statistics of both schools.

<table>
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<tr>
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<td>#</td>
<td>Average sNSM</td>
<td>STD sNSM</td>
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</table>

**Model of developments of motor control function**

Our previous work shows that the difference between gender are large on motor control function [15]. Therefore, this paper discusses the developments of motor control function at each gender.

**Basic aspect of development of motor control function**

First, this paper discusses the basic aspect of developments. Figure 2 shows the total distribution of the measurements in ages and sNSM. In Figure 2, the horizontal axis shows the months from birth. The values of the months from birth are between 75 and 180. The
vertical axis shows the sNSM. Ten measurements that are over 1.0 are not displayed on Figure 2. The blue marks represent the measurements of boys. The red marks do the girls.

Figure 2. Total distributions of sNSMs.
Teachers’ observations show that about 20% of pupils have some problems. Based on the teachers’ observations, this paper defines normal pupil as the better 80% of all pupils. Figure 3 shows the moving average of the better 32 measurements in 40 measurements of sNSMs in ages. In Figure 3, the horizontal axis shows the months from birth. The vertical axis does the sNSM. The blue marks show the distribution of the boys. The red marks do the girls. In Figure 3, in younger people, the gender difference is apparent. As sNSM is smaller, the performance of motor control function is better. The performance of girls is better than the one of boys in primary school and junior high school ages.
Figure 4 shows the standard derivation of the better 32 measures in 40 measures of sNSMs in ages. In Figure 4, the horizontal axis shows the months from birth. The vertical axis does the standard derivation of sNSM. Under 110 months from birth, the derivation of boys are larger than ones of girls.

Precise Development of motor control function of boys

Under 130 months from birth, the development of motor control function of boys is apparent from Figure 3. Over 130 months from birth, in our experiments, the developments of motor control function of boys is not apparent. The linear approximation of the distribution is shown as (3).

\begin{equation}
sNSM = -0.00319 \cdot M + 0.69957 
\end{equation}

(3) is the linear approximation of the developments of motor control function from 73 months to 130 months from birth. In (3), \(M\) is months from birth.

Over 130 months from birth, the developments of boys are not apparent. The linear approximation is shows as (4).
\[ s_{NSM} = 0.001167 \times M + 0.121089 \]  \hspace{1cm} (4)

Over 130 months from birth, the development of motor control function of boys stops. However, around 140 months from birth, the subjects both from a primary school and a junior high school are mixed.

To avoid the effect of the difference of environments, in the range of months from birth from 155 to 170, we have the linear approximation as (5).

\[ s_{NSM} = -0.00102 \times M + 0.443806 \]  \hspace{1cm} (5)

Comparing (3) and (5), the pace of development of motor control function over 155 months from birth is one third of the one of under 130 months from birth.

**Precise Development of motor control function of Girls**

Under 130 months from birth, the development of motor control function of girls apparent. Over 130 months from birth, the developments of motor control function is girls is not apparent.

\[ s_{NSM} = -0.00166 \times M + 0.47039 \]  \hspace{1cm} (6)

(3) is the linear approximation of the developments of motor control function from 73 months from birth to 130 months from birth. In (6), M is months from birth.

Over 130 months from birth, girls keep their development of motor control function. The linear approximation is shows as (7).

\[ s_{NSM} = -0.00026 \times M + 0.29773 \]  \hspace{1cm} (7)

The development of motor control function of girls slows down over 130 months from birth. However, the development continues.

To avoid the effect of the difference of environments, in the range of months from birth from 155 to 170, we have the linear approximation as (8).

\[ s_{NSM} = -0.00019 \times M + 0.283735 \]  \hspace{1cm} (8)
Comparing (6) and (8), the pace of the development of motor control function of girls over 155 months from birth is one ninth of the one under 130 months.

Difference between genders

Figure 3 shows that the difference between gender exists in all ages from 78 months from birth to 180 months. Near 130 months from birth, the gender difference is small. The environment of the primary school and the one of the junior high school differs much. The primary school is in a suburbs of a local city. The junior high school is in a countryside. Our previous work shows that the environments affect the developments of motor control function over 130 months from birth [16].

Under 130 months from birth, girls show more progress than boys in motor control function. On the pace of the progresses of the developments of motor control function, boys are twice as fast as girls.

Over 155 months from birth, the developments of boys continue. The developments of girls nearly stop. If the developments of motor control function follow (5) and (8), the performance of motor control function of boys catch up the one of girls at 16 years old.

Between 133 months from birth to 155 months, it is difficult to show clear view of the developments of motor control function, because of the effects of the difference of environments is large.

Conclusion

This paper proposes the developments of motor control function from the 70 months from birth to 180 months. The slowdown of the developments of motor control function is clear in junior high school ages. The gender difference of motor control function is clear in primary school and junior high school ages. Girls keep their progress in those ages.

Around 140 months from birth, the view of the developments of motor control function is not clear. It is difficult to have measurements in same environments. We hope to show the clear view of the developments of motor control function around 140 months from birth with larger scale measurements.
Acknowledgment

This work is supported by JSPS KAKENHI Grant Number 16K01057 and 16K04818. The authors thanks the members of SoftCDC Corp. for their helps about the measuring experiments.

References


Abstract

In Summer 2018 two faculty members at Glendale Community College (AZ) received a learning grant to extend a citizen scientist project that explored cooperation and conflict at the microbial level using the fermented drink Kombucha. Kombucha forms a microbial ecosystem where bacteria and yeast cooperate to create a protective barrier (SCOBY) against harsh environmental changes and invading pathogens, while allowing other microbes to remain as members of the ecosystem. Kombucha provides an opportunity to explore cooperation and conflict in a living ecosystem. Kombucha was brewed over three weeks using a commercial SCOBY (Symbiotic Culture of Bacteria and Yeast); once brewed the kombucha was used to create the experimental condition. Sweetened tea was brewed and was the control condition for the experiment. The two conditions were further subdivided into:

- Condition 1 - Kombucha control
- Condition 2 - Kombucha with pathogens
- Condition 3 - Tea solution
- Condition 4 - Tea with pathogens

Students in an introduction to statistics psychology class were asked to participate in the experiment. Those who agreed to participate in the experiment swabbed their dominant hand twice and one swab was placed in the kombucha with pathogen condition and the second swab was placed in the control with pathogen condition. The maintenance phase lasted for 14 days and at the end the mediums were visually inspected and compared. The results of the experiment were shared with students. Students were not offered an incentive to participate in the experiment, but they were offered extra credit for completing three assessment questions about the experiment so that even students who did not swab their hands could earn extra credit. This approach also served to reinforce concepts of experimental design that were learned earlier in the semester. An analysis of the student responses revealed that 61% of students correctly identified how control was used in the experiment to establish cause and effect; 44% correctly identified that the act of hand swabbing was the independent variable that was manipulated and 78% correctly identified the limitations of the experimental design. It is not well understood
why students scored higher on the more complex question (Bloom’s Taxonomy) of identifying limitations. Additional data collection is scheduled during Fall 2018 semester.

Two lesson plans including assessment questions, and focused discussion content were developed as part of this grant and will be shared with session attendees.
“Keep it Free” - OER Materials Designed for Statistics in Psychology

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Abstract
Do you like the instructor resources provided by publishers, but feel uncomfortable with the cost of textbooks and are not satisfied with current OER options for psychology students? This presentation is for you.

In January 2016, three faculty members at Glendale Community College created a set of OER (Open Education Resources) materials designed specifically for psychology courses including a workbook, slides, and over 350 practice problems for use in a traditional format or as part of an interactive online platform (MyOpenMath). Adopting these materials saved students an estimated $28,000 - $40,000 over 4 semesters with equivalent student outcomes, retention and performance results. Results of a post hoc analysis revealed no statistically significant differences, t(75) = .41; p>.05, in student performance between courses that used publisher provided materials and OER materials created by the project team (taught by the same instructor).

In addition, approximately 180 students completed a brief survey about the use of the materials, specifically the workbook, its impact on their learning and recommendations for improvements or modifications. Results revealed that 24% of students enrolled in a specific PSY 230 section because of OER materials, 82% preferred the workbook to a hard copy textbook, about 70% of students reported that they would recommend the workbook to other PSY 230 instructors. Recommendations for workbook improvement were related to example problems with more specific steps and directions, more examples and a suggestion to include the answers in the workbook so students can check their work. Roughly, 22% said they would have preferred it in an electronic format. Students appreciated the graphic images to help illustrate statistical content and appreciated the fact that it was free. Attendees will be provided examples of the content and given access to the OER resources, including the interactive learning platform created specially for psychology students.
Abstract

Specific OER content for undergraduate cultural psychology courses is currently not available and to address this gap in OER materials, three faculty members in the Psychology Department at Glendale Community College, Glendale, AZ received a district supported grant to remix and reuse existing OER materials, as well as create new content which emphasized cultural universals and culturally specific constructs in psychology. The grant was awarded to create materials for Psychology and Culture - PSY 132; an undergraduate course that appeals to psychology majors and non-majors because it meets several general education and transfer credit requirements. Additionally, our materials were aimed at meeting lower division curriculum needs where options for psychology and culture are limited. Our project addressed the need for OER materials and lower division materials that specifically address cultural psychology.

We created 13 chapters (e.g., Human Nature, Research Methods, Development, Gender, Health, Personality) that include the following pedagogical elements for each chapter:

1. Chapter Outline with Objectives
2. Definition List
3. Slide Presentation
4. Test Questions Bank (20 questions per section)
5. Links to Recommended Readings (e.g., article, chapter, suggested readings)
6. Links to Videos/Podcast
7. Activity (In-class)
8. Homework or Writing Assignment

The new materials can be used for a designated course, or to supplement current OER offerings for lower division courses in psychology.
Prior to implementing the materials, and as part of an overall assessment strategy, faculty agreed on four formative assessments that were administered over two semesters (Fall 2017 and Spring 2018). Faculty assessment (Lavigne and Worthy) results for Fall 2017 on a gender writing assignment were $t(41)=1.51$, $p = .13$; there were no statistically significant differences between students’ performance. Across the remaining three benchmarks, the number of correct responses on multiple choice items ranged from 41% to 86%, however there were no statistically significant differences between instructors. These results were encouraging and interpreted as content consistency across instructors. Results for Spring 2018 (Lavigne and Romero) were markedly different. The number of correct responses ranged from 41% to 94%, however there were significant differences by item. The inconsistent results can be explained by differences in student populations (i.e., different campuses) and differences in scoring (i.e., partial credit versus full credit). Additional data will be collected Fall 2018 using the newly created OER materials to evaluate between and within instructor differences using the same four formative assessments.
So, you think you know what online learners want in an online class?

Think again.

Distance Education: Poster Session

Abstract:

The purpose of our poster/demonstration is to highlight the discrepancies between what 242 online learners perceive and report about their learning experiences versus what teachers and facilitators think they want and need. Our research goal is to understand what students identify as best practices and barriers in their online classes to improve online learning through faculty education.

Our study’s purpose, design, methodology, and results will be displayed on our poster using smart art and infographics.

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POSTER/DEMONSTRATION

So, you think you know what online learners want in an online class...think again. Come find out what online learners are saying about what keeps them invested in an online class. The purpose of our poster/demonstration is to highlight the discrepancies between what online learners perceive and report about their learning experiences versus what teachers and facilitators think they want and need.

Our poster session will detail more than 242 responses from online learners and what they reported about their experiences. The survey’s purpose, design, methodology, and results will be displayed on our poster using smart art and infographics. Participants interested in our poster session will play a modified game of Kahoot! using a shortened version of our survey and compare their own perceptions to those of learners in our study. This will provide a starting point for a discussion of our full results. We hope that participants learn more about their own perceptions – and misperceptions – about the online world.

PURPOSE

Online learning in education and business has become the norm, and the benefits of this delivery method – increased access to programs, greater flexibility for learners, and the ability for schools and organizations to increase enrollment – have driven the growth of the platform. According to the Distance Education Enrollment Report 2017, the number of higher education students taking at least one distance education course in 2015 exceeded six million (Allen & Seaman, 2017). While enrollment for in-person classes at many community colleges across the country has been flat or has decreased in recent years, online enrollment has seen steady increases; fall semester 2016-2017 online enrollment increased 8% (Lokken, 2018). The National eLearning Survey of Community Colleges 2017 Survey Results indicates that eLearning has been the only significant area of growth for community colleges since the Great Recession (Lokken, 2018). Trends like these suggest that online learning is going to remain an essential component of the education world.

Despite the advantages of online learning, new research is bringing some of its limitations into sharper focus. Issues like student characteristics and readiness, faculty engagement, and course design and delivery systems have been the subjects of recent studies in online learning in higher education. These aspects of online education must be taken into consideration to ensure that meaningful learning happens. One common thread shared among all aspects of online education is the experience of learners. There is a “national call to improve overall student retention and persistence rates and help more students graduate prepared to compete in the 21st century workplace. The challenge for eLearning administrators is to find effective ways to better prepare students to be successful in the virtual classroom” (Lokken, 2018). Understanding student perceptions of their online courses is crucial in the academic world. It is becoming increasingly clear to college administrators that with the growing number of choices students have, they can attend other colleges at a distance if they are not satisfied with the customer service and support they receive (Lokken, 2018).

The focus of our research is to better understand student experiences and perceptions of their online courses. As faculty members who want to deliver better online classes to our students, we are researching online learning within the community college setting. Online learning in community colleges presents some unique challenges, but also addresses issues that cross educational settings. Recent literature
demonstrates that online learning for community college students, although it does provide increased access to learning, may not be as effective as it could be. System-wide studies in California (Johnson & Mejia, 2014) and Virginia (Jaggars, 2010) revealed troubling findings. Both studies indicated that community college students are less likely to complete online courses and are less likely to pass online courses than they are live courses. Online learning in the community college setting presents additional concerns, such as an exacerbated achievement gap for minority students (Kaupp, 2012) and equity issues around the digital divide (Campaign for the Future of Higher Education, n.d.). Although findings from these studies are specific to the community college system, they beg the question: are there ways to redesign and deliver online courses to increase student success across the four-year university setting as well?

There is a growing body of literature dedicated to understanding student perceptions and experiences in online courses. In 2013, Marie Fetzner published a study reporting the results of three cohorts of community college students in the SUNY system. Fetzner’s goal was to understand online learning from the student’s perspective. Our research began with a pilot study that replicated Fetzner’s study at one campus in the Maine community college system. We have since expanded our work to include two campuses in the Maine community college system and have been able to gather data from hundreds of online students. Like Fetzner, we are learning about a broad range of student experiences in online courses, from their decision to take an online course, through start up, across interactions with their peers and faculty members, and their perception of their online courses in comparison to live classes.

The underlying goal of our research is to understand what students identify as best practices and barriers in their online classes in order to improve online learning through faculty education. According to the National eLearning Survey of Community Colleges 2017 Survey Results, one quarter of reporting campuses indicated that they had no mandatory training component for faculty teaching online (Lokken, 2018). One end-goal of our research is to create a handbook of best practices tailored to online faculty in the Maine community college system. Though specific to our system, the same type of research could be conducted by any college or university seeking to understand their online learners and increase their success.

Our study is driven by a desire to increase student retention and completion in online courses. Retention in online courses is notoriously poor, and if students are not successfully completing their courses, they are not being served well by their institutions. Improvements in distance education have been reported over the past twelve years of the Instructional Technology Council’s national survey of eLearning; however, the National eLearning Survey of Community Colleges 2017 Survey Results indicate that 62% of community colleges reported that their retention is lower for online classes than for face-to-face instruction at their college (Lokken, 2018). It is clear that there is still room for improvement. Although the context of our study is the Maine community college system, the findings of our study reflect the experiences of online learners and are likely to shed light on learners in multiple academic settings.

**METHODOLOGY**

The methodology and results presented here reflect one phase of our research project. Our project began during the Fall 2017 semester at Eastern Maine Community College (EMCC) with a pilot study designed to see if Fetzner’s study could be replicated. Because the results were promising, during the Spring 2018 semester Fetzner’s study was replicated using a sample that included all EMCC students enrolled in online classes. Follow up phone calls were made during late spring and summer of 2018, duplicating Fetzner’s methodology. The return rate for this phase of the study was very low, which resulted in a new methodological approach for the 2018 summer session classes.
The work we are presenting at this conference reflects the work completed during the 2018 summer session. It involves students taking online classes at both EMCC and Northern Maine Community College (NMCC). This iteration of the work incorporates modified versions of Fetzner’s survey embedded by participating faculty directly into their online classes, and this methodology has proven to be much more successful, with a return rate of 67%. To better understand student perceptions of the online work and address the issue of how best to retain students in online courses, we designed two voluntary, anonymous surveys: a Beginning of Semester survey and an End of Semester survey. The surveys adapted Fetzner’s (2013) questions to more closely reflect the needs of EMCC and NMCC. The Beginning of the Semester survey was completed by students during the first two weeks of their 2018 summer session courses and the End of Semester survey was completed during the last two weeks of their 2018 summer session courses.

The Beginning of Semester survey had 16 questions and the End of Semester survey had 17 questions. Surveys were administered through Survey Monkey and shared via a URL link with students by their faculty member. The majority of questions on both surveys were on a Likert scale; however, based on the Likert responses, a handful of items involved follow-up questions designed to provide more specific information. By breaking the survey into two parts, the length and time needed to take the survey was reduced. The questions on each survey reflected the types of activities related to the beginning of a course (registering, directions to get started) and the end of a course (reflecting on communication with faculty, sense of community created in the course, challenges).

A week before the first session of summer classes started at both EMCC and NMCC, all faculty teaching online at the colleges were sent an email invitation discussing the proposed project, timeline, and rationale for the study. Based on this preliminary request, 13 faculty members agreed to participate in the study: 7 from EMCC and 6 from NMCC. Faculty represented a diverse array of departments: liberal studies, social sciences, allied health, and business administration.

A second email went to participating faculty a few days before the semester started thanking them for their participation and providing the Beginning of Semester survey link. As part of this email, participating faculty were asked to explain how they offered the survey to students and how many students participated. Most faculty shared the voluntary survey with students via the LMS, and one faculty member shared the survey link via email. Eight faculty members between the two institutions offered extra credit points to students for completing the survey. In total, 475 students took the Beginning of Semester survey: 208 EMCC students (48% response rate) and 146 NMCC students (87% response rate).

The End of Semester survey was sent to participating faculty via email two weeks prior to the end of the semester. This date varied for different courses based on their length – four weeks, eight weeks, or sixteen weeks. Faculty used the same protocol to administer the End of the Semester survey as they did the Beginning of the Semester survey. At the time of this proposal writing, 114 students had taken the End of Semester survey: there was still 1 week left in the semester, so the number will have changed by the conference date.

WHY RESEARCH/FINDINGS ARE IMPORTANT

Understanding how learners function in an online environment is crucial to providing meaningful data for any educational setting. Because this survey was designed and vetted with the express purpose of better understanding the online learners’ experiences, our survey data will allow online educators to better address changes in platforms, course design, and delivery. Attempting to make system changes without this information is inefficient and likely to result in ineffective efforts.
For community colleges, online learning promotes access, a core value of the system. However, if students are not successfully completing online courses and progressing through degree completion, they are not being served well. Knowing the major impediments to completion is of utmost importance to both the students’ success and the academic institution’s viability.

Finally, these survey results will provide tangible evidence from which to create a template of “best practices” to share with online teachers and facilitators. In our own community college system, we hope to synthesize our survey results into a handbook for faculty teaching online, which will include a checklist of protocols a faculty member can utilize before, during, and at the end of the online semester to provide a richer online teaching experience. We envision visiting the seven campuses within our system and sharing our findings in a series of informational sessions and providing each of the campuses with copies of the handbook. In addition, we hope to provide workshops for new online faculty based on our survey results.

Our survey instruments could be easily adapted and utilized by other educational institutions to query their learners to better understand the specific concerns and challenges they face. Teachers and course facilitators need to become familiar with the perceptions of students in online courses in order to improve the delivery and design of their online courses.

An amended version of our survey instruments are below. The questions have not been modified, but responses for individual questions have been omitted in the interest of saving space.

**Beginning of Semester Survey Questions**

1. Through which campus are you taking your online course?
2. Was this your first experience with an online course?
3. Did you choose to take this online course yourself, or were you placed into the course by a counselor or advisor?

For the next set of questions, think about how satisfied you were with the following aspects of getting started with your online class. (Responses ranged 1-5 on a Likert type scale; responses included: Extremely satisfied; Somewhat satisfied; Mixed feelings; Somewhat dissatisfied; Extremely dissatisfied; Not sure/no opinion.)

4. Registration and orientation process for the course (signing up and finding your class site)
5. If you were NOT satisfied with the registration and orientation process for the course, where did you register or participate in an orientation for the class?
6. Directions to get started
7. If you were NOT satisfied with the directions to get started in the course, where did you get directions once you were registered?
8. Interaction with the faculty during start up

For the next questions, we would like you to tell us about your expectations when you registered for an online course. (Responses ranged 1-4 on a Likert type scale; responses included: Definitely what I expected; Sort of what I expected; Not at all what I expected; Had no idea what to expect.)

9. I expected an online course to be easier than an on-campus course
10. I expected less homework than in an on-campus course
11. I thought that homework would not have deadlines
12. I thought I could begin the course any time during the semester/session
13. I expected I would need to have basic computer skills (creating and uploading Word documents, navigating the school portal/Internet, using the Discussion Board, creating PowerPoints/Prezis/etc.)
14. I expected that interaction with faculty would be required
15. I expected that I would participate independently without being required to interact with other students
16. I expected to feel a sense of community with this online course, similar to an on-campus course

End of Semester Survey Questions

1. Through which campus are you taking your online course?
2. Was this your first experience with an online course?
3. Did you choose to take this online course yourself, or were you placed into the course by a counselor or advisor?

For the next set of questions, think about how satisfied you were with the following aspects of your online class. (Same satisfaction scale as used in the Beginning of the Semester Survey.)

4. Directions provided by the faculty
5. Level of interaction with the faculty
6. Level of interaction with other students
7. If you were NOT satisfied with the level of interaction with other students in the course, did you expect more or less interaction?
8. The content of the course
9. Technical help with the course
10. If you were not satisfied with the technical help you received for the course, where did you seek technical help?
11. Your own performance in the course
12. The EMCC/NMCC portal website in general

13. Online courses sometimes present more challenges for students than on-campus courses. Place a checkmark next to any of the challenges you may have experienced.
   a. The course content/material was too difficult
   b. It was hard to handle combined study plus work/family responsibilities
   c. I faced personal problems (health, job, childcare, etc.)
   d. I had financial problems
   e. I lacked motivation
   f. I lacked access to a computer
   g. I lacked reliable internet access
   h. I experienced too many technical difficulties
   i. I lacked basic computer skills
   j. I lacked basic typing skills
   k. The course required too much reading and writing
   l. I felt too alone, not part of a class
   m. The course was taking too much time
   n. I got behind and it was hard to catch up
   o. The online course was too unstructured for me
   p. I didn’t like the online format
q. I didn’t like the instructor’s teaching style
r. I was not interested in the subject matter
s. I didn’t experience any of these challenges
t. Other (please specify)

14. How likely are you to register for another online course?
   a. Very likely   b. Somewhat likely   c. It’s possible   d. Not likely   e. Not a chance

**Free Response Questions**

15. What advice would you give to other students considering an online course?
16. Do you have any suggestions for how EMCC/NMCC can improve online courses for students?

**References**


Abstract

This paper presents the results of a study of instructors’ perceptions of the efficacy of social media as an instructional tool and of their experience with students misusing social media in their courses. The purpose of the study was two-fold. First, researchers were interested in learning how and to what extent instructors used social media in their courses and how effective they felt social media was for student learning. The second focus was on learning whether and to what extent instructors had encountered instances of academic dishonesty by students using social media in their courses; and, what measures they had taken and found to be effective in addressing instances of academic dishonesty. Researchers’ earlier studies on the use of social media to enhance learning and the use of social media to violate academic integrity have focused on students’ perceptions (Cole, Shelley, Swartz, 2018; Cole, Swartz, & Shelley, 2014).

Results were mixed. The majority of the respondents said that they did not use social media as an instructional tool. Instructors who did respond affirmatively to the questions on the use of social
media reported that they used social media such as YouTube (32.88%), blogs (14.38%), Facebook (14.29%), Twitter (12.24%), and Google Docs (11.64%) to enhance instruction to some degree, but found its use to have limited effectiveness in achieving learning goals. Instructors’ experience with students misusing social media to enhance learning was not extensive. Instructors reported having encountered only occasional acts of academic dishonesty (plagiarism and cheating on tests and/or assignments) by students. Students who were found to be cheating on tests were using web sources, smart phones or e-mail. Instructors reported stressing ethical behavior and following up on violations as one way to counter academic dishonesty. Other measures included using plagiarism software, rewriting tests and setting tight timeframes for exams, as well as banning electronic devices from test sites.

For this study, researchers developed a 23-question survey in Question Pro for distribution to members of the Academy of Legal Studies in Business (ALSB). The first solicitation was sent by the ALSB Executive Director in January 2018. A follow-up email solicitation was sent in February. Of the 779 members who were sent the survey link, 216 viewed it. Of the estimated 103 who began the survey, 98 completed it, for a completion rate of 95.14%. Respondents were experienced instructors, at the assistant professor, associate professor or professor level, who taught primarily in the classroom (53%). Thirty-nine percent taught both online and in the classroom. Almost 65% of those responding teach law. Twenty-five percent teach business courses.

A companion study of students’ perceptions of the value of social media as a learning tool, and of the role that social media plays in cheating is planned for fall 2018.
Title: Promoting the Social Inclusion of Students with Autism Spectrum Disorder via Mobile Technologies in the Classroom

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Abstract

According to the 2018 report by National Autism Spectrum Disorder Surveillance System (NASS), Autism Spectrum Disorder (ASD) is the most commonly diagnosed neurodevelopment disorder in Canada, and approximately 1 out of 66 children is identified with ASD in Canada (Public Health Agency of Canada, 2018). Moreover, these findings are in line with findings in the United States where 1 out of 68 children has been diagnosed with ASD (Centers for Disease Control and Prevention, 2014). Since this disorder has a spectrum-like aspect, every child with autism has different issues. Many children with autism demonstrate impairments in language, communication skills, and social interactions; hence, these children have difficulties with communicating and interacting socially with their peers, educators, and parents (Public Health Agency of Canada, 2018).

Schools have implemented various interventions to assist children with ASD in developing their social and communication skills. One of the latest interventions is the use of mobile technologies such as digital mobile tablets (tablets)\(^1\) in the classroom. Since tablets are already a significant part of everyday life for many people, contemporary children have access to tablets at a young age. Tablets also play a key role in learning and encouraging social inclusion since they are socially acceptable, portable, affordable, and flexible (McNaughton & Light, 2013; Rodriguez, Strnadova, & Cumming, 2013). Moreover, research has found that “technology motivates and engages students as it has the potential to spark interest in social interaction and to develop emotional growth” (Withey, 2017, p. 251).

In the past few years, tablets have been integrated into the curriculum for students with ASD and educators have used these devices in conjunction with other technologies and interventions (Kemp et al., 2016). The integration and provision of supports have been made possible with the rapid proliferation of various applications for tablets for students with ASD: applications for developing social skills, communication skills, language skills, math skills, and functional skills (Achmadi et al., 2012; Couper et al., 2014; King et al., 2014; Sarkandas & Rajanahally, 2017; Sigafoos et al., 2013). Although we have mobile technologies integrated in

\(^1\) Mobile tablets are devices through which mobile applications run. Mobile tablets are comparable to computers, and mobile applications are comparable to computer software that need devices to operate. In the context of this program of study, “using mobile tablets” is analogous to saying “using mobile applications that operate via mobile tablets.”
the classroom and research has revealed many benefits of these technologies for students with ASD, we still have many students with ASD who are not able to participate fully in the collaborative learning environment. What is needed to enhance the participation of these students in the classroom so that they feel more valued and included in the learning process?

My doctoral research focuses on understanding how tablets are used in the classroom by meeting the communication, social, and educational needs of students with ASD so that they feel more valued and included in the learning process. Using case study methodology, I will explore in-class experiences of students and their peers using tablets and the impact on educators and parents. Furthermore, I will collect general and detailed data on how tablets are used in the classroom via surveys, classroom observations, and interviews with students, peers, teachers, and parents.

While exploring the experiences of students, peers, and teachers when using tablets in the classroom, my proposed research will provide educators, school psychologists, parents, and other stakeholders with practical insights into the implementation of mobile technologies in the classroom in order to promote the social inclusion of students with ASD. Hence, it will generate valuable information about various tablet applications that are in use, and how they can be used to achieve effective levels of social inclusion for students with ASD. Moreover, my research will also provide an important contribution on how independent functioning of children with ASD can be developed using tablet applications not only in the classrooms, but in any inclusive settings such as after-school programs. Finally, learning from the experiences of students, peers, educators, and parents will also reveal the needs of these stakeholders; thus, the knowledge that will be generated out of this research can potentially assist application developers or other technology enthusiasts to develop more effective, customized tablet applications that can maximize social inclusion in the classroom.
References


Kemp, C., Stephenson, J., Cooper, M., & Hodge, K. (2016). Engaging preschool children with severe and multiple disabilities using books and iPad apps. Infants & Young Children, 29(4), 249–266.


Beyond Social Complexion

Poster Presentation Session

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Abstract

The purpose of this presentation is to call attention to the human race value and how human life relies heavily on formal and informal education rather than the relationship of shared value of human life as one. The fact remains, human race is a single race. Biologically the human race, shares almost 100 percent same set of genes. The essence of shared same set of genes exist but individual experiences embodies cultural experiences as human life inherit set of values, belief, and so forth that influence individuals in society. Collectively, individual experiences of formal and informal education are group into common themes which build social units adapting to their environment. The association of formal and informal education acquires by individuals might differ but, the totality of both types of education contribute to the root of the social system. In general terms, formal education relates to fundamental values align with the U.S. political establishment rather than on adaptation to the demands and cultural context of other cultures. Whereas, informal education is learned through life experiences and in social settings in which, through daily activities, one acquires values and interests and gains knowledge from family, school, religion, community, and propaganda. From birth onward, individual experiences are embedded with strong belief systems through acquired and learned education. Individuals, action by association, interconnect to their common social unit or social classes of belief systems that make-up social groupings of society. In ideal world, human life would start with a clean slate rather than indoctrination of strong traditions which is learned through generations of inherit stereotypes align with their social grouping and influences. Mainly, social stereotypes come from history of learned behavior passed down as part of the culture of learning in which defines the traits to the present. As the view of society belief systems of pre-establish meanings continue on the path of different forms of cultural differences, individual action is drawn into social way of thinking. All things considered, individuals are inclined to believe racial divide is a social norm in which weakens the argument to dismantle the social norm beyond social complexion. In sum, this inherit persuasion of misrepresentation of more than one race exist in which reinforces the myth from the past, undermines scientific truth about existence on single race. And, overshadows the belief of one human race of individuals have their own culture and specific way of living. At present, social influence reveals individuals formal and informal education lack the appetite of social and cultural aspects to address differences beyond social complexion. Suggesting, history myth on more than one race is widely misused on fertile ground without resistance to socially divide and to hold the human race captive, rather than create solutions to share the embodiment and human value of a single race.
Innovations in Advising for a New Generation:  
A Life Span & Integrated Interdependent Approach

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Background and Objectives

With a rapidly changing higher education landscape, many institutions are scrambling to respond and reverse declining enrollments while simultaneously faced with decreased funding and shrinking resources (Oliff, Palacios, Johnson, & Leachman, 2013; ). Challenged with outdated organizational structures and ineffective processes, universities struggle to meet the needs of today’s diverse and evolving group of college students. First generation students and student from low socioeconomic and minority backgrounds, a group who often require additional customized support to succeed (Mangan, 2015; Petty, 2014), are particularly at risk. This demographic of student requires unconventional approaches to advising and innovative student support programming for positive recruitment, retention and graduation outcomes (Antf, 2018; Castleman & Goodman, 2018; Petty, 2014).

Leaders in enrollment management are finding that creating a comprehensive enrollment management operation, one that considers the complete lifecycle of students and effectively intersects enrollment management and planning, budgeting, data analytics, advising, and admissions is “critical to both programmatic and institutional viability” (Connor, LaFave, and Balayan (2017). According to Williams (2008), this emerging concept “may improve productivity, continuity and, above all else, create a differentiated student experience.”

The Department of Social Work at the Metropolitan State University of Denver, who primarily serves first generation, students of color and low-income students, employs this innovative model and effectively intersects academia, student services, enrollment management, and budgeting so that students’ needs and teaching needs are equally considered and attended to in both day to day operations and long term strategic planning. We use holistic admissions review processes. This model has resulted in annual increases in program applications, rapidly increasing enrollment, improved attrition and retention rates, and added financial resources for the Department of Social Work.

Ways we serve this particular demographic:

- Recruiting and prospective student advising activities and programming that are accessible.
- Advising practices and programming grounded in holistic and intrusive advising approaches.
- Professional advisor partnership and collaboration with faculty advisors.
- Setting affordable tuition and fees rates and providing stipend and scholarships.
- Continual assessment practices that incorporate student feedback.
- Accessibility
Methodology and Discussion

MSU Denver is an urban university serving a high number of first generation (33%) and diverse student body (~42% students of color), classified as a Hispanic Serving Institution. The Department of Social Work serves approximately 800 undergraduate and graduate students enrolled in our programs each year. Through our Office of Social Work Student Services, Administration and Finance (OSWSS), Office of Field Education, and our Assessment Committee Management Activities (Exit and Alumni Surveys) we collect student data systematically including student demographics and performance, application (number of applications/prospects, accept rates, matriculation etc.) and enrollment data. This pilot study identified the following variables and analyzed trends over a 5-year period to monitor changes: Age, Race/Ethnicity, Gender, Veteran Status, Income Status (Disadvantaged Background), Rural vs. Urban setting, First Generation Status. Descriptive statistics and trend analyses and some qualitative analyses were completed.

Our unique application of an innovative model and attention to student needs, we believe is creating positive outcomes at both the undergraduate and graduate levels. During an initial pilot study of our model, we identified increased trends in the following outcomes:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
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<tbody>
<tr>
<td>Yield and Attrition Rates</td>
<td>Graduate yield and retention rates improved each year and predictive analytic tools were developed and employed to accurately project future enrollments/revenue.</td>
</tr>
<tr>
<td>Retention Rates</td>
<td>Undergraduate retention increased by 8% over 5 years. Graduation retention remained strong at ~98% each year.</td>
</tr>
<tr>
<td>Enrollment (CHP/FTE)</td>
<td>Undergraduate CHP/FTE increased.</td>
</tr>
<tr>
<td>Headcount</td>
<td>Undergraduate headcount increased by 4% over 5 years. Graduate headcount increased by 79% over 5 years.</td>
</tr>
<tr>
<td>Acceptance</td>
<td>Acceptance increased by ~1% each admissions cycle and the average score of accepted applicants increases by ~1% each admissions cycle.</td>
</tr>
<tr>
<td>Student Satisfaction</td>
<td>Data from Exit and Alumni Surveys as well as in-person feedback forums indicate increased student satisfaction and program ability to respond to students’ requests.</td>
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During the next iteration of this research, we will test the model using Quasi-experimental design with a mixed method component (qualitative feedback from students). Within our university Departments often use a traditional advising approach, we will collect quantitative data: retention rate, enrollment/headcount, and application data and qualitative data (feedback from students) to test the feasibility and effectiveness of our model.

Presenters explore:

- Reasons we believe the model has been effective
- The essential components of the student lifecycle integrated interdependent approach.
- Strengths and challenges of the student lifecycle integrated interdependent approach.
- The professional background and expertise required to form student lifecycle integrated interdependent approach teams.
- Various ways the model can be utilized at different institutions, including those with low resources.
- Ways innovative advising services and programming can utilize best-practices to support a diverse student body and attract new students
- How enrollment management is directly aligned with budget planning.
References


Oliff, P., Palacios, V., Johnson, I., & Leachman, M. (2013). Recent deep state higher education cuts may harm students and the economy for years to come. Center on Budget and Policy Priorities, 1-21.


Development and Application of Morality Test Tool for North Korean Refugee Adolescents as a Culture Cohort

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I. INTRODUCTION

According to Ministry of Unification, the number of North Korean defectors settled in Korea is over 30,000 by 2018.1 As North Korean defectors increased, the number of North Korean defectors living in South Korea increased rapidly. The number of North Korean refugees born in third countries is steadily increasing. North Korean defectors who have experienced family disintegration in North Korea or third countries and escaped from their unstable lives in China and entered South Korea are steadily increasing. The important point is the reunification of people as well as reunification of the system in preparing the reunification of the Korean peninsula. The reunification of human beings is to restore the homogeneity of the two Koreas who have undergone the process of heterogeneity through more than 70 years of division, so that they can join together in one society, and create a new and healthy living community. The reunification of human beings has already been seen in the examples of Germany, Vietnam, and Yemen Unification, which sometimes have to go through a more complex and longer process than the unification of territory. The reunification of human beings is possible through encounter, communication and understanding. In the process of reunification, North Korean defectors and South Koreans are required to be merged. In preparing for reunification, it is an important task for us to help North Korean defectors who sometimes live as strangers in society.

Since the mid-1990s when the number of North Korean defectors began to accumulate, there have been more studies on North Korean defectors. Research on North Korean defectors has focused on social adjustment, cultural adjustment, school adjustment, and psychological adjustment in South Korean society. The actual situation and problems of North Korean defectors’ adaptation to South Korean society, support policies for North Korean defectors, social integration plans and programs, and civic education for them have been studied. Researchers pay attention to the inner aspects of the consciousness and tendencies of North Korean defectors, such as emotional and cultural psychosomatic, self-efficacy, mental health, and psychological characteristics.

On the other hand, there is a view that studies of North Korean defectors lack understanding of the characteristics of North Korean defectors, inconsistent opinions among researchers, and objective understanding of the psychological state of North Korean teenagers. Given this, it is necessary to identify the differences between North Korean defectors and South Koreans, in the process of reunification for human unification and prepare appropriate countermeasures. It is necessary to pay attention to the inner side of North Korean defectors in terms of their values and culture. It is important to understand the psychological characteristics of North Korean adolescent defectors. In particular, North Korean defectors grew up and lived in North Korean society or a third country. They lacked educational opportunities in the South Korea compared to native South Korean students. Their parents lack growth experience in South Korea society. In this regard, the values and morality of North Korean defectors could be different from those of South Korean teenagers. While South Korea has the characteristics of a capitalist society with a strong individualistic aspect of free competition, North Korea has the characteristics of a controlled, collective, socialist society. These differences can also affect the formation of values and morality. Therefore, it is necessary to diagnose their moral aspects and to check their characteristics in examining the psychological characteristics of the adolescent

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1 http://www.unikorea.go.kr/unikorea/business/NKDefectorsPolicy
It needs a moral diagnostic test tool that is easy for the adolescent defectors to understand and respond to. It is also urgent to develop measurement tools that can measure their morality comprehensively in order to understand the individual specificity of the adolescent defectors. This study aims to lay the groundwork for developing a moral diagnosis tool to diagnose the moral characteristics of the adolescent defectors. To achieve these research objectives, the following research tasks are established as follows: (1) How can the components of the moral diagnostic scale be organized? (2) What are the psychological and cultural characteristics of North Korean defectors?

II. Psychological and Cultural Characteristics of North Korean Defectors

1. The cultural characteristics of North Korean defectors

Since 2000, much research has been published related to adaptation of North Korean defectors to South Korean society. Many North Korean teenagers born in North Korea or third countries suffer from language, culture, and the suspension of education in their early years of life in South Korea. Studies suggest that North Korean adolescents show the difficulties in adapting to school, emotional expressions are extreme, and low-path self-efficacy, the older the defectors, the more authoritarian they are. Psychological characteristics of North Korean defectors also indicate problems such as anxiety symptoms, psychological stress, depression, alienation, awkwardness, loneliness, and extreme aggressiveness. Many North Korean teenagers are experiencing emotional confusion and conflict and are forming a negative self-identity in South Korean society. Therefore, in order for young North Korean defectors to adapt to South Korean society, they should focus on cultural adaptation.

South Koreans’ interest and perception of North Korean defectors has risen than in the past. However, North Korean defectors still exist as strangers. Our attitudes toward North Korean defectors are still not free from prejudice and discrimination. In the survey on the 2017 inter-Korean integration, 44.7 percent of North Korean defectors think that it is necessary to resolve their prejudice and discrimination. Many the adolescent defectors recognize that South Koreans discriminate against them because they are from North Korea. Therefore, in order to communicate and integrate with the adolescent defectors, they need to be fully understood.

2. Integrated moral diagnostic test for North Korean adolescent defectors

Cognitive dimension, value dimension, and identity dimension were considered for integrated moral diagnostic test. For the cognitive dimension, moral reasoning and moral judging ability test sites were referenced. For the value dimension, the social moral reflection questionnaire was referenced. For identity dimension, moral identity was referenced. HEXACO model was referenced in personality dimension. In terms of collective consciousness and group identity, national identity, and global citizenship were considered. For the level of consciousness, collective consciousness, individualistic consciousness, and desire for freedom were selected as components.

III. Diagnostic test for North Korean adolescent defectors

1. Question of morality diagnostic test tool

The questions were reviewed in previous tests and composed of 48 questions for screening questions of the moral test tool. Among them, redundant or ambiguous questions were modified into language expressions that are easy for the adolescent defectors to understand. The defectors’ teachers who are skilled in the language of the defectors made the Chinese translations of the
questionary. Using the developed morality diagnostic test tool, we conducted a moral diagnostic test on 125 North Korean teenagers. As a result of the test, the items with high reliability for the items of the morality diagnostic test tool and the reliability of the test scores were selected as final questions.

2. The cultural characteristics of North Korean adolescent defectors

1) Characteristics of Samples
The questionnaire was conducted on 100 North Korean H middle and high school students and 25 North Korean teenagers attending Y elementary school in Seoul city. The survey was conducted September 19, 2018 for H middle and high school students and October 2, 2018 for Y elementary school students. Data collection was conducted in August 2018 to explain the research, obtain the consent of the head of the agency, and distribute documentation for student’s parents and parent’s consent to obtain the consent of the parents who wish to participate in the survey. Research assistants help students in online questionnaires. For H middle and high school, among 31 middle school students, there are 20 female students and 11 male students. The birth year is from 2001 to 2005 and the year of entry is from 1999 to 2007. Among the 69 high school students, there are 36 female students and 33 male students. The year of birth is from 1993 to 2001 and the year of entry is from 2007 to 2018. The country of birth is 39 in North Korea and 29 in South Korea.

2) Measurement tools and methods
The questionnaires used online questionnaires rather than paper ones. The answer was constructed to choose the Likert Scaling: (1) strongly disagree, (2) disagree, (3) undecided, (4) agree, (5) strongly.

3) Meta-Analytic Results
The composition of 100 middle and high school students is as follows. Out of 31 middle school students, 20 are female and 11 are male. The birth year is from 2001 to 2005, and the entry year is 1999 to 2007. Among the 69 high school students, there are 36 girls and 33 boys.
H middle and high schools and Y elementary school students comprise as follows: There are 60 male students, 65 female students, and 125 in total. Birth year is 1993 to 2009. The entry year of South Korea is 1995 to 2018.

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Country of Birth

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**GENDER**

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**Period of residence in Korea**

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IV. Descriptive Statistics

1. confidence interval

The initial value is 95%. There is a significant difference at t level of .05

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a. Lilliefors Modify significance probability

2. factor analysis

Since the KMO is .802, the correlation is high. In Bartlett's spherical test, the approximate chi-square value is 2197.38 with a significant probability because the significant level is .000. That appears to be less than of .05, the study model concludes that it is appropriate.

KMO and Bartlett's test

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3. Survey Questions and Survey Results

The results of the questionnaires of the North Korean adolescent defectors according to 48 items are as follows.

Q1. Saving someone's life is very important even if he is a stranger

Q2. It is important to keep the promise to those who are not familiar with me.
Q3. I always try to tell the truth without telling a lie.

Q4. When there are people who can’t defend themselves, I take sides with them.

Q5. It is important that people do not take other’s belongings.

Q6. I always try to keep the law and the rules.

Q7. I always try to live in appreciation.
Q8. I do not even have a grudge against those who blamed me.

Q9. I rarely say my opinion at a group meeting.

Q10. I prefer a job that interacts with others rather than working alone.

Q11. To be moral is to take other people’s interests equally into consideration of mine.

Q12. I make decisions based on my immediate feelings rather than on consideration.
Q13. I feel like crying when I see someone else crying.

Q14. I think I deserve more respect than ordinary people.

Q15. I don't usually do anything that I risk getting hurt or regretting later.

Q16. I can tell the mood of a friend exactly by facial expression of a friend.

Q17. When a friend or my family is having a hard time, I can easily recognize it and comfort him or her.
Q18. When I see someone who is in pain, I sympathize with him and feel pain and grief together.

Q19. I am worried about someone who is treated unjustly or unkindly.

Q20. I try to keep my promise with others even if it costs me a little.

Q21. Keeping time is very important to me.

Q22. Fairness is to divide something equally.
Q23. I am insensitive to other’s feelings.

Q24. I tend to say thank you no matter how trivial it is.

Q25. When I am angry, I can control my own anger.

Q26. I can control and adjust my thoughts and emotions to match the situation.

Q27. I refrain from smashing, kicking or fighting.
Q28. I don't speak ill or negatively of others.

Q29. I value other's things as well as mine.

Q30. I treat animals well and take care of those who are harassed.

Q31. I think of their rights to treat people equally and legitimately

Q32. I often despite the strong threats and defend my claim.
Q33. I try to keep my promise.
Q34. I can distinguish my emotional state very well.
Q35. I have a definite conviction to be someone in the future.
Q36. I think why I acted like that when things went wrong.
Q37. I reflect on myself, my actions or my words when I hurt others.
Q38. I have a lot of pride in my ethnic.

Q39. I feel a strong attachment to my ethnic.

Q40. I think that the country where I am living now is my motherland.

Q41. No nation or group should dominate and exploit other countries.

Q42. I gladly work with people of different cultural values.
Q43. I do not intend to sacrifice my private interests for common interest.

Q44. Freedom is a precious value that I cannot trade for anything.

Q45. I am willing to sacrifice for my country.

Q46. I think that the country where I was born is my motherland.
Q47. Saving life is more important than keeping laws and rules.

Q48. Getting a reputation as a good person is more important to me than anything else.

The following table compares the survey average of 69 high school students in H middle and high schools with 32 students at S University in Seoul. There are a total of 48 questions. Using the SPSS/PC Version 20 Package, the average and standard deviation are calculated for each item.
High school students from the North Korean adolescent defectors survey were born in the 1990s to 2009. These students are 69. The birth year of South Korean university students surveyed was from 1990 to 1999, and they were 32. Among elementary and middle school students surveyed, there is a big difference in age between university students who are surveyed in South Korea. Therefore, while comparing the responses of respondents from South Korean students and North Korean defectors, the responses of elementary school students and middle school students of North Korean defectors were excluded.

Due to the high age characteristics, university students had a high response average in most of the questions. What is unique is that: 1) In Q8, Q9, Q22, Q23, Q32, and Q45 university students had lower response averages. 2) In comparison of the mean scores of the North and South students, there was no question that the average of the South students was one point higher than the average of the defectors.

Q8. I do not even have a grudge against those who blamed me.
Q9. I rarely say my opinion at a group meeting.
Q22. Fairness is shared equally.
Q23. I am insensitive to other’s feelings.
Q32. I often despite the strong threats defend my claim.
Q45. I am willing to sacrifice for my country.

V. CONCLUSION

It is necessary to pay attention to the following items that high school students among North
Korean defectors have averaged higher than South Korean university students. The results of the questionnaire comparison on question 8 show the following points: It has a good heart not to blame for those who blame themselves. The results of the questionnaire comparison on question 9 show the following points:

North Korean adolescent defectors have a tendency not to show their opinions strongly. The results of the questionnaire comparison on question 22 show the following points: University students in South Korea know more about the meaning of fairness. The results of the questionnaire comparison on question 23 show the following points: North Korean teenagers are more sensitive to the minds of others. The results of the questionnaire comparison on question 32 show the following points: North Korean defectors often reveal their claims. The results of the questionnaire comparison on question 45 show the following points: North Korean adolescent defectors have a strong tendency to sacrifice for their nation.
Development of a curriculum and teaching materials of IoT and HEMS utilizing Node-RED

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Abstract

As the IoT is getting popular, interest in HEMS (Home Energy Management system) is increasing by the faculty of engineering. It requires a wide range of knowledge and skills of communication technologies such as TCP/UDP and HTTP, and device control protocols such as ECHONET Lite (ISO/IEC 14543-4-3 international standard).

In order to understand these technologies, hands-on projects are essential. Therefore, not only a good curriculum that covers a wide range of technologies efficiently, but also easy-to-use teaching materials are important, especially for students who do not specialize in these technologies.

We adopted a visual programming tool called Node-RED, and developed curriculum and teaching materials, because Node-RED does not require a steep learning curve and is a suitable tool for prototyping of IoT in which essential communication modules come as standard.

The curriculum covers contents such as IP communication, JavaScript, device control with the ECHONET Lite protocol, HTML and CSS, web API (REST) and web application. Sample programs with Node-RED are developed as the teaching materials according to the curriculum respectively. We developed modules for receiving and sending ECHONET Lite commands so that ECHONET Lite communication can be easily handled in the sample programs.

Using the curriculum and teaching materials developed this time, I gave a lecture on "Network and HEMS" at Kanagawa Institute of Technology. During the class, students modified sample programs and experimented something different on the actual devices.

Based on the results of the questionnaire before and after the lecture, we confirmed that students had improved the degree of comprehension of basic technologies of HEMS.

We developed the curriculum and teaching materials of IoT and HEMS utilizing Node-RED and confirmed the usefulness through the lecture.

KEY WORDS: HEMS, teaching materials, Node-RED, visual programming tool, IoT
1. Introduction

1.1 Background

Due to the spread of IoT (Internet of Things) equipment in recent years, interest in the Home Energy Management System (HEMS) which is one of examples of IoT is increasing from students in a faculty of engineering. HEMS is a system that controls home appliances such as air conditioners and water heaters via computer networks. To build a system using IoT devices, a combination of a wide range of technologies such as communication and network and so forth technology such as TCP / UDP, device control protocols such as ECHONET Lite, and HTML 5 for realizing applications are required.

Need for education about IoT is increasing. And a curriculum that covers a wide range of technologies efficiently, and easy-to-use teaching materials are expected.

1.2 ECHONET Lite

ECHONET Lite is an international standard communication protocol\(^1\) to control home appliances developed by ECHONET Consortium\(^2\). With binary commands defined on the UDP/IP layer, it can control various devices such as air conditioner, lighting, water heater and storage battery. The packet structure of ECHONET Lite is shown in Fig.1. To get a state of a device, use a property GET command. To control a device, use a property SET command. For example, to get an operation status of an air conditioner, the packet is like this, "10, 81, 00, 00, 05, FF, 01, 01, 30, 01, 62, 01, 80, 00".

Fig.1 Packet structure of ECHONET Lite

1.3 Previous researches and Issues to be resolved

Along with the spread of IoT, there are many researches on education of IoT. For example, Kugai, et al. "Graduate student training based on IoT prototype development"\(^1\) and Akiyama, et al. "Proposal and evaluation of M2M prototype system implementation curriculum for science students"\(^3\).

Kugai’s paper wrote "IoT prototype development practice" to learn the knowledge and technology of IoT that includes IoT technical investigation, Arduino exercise and Raspberry Pi exercise. Kugai’s paper is based on researches for graduate students, and lacks a viewpoint of systematic learning of required technologies.

Akiyama’s paper wrote a proposal for curriculum to teach the M2M system as four elements: devices, gateways, networks, and clouds in 11 lectures. Because the curriculum covers a wide range of technologies from the device to the cloud for the students of the literature, the technical level of each technology became not so deep.

So we have decided to develop a systematic curriculum that covers essential technologies for IoT and HEMS within a local network, and teaching materials with an intuitive programming tool.

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1. ISO/IEC14543-4-3
2. ECHONET Consortium: https://echonet.jp/english/
2. Development of curriculum and teaching materials

2.1 Policy for curriculum and teaching materials

There are many IoT services using cloud server. However, we decided that the IoT/HEMS system should be configured within a local network, because we would like to focus on essential technologies to provide enough level of knowledge and hands-on experiences. This curriculum is designed for students in a faculty of engineering who have learned the basics of programming and network communications, but have not learned HTML5 technologies. The goal of the class is to create a web application that controls home appliances using the ECHONET Lite protocol. We will utilize a visual programming tool and create samples according to the curriculum as teaching materials.

2.2 Curriculum

The curriculum is shown in Table 1. In the first half, we will teach how to control devices using the ECHONET Lite protocol. In the second half, we will teach how to create web applications using HTML5. All the practical trainings uses a visual programming tool, “Node-RED” that is described later. Every lecture includes practical hands-on training. Students can modify sample programs and confirms the operation with actual devices such as air conditioners, lightings and air purifiers.

One lesson consists of a 30 minute lecture and a 60 minute hands-on training.

<table>
<thead>
<tr>
<th>Number of lessons</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The basics of the network and the ECHONET Lite protocol</td>
</tr>
<tr>
<td>2</td>
<td>Node-RED and JavaScript</td>
</tr>
<tr>
<td>3</td>
<td>Device control with ECHONET Lite -1 (simple control)</td>
</tr>
<tr>
<td>4</td>
<td>Device control with ECHONET Lite -2 (automation control)</td>
</tr>
<tr>
<td>5</td>
<td>HTML and CSS</td>
</tr>
<tr>
<td>6</td>
<td>REST and WebAPI</td>
</tr>
<tr>
<td>7</td>
<td>Web Application</td>
</tr>
<tr>
<td>8</td>
<td>Development of Web application using Node-RED</td>
</tr>
</tbody>
</table>

2.3 Teaching Materials

2.3.1 Selection of a programing tool for hands-on training

Here are requirements for a programming tool for hands-on training.

1. Data flow (data input, data processing and data output) can be clearly and easily handled in order to show the program structure visually.
2. It should support multi-platform (Windows, Macintosh and Linux).
3. The tool should not require a learning curve to master operations.
4. The programming language should not require a learning curve. Practical functions can be realized with basic programming skills.
5. Sending and receiving UDP function should be supported for ECHONET Lite protocol.
6. It should be easy to develop Web applications using HTML5. Support of Web server function, URL routing function, WebSocket and MQTT is expected.
7. The cost of the tool should be free.

Based on the above policy, we examined programming tools.

SCRATCH

SCRATCH is a popular visual programming tool for beginners of programming. Combining blocks makes it easy to create programs. The development screen of SCRATCH is shown in Fig.2. SCRATCH lacks support of UDP and it is suitable for a relatively small scale project.

Fig.2 SCRATCH
Lab VIEW
Lab VIEW is widely used as a development tool for signal processing systems. Fig.3 shows the screen of LabVIEW. Connect blocks such as adders and multipliers to build a system. License cost is relatively expensive. It is not so suitable for web application development.

Node-RED
Node-RED is a flow-based visual programming tool developed by IBM, and it is now open source. Node-RED provides a browser-based flow editor and functions can be created with JavaScript. Node-RED supports various web standard communication protocols such as TCP, UDP and http. With web server function, it is also easy to create Web applications. In addition, it supports e-mail and Twitter client functions, so it is easy to implement social functions. Because of these features, it is widely used for prototyping IoT systems. Blocks called nodes have various functions, and by placing these nodes in the workspace and connecting them, it is possible to describe a series of applications such as data reception, processing, and data transmission. An application created by connecting a node is called a flow.

The UI screen of Node-RED is shown in Fig.4. The left column is called a palette and stores nodes of various functions. Drag and drop nodes from the pallet into the workspace in the center and place it. The left end of each node is input, the right end is output, and a flow is created by connecting an output of a node and an input of another node. The column on the right is called the debug area, and the output data of an arbitrary node is displayed using the debug node. The flow in the workspace of Fig.4 is a flow of turning on/off a lighting that supports ECHONET Lite. This flow consists of an injection node, a function node, a UDP output node, and a debug node in order from the left. The Inject node provides an event trigger function, so it can be used as input button to the UI. A function node is empty in the beginning and a function can be written in JavaScript. "Light ON" function node outputs data for turning on a lighting and it is inputted to "send EL 1" function node. In "send EL 1" node, light ON input data is converted to ECHONET Lite binary data and it is inputted to UDP output node. The UDP output node sends binary data to the specified IP address as UDP.

After several trials, we decided to adopt Node-RED as our programming tool.
2.3.2 Development of ECHONET Lite packet Send and Receive module

Because ECHONET Lite packet is binary data, it is difficult to handle it as it is in a program. Therefore we developed the “Parse EL1” node that converts binary data out of the UDP receiving node to an object data that represents each element of ECHONET Lite, and the “Send EL1” node that converts the object data of ECHONET Lite into the binary data.

The data format handled by the UDP Send node and the Receive node is binary format. For example, the packet to turn on the operation status of a lighting from a controller is as below.

"10, 81, 00, 00, 05, FF, 01, 02, 90, 01, 61, 01, 80, 01, 30"

Processing this data with the "Parse EL1" node will output an object with the data structure shown below.

```json
{
    "ip" : "224.0.23.0",
    "tid" : 0,
    "seoj" : ["0x05FF", 1],
    "deoj" : ["0x0290", 1],
    "esv" : "0x61",
    "epc" : "0x80",
    "edt" : ["0x30"]
}
```

This data is a SET command (esv: 0x61) that sets the operation status (epc: 0x80) to ON (edt: 0x01) with a command addressed to a lighting (deoj: 0x0290) from the controller (seoj: 0x05FF) of ip address 224.0.23.0. With this object data, it is easy to handle ECHONET Lite command.

When this object data is inputted to the "Send EL1" node, binary data "10, 81, 00, 00, 05, FF, 01, 02, 90, 01, 61, 01, 80, 01, 30" is outputted.

Both the "Parse EL1" node and the "Send EL1" node are used through the all sample programs.

2.3.3 Teaching materials

Here are some examples of teaching materials.

Fig. 5 shows a flow out of teaching materials for the 4th lecture, “Device control with ECHONET Lite -2 (automation control)”. A lighting turns on or off according to a door status (open/close) of a refrigerator. The flow on the upper side controls ON /OFF of lighting. The middle flow periodically acquires the door status (open/close) of a refrigerator. The lower flow receives the door status of a refrigerator and generates a trigger of ON /OFF control of the light according to the door status. Students can change the value of DEOJ (target device), EPC (property) and EDT (data) of the source code of "light ON" function node shown in Fig.6.

Based on this flow, students can try projects “Switching the lighting mode (normal light mode and night light mode) of the lighting when turning on / off the remote control of the Air conditioner” and "Change the brightness or color of the lighting in response to the temperature sensor value".

Fig. 5 A flow to turn on/off a lighting according to a door status of a refrigerator
Fig. 6 JavaScript source code in "Light ON" function node

Fig. 7 shows a flow out of teaching materials for the 7th lecture, “Web application”. This is a remote controller of an air conditioner. Fig. 8 shows the UI of the remote control developed using HTML 5 (HTML, CSS, JavaScript). The flow in Fig. 7 uses web server function and URL routing function. Four nodes at the left end of the flow are http input nodes, each of which has a different URL end point for REST interface. When a web browser accesses to the URL “/AirCon”, HTML, CSS and JavaScript files corresponding to Fig. 8 is outputted from "GUI" node and send back to the browser. The browser renders received data and displays the screen of Fig. 8.

When a button on the screen is pressed, corresponding URL in the flow is accessed and the following function node generates ECHONET Lite object such as to turn on/off operation status, to change the operation mode (automatic / cooling / heating), or to set the temperature value. Through the “Send EL1” node and UDP output node, ECHONET Lite packet is sent out.

Based on this flow, students can try a projects "Set temperature value with a slider" and "Select operation mode using radio buttons".

Fig. 7 The seventh sample flow
3. Practice, results and discussion

Using the curriculum and teaching materials explained above, we gave a lecture in Kanagawa Institute of Technology. The number of students was 14 people. As shown in the 2.2 curriculum, students edited sample programs and controlled the actual devices. We did a questionnaire about keywords related to IoT/HEMS to students before and after the course. The student checks either "I understand", "I have heard" or "I do not know well" about each keyword. The questionnaire results are shown in Figs. 9 and 10. The horizontal axis is the ratio of the people.

Before this course, about 20% of students checked "understand" to most of keywords. After the course, about 50% of students checked "understanding" to most of keywords. Especially, everyone answered "Understand" to "Node-RED" and "ECHONET Lite", which are key items of this course.

There were several comments from students.
"Thanks to the ECHONET Lite packet Send and Receive module, I could understand the protocol."
"Node-RED is so easy to use."
"It was fun to control actual devices."
4. Conclusions
We have developed a curriculum and teaching materials for IoT and HEMS education and carried out practical evaluation. We created sample programs as teaching materials according to the curriculum using a visual programming tool, Node-RED. The results of the questionnaire before and after the course, we confirmed the usefulness of this curriculum and teaching materials. Regarding the teaching materials, we confirmed the effectiveness of the Node-RED, the ECHONET Lite packet Send and Receive module and the sample programs. Students were able to acquire knowledge and skills that would contribute to the future research.

Reference

i Yosuke Kugai, Masahiro Inoue, Nobuhiro Ohe, Hiroshi Ichimura: “Graduate student training based on IoT prototype development” The Japan Institute of Technology Education, (2017), Lecture paper on engineering education research lecture paper, 470-471.

Title: Strategies for Childhood Education in Web Development Skills

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(Internet Academy is a programming and web design school established 1995 in partnership with a web design company. Internet Academy (a W3C member) is committed to updating students of the latest updates and technologies in the IT industry. As of 2018, the school has produced over 25,000 graduates.)

Full Paper: attached below
Strategies for Childhood Education in Web Development Skills

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⁴School Principal, Internet Academy; ⁵Department of Home Electronics, Kanagawa Institute of Technology

Abstract. It is against the backdrop of a critical demand for larger workforces in the IT sector, that Internet Academy has seen an increasing demand for education in computer programming. This paper gives suggestions, drawn from programming instructors’ teaching experiences, for an optimized education of computer programming. A wide range of skills – categorized as programming languages – have been found to be acquirable in a relatively short period of time: adult learners with little to no programming experience were recorded to have successfully acquired and applied occupational and trade specific skills within their workplace in as little as 8 days of highly concentrated tutoring. On the contrary, the understanding of algorithms within programming have been found to be difficult to ingrain in a learner’s mind within a short period of time. A course of action that is deduced from these two findings is not only to emphasize, but to prioritize the acquisition of an understanding of algorithms in students’ education. Building first a strong foundation for programming thought is suggested to allow a faster understanding of programming languages that are to have relevance and demand in the future.

The incorporation of visual programming tools [1] is recommended also. Their use would allow for three learning phases (rather than one or two as is common today) to be facilitated in computational thinking curriculums, the phases being: an introduction to the graphical representation of textual programming, a comparison between the graphical and plain text representations, and a gradual transition towards the handling of purely textual code. The tripartite process of introducing programming is recommended as a more efficient means of enabling students to apply their intuitive understanding of algorithms towards practical usage, and encouraging the building of a stronger foundation for future skill implementation and adaptability. We consider the implications of these findings to be extremely timely, given the transitions that many countries are undergoing to further integrate computer programming into their school curriculums.

Introduction

This paper examines trends in human resources and the research of academics, policy makers and educators as an effort to construct a recommendation for strategy regarding the childhood education of web development skills. It may also be noted that web development skills are often referred to now as computational thinking, or as a subset of computational thinking. During 23 years of teaching experience and through the following up of over 25,000 graduates’ career developments, Internet Academy has observed that practical programming skills are attainable in a short period of time, through highly concentrated study and implementation. Through case studies, it has also been found for these practical skills to be honed most effectively when put to use in a workplace environment. On the other hand, a reviewing of the feedback received from learners who had partaken in a higher level programming course was suggestive that the understanding of programming algorithms is particularly challenging to solidify as knowledge. This difficulty, it has been found, stems from two factors: i) the fact that an understanding of programming algorithms is difficult to acquire within a short period of time and ii) the fact that
understanding level is not correlative with the duration of practical experience, nor does long-term practical experience warrant a high level of recognition and understanding of programming algorithms.

This paper holds a primary motivation of providing suggestions on what aspects of skills development are to be prioritized within educational curriculums. The paper also explores the current reality, scope, and possibilities of programming education, as well as the range of mediums through which it may be taught and learned today. Also touched upon are the growing demand for this skill, as well as the etymology and current application of the term computational thinking. This, in fact, has been a source of much confusion in discussions surrounding web development. The study also contributes a series of sample trials which have been designed and tested to measure individuals’ current understanding of programming algorithms, and individuals’ level of growth in understanding of programming algorithms upon completing two different methods of study. The results from these sample practice tests lend support to the hypotheses made above, and it is our intention that the tests will be further developed and refined for future studies. Within the study of this paper, all tests and interviews were conducted in Japan with Japanese speakers. However, the conclusions that have been drawn are regarded to hold relevance for the educational sectors of all nations that are seeking to integrate and expand their computational thinking curriculums within compulsory education. Analyses of educational developments that are taking place within the EU have also been carried out as a means for comparison.

Literature Review

The Web Development Skills Gap

Computational Thinking has been embraced as not only a vital, but also increasingly relevant subject to be included in the curriculums of both formal and informal education settings around the world. Computational Thinking has gained reputation not only as a subject meriting integration in school curriculums, but as a universal competence that should “be added to every child’s analytical ability…” (Voogt, 2015, p.715) [33] Studies conducted by the European Commission have revealed for two noticeable trends to underlie the recent governmental efforts that have been made to further incorporate the subject of Computational Thinking [2] within school curricula. One evident trend (or rationale) is to foster the growth of thinking and problem-solving skills through various mediums and perspectives that are relevant to the digital age. Another is to foster the learning of practical skills that will be of beneficial outcome for economic growth and employment rates. Out of 13 MOEs of various countries [3] surveyed on their purposes for integrating Computational Thinking in their schools’ curricula, all answered positive to holding the rationale of “fostering logical thinking skills... (and) problem-solving skills”. 11 countries responded positive to holding the aim to foster “other key competences”. Within the 7 countries that responded with a positive to holding the aim of focusing on “the development of coding and programming skills”, only 3 responded for “fostering employability in the ICT sector” to be an aim in their efforts to incorporate Computational Thinking within their compulsory education programs. Despite these results, the European Commission has clarified in the New Skills Agenda for Europe that “the need to develop digital skills for employability” is a distinguished focus and priority in its policy changes. (Bocconi et al., 2016, p.25) [26] Indeed, the strengthening of human capital, employability and competitiveness within digital and related markets remains a prominent and fully evident task for countries even outside of Europe.

In countless studies and reports, the consensus is held that “all technological skills, both advanced and basic, will see a very substantial growth in demand” (50% in the United States, 41% in Europe), and that with the continual increase in the number of advanced technologies will also grow a greater demand for personnel who are equipped with the knowledge of how to “innovate, develop… adapt” and service
(those technologies) in the workplace”. (McKinsey & Company, 2018, p.8) [31] It has been reported that as advanced technological skills are essential for running a highly automated and digitized economy, people with these skills will inevitably be a minority” (Ibid, p.30) [31], and that “the need for technological skills will increase, both for advanced IT skills and basic digital skills, as more technology professionals are required but also more technology-enabled jobs such as engineers are created”. (Ibid, p.23) [31] Occupational categories to which this applies include “big data scientists, IT professionals and programmers, technology designers, engineers, advanced technology maintenance workers, and scientific researchers”. (Ibid, p.8) [31] Within this increased requirement for advanced technological skills, it is expected for the fastest rise in demand to be found in advanced IT and programming skills, with this demand foreseen to grow “as much as 90 percent between 2016 and 2030”. (Ibid, p.8) [31] It may be stated for there also to exist a more general and widespread need for digital skills. As reported by the European Commission, “many sectors are undergoing rapid technological change and digital skills are needed for all jobs, from the simplest to the most complex.” (European Commission, 2016, p.2) [29] As the New Skills Agenda [4] reports, “the demand for digital technology professionals has grown by 4% annually in the last ten years. Yet digital skills are lacking in Europe at all levels. Despite continued strong employment growth, the number of unfulfilled vacancies for ICT professionals is expected to almost double to 756,000 by 2020”. (Ibid, p.7) [32] For the case of Japan, Japan’s Ministry of Economy, Trade and Industry reported in June 2016 that human resources in the same sector were lacking by 170,000 people, this estimate being anticipated to rise to 370,000 by 2020, and 800,000 by 2030. (METI, 2015) [32] That there is a growing skills gap in the web development sector is difficult to refute, given the multitude of angles from which it has been evidenced.

Computational Thinking, Defined

The application of instructional technology in educational settings still holds many areas in need of adjustment. A branch of scholars have gone as far as to state that “what we see as the most compelling conclusion about the current state of technology in education (is how) instructional technology as currently designed and implemented has done little to change education”. This conclusion, it is said, follows from two interrelated observations: that much of the application of instructional technology has “started from inaccurate assumptions about the nature of human learning”, and that instructional technology has been “developed primarily from a technical point-of-view” with only secondary acknowledgment of human processes...” (Winegar and Kritt, 2009, p.46) [34] Barriers such as these found in the application of instructional technology, and the lack of institutional and governmental consensus on the educational priorities to be held in teaching programming and web development, have resulted in a widespread use of the term Computational Thinking. As if a reflection of the status quo, the term’s meaning is varying and oftentimes molded to suit the (often market driven) agendas of its users.

Computational Thinking is an often used but widely comprehensive and thus extremely vague term that lacks a narrow definition. Observations have been made of “a significant increase in the amount of academic and grey literature on CT (Computational Thinking), which is also being mentioned, explicitly or implicitly, in policy-related documents.” (Bocconi et al., 2016, p.10) [26] Difficulties which result are that “the concepts (of Computational Thinking) ... and the practice of programming are difficult to delineate in the literature”, and readers (and thus, also writers) are led to the impression that the term is synonymous to programming, and that Computational Thinking is dependent on programming, or vice versa. Computational thinking is thus perceived as a term that is inclusive of, or implicative of words such as the following: “programming, problem solving, coding, information literacy, computational thinking, algorithmic thinking, digital competence/literacy, computer science, informatics, computing, information technology” (Ibid, p.22) [26] The term has also been purported to hold various essential dimensions - such as “a confidence in dealing with complexity, persistence in working with difficult problems, having a tolerance for ambiguity in dealing with open-ended problems, and the ability to work in collaborative groups towards a common
goal” – all of which have been purported to be essential by the Computer Science Teacher Association (CSTA). (Voogt, pp.718-719) [33] The term’s contested definitions and multitude of related concepts however, pose no barrier to the scope of this paper. What can surely be said, is that although “computational thinking does not…necessitate the use of computers of any sort”, programming does. In addition, programming “requires one to think computationally”. (Demir et. al, 2018, p.1) [27] The following may also be stated with confidence: that “CT focuses on developing these thinking skills while within subjects beyond computer science”, and that it does not necessarily require the use of programming nor are CT scholars making the claim that programming has to be the context in which these skills are developed.” (Ibid, p.716) [33] Along with the understanding that programming is a skill with an undeniable rise in both relevance and demand, these are the premises on which the research of this paper has been conducted.

Discussion and Evaluation

Programming education takes various forms, and may be broken down into the following general categories: classroom lectures, one-on-one tutoring, e-learning, and blended learning [5]. Internet Academy offers enrollment plans in which students have the opportunity to take lessons in all but one of the styles listed above (e-learning) due to the abundance in research evidence for its disadvantages of holding both a “high student dropout rate” and barriers to having a “socialization process for students and teachers in a developed e-learning system”. (Deperlioglu and Uktu, 2010, p.329) [28] That the school provides options for learning in nearly all styles of teaching lends the research of this paper opportunities for well-rounded suggestions and balanced perspective on the flow of learning and skill acquisition of web development skills. The key observation from which this study kicked off, was that for adults, programming language skills were acquirable within a short period of time. What is particularly remarkable are the cases recorded in which students with little to no prior study of computational thinking successfully acquired the skills to design and program websites - even within their workplaces – in as little as 8 days to several months, depending on the intensity of learning. One typical case study is that of a new employee training program which took place across 8 days (7 hours a day), in which three students successfully acquired skills in HTML, CSS, JavaScript, as well as the ability to use authoring tools. (Internet Academy, 2018) [30]

That adult learners holding little to no programming experience are able to learn occupational and trade specific skills, and apply them within their workplace in as little as 8 days of highly concentrated tutoring, serves as a premise for the hypotheses raised in this this paper. Meanwhile, another noticeable trend is prevalent within Internet Academy’s database of learners’ comments and reflections on their studies. This is for learners to have found particular difficulty in overcoming the barrier of understanding certain aspects of programming. With regards to learning PHP (a server-side programming language used for web development), oft-repeated comments were of the following nature:

i) Relating to how particular syntaxes (eg. repeat) are difficult to understand, and how it is difficult to visualize how they may be processed within a program.

ii) Relating to the difficulty of reading through functions and selecting the appropriate functions to carry out various processes that are in mind.

iii) Relating to the difficulty of understanding the underlying principles and concepts of PHP. [6]
These commonly found barriers to learning programming (in this case, for PHP) are noticeably closely interlinked with the understanding of processes, inputs, and outputs within programming, and the comments may be judged to be indicative of the difficulty of achieving a higher understanding of programming algorithms. This presents a finding that is greatly significant given that practical programming skills and algorithmic thinking skills are requisites for the education of web development skill. From the experiences of learners at Internet Academy who had held little to no programming experience yet were able to acquire and apply tradeable web development skills in a short term, the following may also be deduced: that the duration of time required for the acquisition of algorithmic thinking skills is greater than that which is required for practical programming skills. If the learning of algorithmic thinking skills truly does call for greater study time – or, if even just simply, practical programming skills can be acquired with greater ease – it follows that learners should concentrate on developing and honing aspects of their skill set that require more long-term training.

Within this study, a plan for research (composed of two hypotheses, two separate trials, and evaluations) has been prepared and tested on a small scale, with just a handful of participants. It is our intention and hope to carry out these trials, in the future, on a larger-scale trials.

Test Trials and Results for Hypothesis 1

Out of the two separate yet related hypotheses regarding the understanding and learning of programming algorithms, the first was that acquiring and developing an understanding of programming algorithms requires long-term learning. To test whether the first hypothesis of whether the duration of time required for the acquisition of algorithmic thinking skills is greater than that which is required for practical programming skills, we chose to measure the understanding of programming algorithms held by professional programmers who have received no specific training or lecturing on programming algorithms. We believed that various evaluations may be drawn from a study such as this; such as the expected limits which exist for the gradual learning of programming algorithms through practical experience alone, and the expected timeline for gaining an understanding of programming algorithms. Speculations were made that for professional programmers who have received no specific training or lecturing on programming algorithms, a correlation would be found between the numbers of experience held in professional programming and the scores achieved in a given understandings test. It was also estimated that participants with more than 5 years of professional experience would score more than 90%, this being an indication of a near-ideal level of algorithmic understanding ability in most workplaces. Future research, however, will require a more in depth assessment of the ideal level of algorithmic understanding ability that is required in the majority of workplaces.

For the first test trial involving participants with experience of programming practice within the workplace, a total of three participants with a range of levels of experience (in this case 0.5 years, 2 years, and 5 years) were gathered. The primary objective of the trial was to measure differences in participants’ understanding of programming algorithms, according to the duration of their programming practice within the workplace (in years). Although demographics (age, gender, educational background) were not considered, the participants having received the same job training, and having carried out similar tasks and held similar responsibilities is believed to have provided some solid commonality and basis on which the results could be measured. In future studies, it may be recommended to conduct studies within specific workplaces, with a focus on groups with similar educational and training backgrounds. To measure the relation between understanding and number of years of experience, participants who had first been screened for the duration of their employment in which they had undertaken programming were asked to complete a written test (Figure 1a) in a controlled environment for 15 minutes. The test, although a rough model,
was designed to assess the participants’ levels of understanding of programming algorithms. In the test, a score of 100% is indicative of an understanding of algorithms that is ideal - in other words, complete – in terms of the expectations of even high-level occupations requiring programming capability. Figure 1 is a compilation of the test and scores that were given to the participants.

Results

The score results for the first trial test involving participants with experience of programming practice within the workplace, were as follows, as recorded in Table 1:

Table 1. Scores for Programming Algorithms Understanding Test 1 (for participants with experience of programming practice)

<table>
<thead>
<tr>
<th></th>
<th>Person X</th>
<th>Person Y</th>
<th>Person Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience (years)</td>
<td>0.5</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Score (Out of a total of 54)</td>
<td>7</td>
<td>17</td>
<td>24</td>
</tr>
<tr>
<td>Percentage Score</td>
<td>13%</td>
<td>31%</td>
<td>44%</td>
</tr>
<tr>
<td>Expected Percentage Score</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
</tr>
<tr>
<td>Passed or Failed Expectations</td>
<td>FAIL</td>
<td>FAIL</td>
<td>FAIL</td>
</tr>
</tbody>
</table>

As is shown in the table above, none of the participants with experience of programming practice were able to score more than the expected percentage score of 90%. In fact, to much surprise, no participants were able to score more than 50% within the given algorithms understanding test. In other words, none of the participants (not even Person Z, with 5 years of programming experience) was able to pass more than half of the test in marks. Although the sample size is small, the results suggest that more extensive testing may yield results that are also suggestive for the understanding of algorithms within programming to be difficult to ingrain in a learner’s mind even after a relatively long duration of work experience.

Test Trials and Results for Hypothesis 2

The second hypothesis drawn was that dividing the learning of web development skills into the following three separate steps, or processes, would constitute the most gradual, smooth, and thus effective method for teaching and learning programming algorithms. The three steps would consist of the following:

Step 1: a visual phase (ie. an introduction to the graphical representation of textual programming)

Step 2: a phase in which learners can compare a visual representation of code with the original, plain text representation.

Step 3: a gradual transition to purely textual code.
Regarding the second study focusing on participants who have never been introduced to programming, speculations were made that the group who had learned simple programming through a three-step learning process would achieve greater scores of indication for improvement in understanding in their second test attempt. The measure of improvement in understanding was also expected to be greater than their counterpart group which had been introduced to programming using only a two-step learning process. To measure the second hypothesis concerning the three-step process of learning web development skills, a separate test was prepared. Participants who have never been introduced to programming were asked to learn the basics of coding through a three-step process in a controlled environment. The test for one group was composed of the following: an introduction to the graphical representation of textual programming, a comparison between the graphical and plain text representations, and a gradual transition towards the handling of purely textual code. The test for another group, was composed of the following: a two-step process involving only an introduction to the graphical representation of textual programming and immediate transition towards the handling of purely textual code. Studies of this nature – which aim to directly compare the effectiveness of programming learning tools, as well as participants’ understanding levels using a quantitative measure – are still rare. The research in this paper is thus an effort to pave the way for future research to be conducted in the field of web development education.

In the second trial test for participants with no learning or practical experience of programming, a total of eleven participants were gathered, six of whom had no prior experience of programming. To put to test the hypothesis that the educational hurdles of understanding algorithms may be better overcome through three learning phases (i.e. the incorporation of visual programming tools), a series of tests were conducted in which half of participants (Group A) were asked to carry out Steps 1 and 3 twice, and the other half of participants (Group B) were asked to carry out Steps 1 and 3, once, and subsequently, Steps 1, 2 and 3, once. Put more concisely, the primary objective of this test trial was to measure participants’ skills growth after completing two timed tests. For the first stage of the trial, both Group A and Group B were asked to take the same tests. For both groups this first attempt incorporated the use of visual programming tools including two learning phases (an introduction to the graphical representation of textual programming and then immediate transition towards the handling of purely textual code). For both group’s second attempt, Group A was asked to repeat the first stage, whereas Group B was asked to take a different test. This test consisted of three learning phases (an introduction to the graphical representation of textual programming, a comparison between the graphical and plain text representations, and a gradual transition towards the handling of purely textual code). Within the trial, participants in both Group A and B were first shown, across three timed minutes, the main features of BBC’s micro:bit [25] (a programmable device produced by a non-profit organization which allows for coding in the realms of Design Technology, Physics, Art and Music). They were also shown how to program it using a compatible online visual programming editor provided by Microsoft. Programming of the device is made possible using a JavaScript Blocks Editor, which allows the dragging and dropping of blocks to visually program the device, and preview a simulation of actions to be performed on the device. The device also holds functions in which it may be coded from any web browser in Python and Scratch, amongst other forms. With its built-in 25 LEDs, 2 buttons, connection pins, light, temperature, and motion sensors, as well as USB interface with wireless, radio and Bluetooth connection features, the device may be programmed to carry out countless functions, making the results of coding realizable in physical form. Despite the device and editor’s seeming complexity, it’s highly simple, practical, and non-decorative interface made the tool favorable for use within the trial.
Results

For the second trial test, the recorded results were the following, as recorded in Table 2:

Table 2. Scores for Programming Algorithms Understanding Test 2 (for participants with no prior experience of programming)

<table>
<thead>
<tr>
<th>GROUP A</th>
<th>Person A</th>
<th>Person B</th>
<th>Person C</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Attempt</td>
<td>13</td>
<td>9</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>Second Attempt</td>
<td>23</td>
<td>14</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td>Change in Score</td>
<td>+ 10</td>
<td>+ 5</td>
<td>+ 4</td>
<td>+ 6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GROUP B</th>
<th>Person D</th>
<th>Person E</th>
<th>Person F</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Attempt</td>
<td>19</td>
<td>20</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>Second Attempt</td>
<td>23</td>
<td>24</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Change in Score</td>
<td>+ 4</td>
<td>+ 4</td>
<td>+ 5</td>
<td>+ 4</td>
</tr>
</tbody>
</table>

Learning processes used in FIRST attempt:

- Step 1
- Step 2
- Step 3

Groups A and B: ✓ ✓

Learning processes used in SECOND attempt:

- Step 1
- Step 2
- Step 3

Groups A: ✓ ✓ ✓

Groups B: ✓ ✓ ✓

As can be seen in the results above, carrying out Steps 1, 2 and 3 produced no significantly different results in comparison to the participants who carried out Steps 1 and 3 only. The test results shown in Table 2 therefore, do not provide strong evidence for or against the claim that the learning of programming algorithms may be maximized with a learning process that includes three steps (an introduction to the graphical representation of textual programming, a comparison between the graphical and plain text representations, and a gradual transition towards the handling of purely textual code). It may be suggested that clearer results may have been recorded, had the trial not consisted of two attempts, but only one. The format of the test itself is worth reproducing with only one attempt, and with greater sample sizes. The details of the markings which have been given for Test 2 have been compiled in Figure 2. What was of greatest interest were the results for Test 2 when taken by participants with experience of programming practice within the workplace. The details of the markings which have been given in the test have been compiled in Figure 3. That only one participant was able to achieve a full score, and the two participants with five (+) years of programming experience were unable to receive a full score suggests that experience of programming does not correlate cleanly with understanding of programming algorithms, even at the most basic level.

Table 3. Scores for Programming Algorithms Understanding Test 2 (for participants with experience of programming practice)

<table>
<thead>
<tr>
<th>Experience (years)</th>
<th>Person V</th>
<th>Person W</th>
<th>Person X</th>
<th>Person Y</th>
<th>Person Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score (Out of a total of 25)</td>
<td>21</td>
<td>25</td>
<td>18</td>
<td>8</td>
<td>21</td>
</tr>
<tr>
<td>Percentage Score</td>
<td>84%</td>
<td>100%</td>
<td>72%</td>
<td>32%</td>
<td>84%</td>
</tr>
<tr>
<td>Expected Percentage Score</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Passed or Failed Expectations</td>
<td>FAIL</td>
<td>PASS</td>
<td>FAIL</td>
<td>FAIL</td>
<td>FAIL</td>
</tr>
</tbody>
</table>
The hypothesis presented in this paper that prioritizing in young learners the learning of programming algorithms, as well as the allocation of more time in compulsory education curriculums will allow learners to stretch and hone their algorithmic thinking abilities, remains supported. The recordings of student successes and learner comments are indicative that programming algorithm understanding is difficult to acquire in the short term, but that it may be improved gradually over time. The differences in scores recorded in the test for participants with programming experience of varying duration, as shown in Table 1, as well as the recorded cases of those of adult-age with no prior learning experience being able to acquire occupational and trade specific web development skills in a short period of time, support this also. We believe that there has been abundant suggestion for the learning of algorithmic thinking skills to call for greater study time. That practical programming skills can be acquired with greater ease also lends great support to the recommendation that learners should prioritize (in other words start with, or allocate more time to) developing and honing aspects of their skill set that require more long-term training. With clear priorities, the teaching of web development skills at the compulsory education level will allow students to build a stronger foundation for programming thinking abilities. This will not only allow a faster understanding of programming languages that will have relevance and demand in the future, but will be in alignment with many policymakers’ intentions to nurture the growth of workforces that can build and adapt to new systems and frameworks. Those workforces would also be more equipped to solve digital-age problems for themselves.

As a last note, it may also be said that history of research on the study processes for improving algorithmic thinking skills remains relatively shallow, and that even policymakers and educators themselves remain divided as to how this may be best carried out. To not only contribute to filling this gap, but to help determine learning methods which will be suitable especially for learners who hold language barriers to learning programming, we wish to further look into the nature of study processes that are most effective and efficient for the acquisition of programming skills. For compulsory school age children, the breaking down of this barrier is particularly vital, and to state the least, urgent. By applying the use of learning tools which have not been developed based on the premise that users will hold English as their mother tongue, and do not rely heavily on an understanding of English, more children around the world will be able to effectively develop more efficiently their understanding of programming algorithms. This is not to say that programming activities have not become more accessible - in both the literal and figurative sense of the word - given the introduction of educational toys and tools that are new and improved developments based on the Logo programming environment (first introduced in the 1960’s by Seymour Papert). Learning tools for computational thinking that are most prevalent today are visual programming tools, which have carried on the functions of this drag and drop, block-faced interface. Visual programming tools hold more capacity for complexity than meets the eye, for they can not only control multiple characters and animations, but the programming language itself includes the scope for programming concurrency and events. (Bocconi et al., 2016, pp.39-40) [26] An objective found in many of these educational tools are the moving of an object to a designated location or goal through techniques such as the following: arranging tiles in order to see movement (eg. Primo Toys Cubetto [7], Osmo Coding Family, including Coding Awbie, Coding Jam, Coding Duo [8]), pressing buttons to see movement (eg. Think & Learn Code-a-pillar [9]), or arranging tiles on a board and moving an object along those tiles (eg. Code & Go Robot Mouse [10], Robot Turtles Game [11]). (Out of the selection of popular educational tools that have been mentioned above, those corresponding to Step 1 include the following: Hopscotch [12], Scratch [13], Stencyl [14], RoboMind [15], Etoys [16], Waterbear [17], and Kodu [18], and those corresponding to Steps 1 and 2 include the following: Code Lab’s Google Santa Tracker [19], Smalruby [20], Alice [21], Tynker [22], Blockly [23], and Swift Playgrounds [24]). We believe that extending the duration of use of such language-free tools and then later, visual programming tools, even non-English speaking children will be able to gain more confidence with transitioning to purely textual programming.
Conclusion

The background research and results of the trials, together, that the learning of programming algorithms should be prioritized and started from an early age. The two trials conducted in the research took samples of a small scale, and research of a greater scale will be required. However, not only the results of the trials but the data of more than 25,000 students which has been collected by the school since 1995, show clear patterns which are supported by the background research presented in this paper. Furthermore, the abundant data and analyses that have been drawn by government ministries and educational researchers around the world suggest the worth of conducting in the future, large-scale trials of a similar nature. Future trials will, hopefully, strengthen the evidence for the following conclusions that have been drawn from the tests conducted:

i) That the duration of time required for the acquisition of algorithmic thinking skills is in fact extensive (the results displayed in Table 1 suggest for it to have been highly difficult for even those with more than one year of practical programming experience to achieve more than half of the marks in the programming algorithms understanding test).

ii) The learning of programming algorithms should be prioritized especially from the compulsory education level. This is suggested by the result of adult-age learners with no prior learning experience being able to acquire occupational and trade specific web development skills in a short period of time.

Now is the time to re-evaluate the current state of technology in our educational systems, and in what directions that technology is being innovated. While computational thinking does not require programming, skillful programming has an understanding of algorithms as its core foundation. Rather than overlooking this truth, we are to focus our attention on developing and nurturing algorithmic understanding within compulsory educational curriculums. The continual rise of the skills gap within the IT sector not only supports, but calls for such action. As the research of this paper shows, there are various, yet clear tasks to be completed in the development of programming education. The existing voids of research on subjects (such as the acquisition of an understanding of programming algorithms, English language barriers to programming, and educational strategies that are to be taken outside the West), may be filled with further study, and pose no significant impediments to research. Internet Academy will strive to fill in as many of these gaps as possible, so that individuals around the world who are equipped with programming skills (and with great hope, younger generations), may be able to further cooperate and work together to overcome global difficulties that are to arise in the digital age.
<script>
function ObsList()
{
    this.handlers = [];  
    this.fetchData = function fetchData() {
        var data = {
            grape : "purple",
            lemon : "yellow",
            banana : "yellow"
        };  
        obsList.notify( data );
        obsList.remove( obs );
    }
}

ObsList.prototype = {
    add : function(obj) {
        this.handlers.push(obj);
    },
    remove : function(obj) {
        for ( var i = 0, len = this.handlers.length; i < len; i++ ) {
            if (this.handlers[i] === obj) {
                this.handlers.splice(i, 1);
                return true;
            }
        }
        return false;
    },
    notify : function() {
        var args = Array.prototype.slice.call(arguments, 0);
        for (var i = 0, len = this.handlers.length; i < len; i++ ) {
            this.handlers[i].update.apply(null, args);
        }
        obsList.notify( data );
    }
}

function Subject()
{
    var obsList = new ObsList();
    var DataUpdated = {
        update : function() {
            console.log("Data is updated");
        }
    }
    var DataPublished = {
        update : function() {
            console.log("Data is published");
        }
    }
    var subject = new Subject();
    subject.addObs(DataUpdated);
    subject.fetchData();
    subject.addObs(DataPublished);
    subject.fetchData();
    subject.removeObs(DataUpdated);
    subject.fetchData();
    subject.removeObs(DataPublished);
    subject.fetchData();
}

function Subject() {
    var obsList = new ObsList();
    var DataUpdated = {
        update : function() {
            console.log("Data is updated");
        }
    }
    var DataPublished = {
        update : function() {
            console.log("Data is published");
        }
    }
    var subject = new Subject();
    subject.addObs(DataUpdated);
    subject.fetchData();
    subject.addObs(DataPublished);
    subject.fetchData();
    subject.removeObs(DataUpdated);
    subject.fetchData();
    subject.removeObs(DataPublished);
    subject.fetchData();
</script>
Figure 1b. Scores Gained for Programming Algorithms Understanding Test 1 (for participants with experience of programming practice)

<table>
<thead>
<tr>
<th></th>
<th>Person X (0.5 years)</th>
<th>Person Y (2 years)</th>
<th>Person Z (5 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>function ObsList(){}</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>this.handlers = [];</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>ObsList.prototype = {}</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>add : function(obj) {</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>this.handlers.push(obj);</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>}, remove : function(obj) {</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>for ( var i = 0, len = this.handlers.length; i &lt; len; i++ ) {</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>if (this.handlers[i] === obj) {</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>this.handlers.splice(i, 1);</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>return true;</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>} return false;</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>}, notify : function() {</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>var args = Array.prototype.slice.call(arguments, 0);</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>for (var i = 0; len = this.handlers.length; i &lt; len; i++) {</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>this.handlers[i].update.apply(null, args);</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>}</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>function Subject() {}</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>var obsList = new ObsList();</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>this.addObs = function addObs( obs ) {</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>obsList.add( obs );</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>}, this.removeObs = function removeObs( obs ) {</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>obsList.remove( obs );</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>this.fetchData = function fetchData() {</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>var data = {</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>grape : &quot;purple&quot;,</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>lemon : &quot;yellow&quot;,</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>banana : &quot;yellow&quot;</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>}, obsList.notify( data );</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>}</td>
<td>var DataUpdated = {</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>update : function() {</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>console.log(&quot;Data is updated&quot;);</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>}</td>
<td>var DataPublished = {</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>update : function() {</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>console.log(&quot;Data is published&quot;);</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>}</td>
<td>var subject = new Subject();</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>subject.addObs(DataUpdated);</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>subject.fetchData();</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>subject.addObs(DataPublished);</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>subject.fetchData();</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>subject.removeObs(DataUpdated);</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>subject.fetchData();</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total Score=</td>
<td>7</td>
<td>17</td>
<td>24</td>
</tr>
<tr>
<td>Percentage Score=</td>
<td>13%</td>
<td>31%</td>
<td>44%</td>
</tr>
<tr>
<td>GROUP A</td>
<td>GROUP B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st attempt</td>
<td>2nd attempt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st attempt</td>
<td>2nd attempt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st attempt</td>
<td>2nd attempt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st attempt</td>
<td>2nd attempt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st attempt</td>
<td>2nd attempt</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test 2: Scores Gained for Programming Algorithms Understanding Test 2 (for participants with no prior experience of programming)

<table>
<thead>
<tr>
<th>Person A</th>
<th>Person A</th>
<th>Person B</th>
<th>Person B</th>
<th>Person C</th>
<th>Person C</th>
<th>Person D</th>
<th>Person D</th>
<th>Person E</th>
<th>Person E</th>
<th>Person F</th>
<th>Person F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 1</td>
<td>let conversion switch = 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 2</td>
<td>let figure = 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 3</td>
<td>input.onButtonPressed(Button.A, () =&gt; {</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 4</td>
<td>figure] = MatF.random(6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 5</td>
<td>if (figure &lt;= 3) {</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 6</td>
<td>basic.showLeds()`</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 7</td>
<td>} else {</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line 8</td>
<td>conversion switch = 1</td>
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<td>conversion switch = 0</td>
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The meaning of change variable 「Conversion switch」

Frontend: 92%
2nd Score - 1st Score = 48%

Frontend: 96%
2nd Score - 1st Score = 68%

Frontend: 80%
2nd Score - 1st Score = 36%

Frontend: 56%
2nd Score - 1st Score = 10%

Frontend: 36%
2nd Score - 1st Score = 52%

Frontend: 52%
2nd Score - 1st Score = 17%

Frontend: 48%
2nd Score - 1st Score = 12%
Figure 3: Scores Calculated for Programming Algorithms Understanding Test 2 (for participants with 0.5-1 year of programming experience)

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**Total Score (Out of 25)** = 21

**Total Percentage = 84%**

**Experience (years) Total Points Allocation**

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Footnotes

[1] Visual programming tools have been designed to support intuitive learning without the requirement of a detailed understanding of algorithms (e.g. Scratch, developed by MIT Media Lab).

[2] Also referred to as coding, programming, and algorithmic thinking, amongst other terms.

[3] Austria, Czech Republic, Denmark, Finland, France, Greece, Hungary, Italy, Lithuania, Poland, Portugal, Switzerland, Turkey.

[4] The European Commission’s New Skills Agenda is centered on three work strands, which are the following: i) Improving the quality and relevance of skills formation ii) Making skills and qualifications more visible and comparable iii) Improving skills intelligence and information for better career choices.” (European Commission, 2016, p.3)

[5] Blended learning is a ‘blend’ or combination of e-learning, and education within a traditional setting.


[18] https://www.kodugamelab.com/about.


[25] https://microbit.org/guide/quick/
References


1. Title: Designing an Online Writing System for Promoting Collaborative and Autonomous Learning

2.-5. Names, affiliations, addresses, and e-mail addresses of the authors:

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   5. y.kishi@shoin-u.ac.jp
6. Paper

Abstract

It is our purpose to design an online writing system in Web-based collaborative environments in order to develop university students’ English writing skills. The system also provides an automated text analysis function which enables students to recognize their active vocabulary, so as to help them engage in autonomous learning. Our writing system was used in a writing course at a Japanese university and data was collected from both the text analysis and a questionnaire. The results indicated that the system could promote collaborative and autonomous learning to help develop students’ writing skills.

1. Introduction

The objective of this study was to see if an online writing system in Web-based collaborative environments was helpful for improving EFL students’ writing skills. An online discussion forum was set up as a platform for writing with the aid of CSCL (Computer Supported Collaborative Learning) technologies to develop our online writing system. Based on social constructivist approaches, the use of online discussion forums leads to a student-centered model. Students create a learning community in the online forum, where they explore ideas, provide content expertise and feedback, and where all participants share feelings. Namely, students play active roles in their own learning processes, while the role of teachers is to facilitate students and to be supportive within these environments. The design for our online discussion forum is based on the collaborative space ontology (Takeuchi, Hayashi, Ikeda, & Mizoguchi, 2006). According to the collaborative space ontology, collaborative space is classified into two areas: one for practice to create community knowledge, and the other for education to pass it on to the next generation. Our system was designed to integrate both of these functions and was named Coconuts (Kushima, Kishi, Y., Tajika, Kishi, N., & Sonoda, 2014). Coconuts also provides automated text analysis which enables students to recognize their active vocabulary. It may be assumed, from the results of our study, that Coconuts promotes collaborative and autonomous learning in EFL students’ writing activities.

2. The Design of Coconuts

Figure 1 shows the top page of Coconuts. The right column is for practice in writing English compositions. The left one is for collaborative learning, where participants learn from peers or the bot’s writing. A participant inputs his/her own text into the entry field in the right column. A portion of all the participants’ writing appears in the left column, where a participant’s nickname, his/her icon, and the number of words and versions of their writing can also be seen. Unlike a prevailing online discussion forum, it does not scroll down the entirety of their work. When a participant’s nickname is clicked on, the total of his/her writing appears. Therefore, learners refer to others’
compositions if needed within the online writing system. The design of *Coconuts* was based on our idea for students to initially work on their assignments on their own.

*Coconuts* is also equipped with the following unique features. One feature is a virtual member, or a bot, that automatically presents model writing or gives advice. The bot that provides model writing is expected to play the important role of an advanced member (⑤). Model writing leads to an increase in learners’ consciousness of how text is organized (Hyland, 2003; Swales and Feak, 2000). In the composition course, the students were asked to work on e-mail writing, but most of them had little knowledge of how to write an e-mail. Hence, model writing presented by the bot was expected to have the students raise their consciousness of the key lexical and grammatical features of a text and the organization of the discourse. Considering students’ English proficiency, a bot that provides advice in Japanese for each of the composition tasks is also incorporated into the system (⑥).
Figure 2. The Page of *Goi (Vocabulary) Score*

The second feature is that *Coconuts* analyzes each learner’s writing and creates a page which automatically shows how their active vocabulary is being used in each composition (Figure 2). The page was named *Goi Score* (*goi* means vocabulary), where learners can recognize at what level based on JACET rank\(^*1\) (JACET, 2016) their own active vocabulary is.

3. Research Questions

In order to measure the effectiveness of *Coconuts*, the following hypotheses were proposed:
1) An online writing system in Web-based environments helps students to be actively involved in writing activity and develop their writing skills.; 2) An online portfolio about students’ active vocabulary promotes students’ autonomous learning.

4. Procedure

*Coconuts* was used in a writing course at a Japanese university, and 15 students enrolled in the system. The students were required to write and post an email to meet a specific purpose after they learned target expressions using the textbook in each class. After the students completed the course, data was collected from both text analysis and an anonymous questionnaire. Emails of six topics: invitation, request, appreciation, complaints, apology, and proposal were used for analysis. Additionally, texts by three native speakers of English were analyzed so that active vocabulary and clause structure in their texts could be compared with that of the students’ texts. The following factors were analyzed:

1) Tokens, Types, Type/Token ratio, Content words/total, Average rank based on JACET rank, Average content-word rank based on JACET rank
2) Number of sentences, Average number of words per sentence, DC/C (dependent clauses per clause), and VPs (verb phrases)
5. Results and Discussion
5.1 Collaborative Learning

The results of a questionnaire survey of the students showed that the students were engaged in collaborative learning. Table 1 shows what the students focused on in the online writing activities. About half of the students focused on working on the activities on their own (48.1%), and 30.7% of the students answered, “the perfection level of English writing.” The rate of the students who chose the option of “collaborative learning” was 14.8%, but none of them focused on member contribution. Table 2 shows what the students often referred to in the writing activities. The most frequently used material was the textbook (42.5%), followed by peer writing (22.5%). The figures in Table 1 and 2, i.e., “collaborative learning” (Table 1) and “peer writing” (Table 2), indicate that the students were engaged in collaborative learning. With regard to the extent to which the students referred to peer writing, most of the students in all the classes (80.0%) answered, “I referred to peer writing and incorporated part of it into my writing. As for the bot’s writing, 20.0% of the students answered, “I referred to the bot’s writing and incorporated part of it into my writing.” 20.0% of them answered, “I referred to the bot’s writing, but I did not incorporate it into my writing.” The highest rate of the response (60.0%) was “I hardly referred to the bot’s writing.” It is likely that the students were more interested in peer writing than the bot’s.

<table>
<thead>
<tr>
<th>Table 1. What the Students Focused on in the Online Writing Activities (%)</th>
<th>N=15</th>
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<tbody>
<tr>
<td>The perfection level of English writing</td>
<td>30.7</td>
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<tr>
<td>Member contribution</td>
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<tr>
<td>Collaborative learning</td>
<td>14.8</td>
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<tr>
<td>Working on the activities with friendly competition</td>
<td>7.4</td>
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<tr>
<td>Working on the activities on their own</td>
<td>48.1</td>
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<tr>
<td>Enlarge their vocabulary</td>
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<tr>
<td>Other (Please specify)</td>
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*Note. Multiple answers are permitted.*

<table>
<thead>
<tr>
<th>Table 2. What the Students Often Referred to in the Writing Activities (%)</th>
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<tbody>
<tr>
<td>The textbook</td>
<td>42.5</td>
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<td>Peer writing</td>
<td>22.5</td>
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<td>The bot’s advice</td>
<td>10.0</td>
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<td>The bot’s writing</td>
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<td>Key phrases (The example sentences from an online dictionary)</td>
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</table>
5.2 Comparison Between the Students’ Compositions and the Native Speakers’

Table 3 shows the figures of the factors regarding vocabulary gained from the analysis of the students’ and native speakers’ writing. It is natural that native speakers used the words whose JACET ranks are higher. The email format that was required includes both informal and formal styles. It was expected that the two groups would use similar familiar vocabulary in the informal-style email. Focusing on the informal emails, Table 4 shows that the averages of Type/Token ratio (TTR) and content words/total of students’ writing were close to that of the native speakers’, as we had expected. With regard to some topics, e.g., “complaints” and “apology,” the difference in JACET ranks between the two groups was smaller.

Table 3. The Averages of Goi (Vocabulary) Score

<table>
<thead>
<tr>
<th>Topics</th>
<th>TTR</th>
<th>Content words/total</th>
<th>JACET rank</th>
<th>Content-word rank based on JACET rank</th>
<th>TTR</th>
<th>Content words/total</th>
<th>JACET rank</th>
<th>Content-word rank based on JACET rank</th>
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<td>0.54</td>
<td>502.5</td>
<td>1027.0</td>
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<td>0.51</td>
<td>351.3</td>
<td>720.9</td>
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<td>952.5</td>
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<td>570.5</td>
<td>1077.0</td>
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</table>

M = 0.669, Mdn = 0.672, SD = 0.0164

Table 4. The Averages of Goi (Vocabulary) Score in the Informal Emails

<table>
<thead>
<tr>
<th>Topics</th>
<th>TTR</th>
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<th>JACET rank</th>
<th>Content-word rank based on JACET rank</th>
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<th>JACET rank</th>
<th>Content-word rank based on JACET rank</th>
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</tr>
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<td>0.50</td>
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<td>0.54</td>
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<tr>
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<td>0.54</td>
<td>427.2</td>
<td>793.1</td>
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</table>
The findings from the analysis of unigrams\(^2\) of each group were that there was some difference in the two groups’ tendency of using active vocabulary. While the native speakers used pretty, It’s, way, and such very frequently, the Japanese students did not use them very often. Instead, like, If, want, please, ask, think, forward, next, soon, favor, and other were high-frequency words in the Japanese group, but they were not seen very frequently in the native speakers’ materials. The high-frequency words used by the Japanese students appeared very often in the textbook, and thus we can infer that the students’ works were greatly affected by the textbook.

As far as the types of (subordinate) clauses are concerned, the following findings were obtained: The Japanese students’ materials were similar to that of the native speakers’, with respect to the ratio of subordinate clauses to all the clauses, and with respect to the types of subordinate conjunctions. In particular, the conjunctions if, that, and the phonologically null counterpart of the conjunction that were very frequently used in both, but the participants tended to use the conjunction that and its phonologically null counterpart with a narrow range of verbs, i.e., hope, think, and some others. The Japanese students’ materials were different from the native speakers’ in that because was used very frequently, if not always, to give a reason, while it was not often used in the latter group, who instead used since and as.

### 5.3 Autonomous Learning

Table 5 shows the comments that nine of the Japanese students gave on Goi (Vocabulary) Score. Some students recognized their need to increase their vocabulary, and were encouraged to acquire more words by using Goi (Vocabulary) Score.

<table>
<thead>
<tr>
<th>Awareness of lacking their own vocabulary:</th>
<th>had insufficient vocabulary / tended to use too many high-frequency words / used only plain words because my vocabulary was small / used only words and sentences learned in high school days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivated to enrich vocabulary:</td>
<td>want to develop my vocabulary / tended to use plain words and compose an essay using short sentences, so want to write a formal essay and use appropriate words for business purposes</td>
</tr>
<tr>
<td>Characteristics of active vocabulary:</td>
<td>can express my thoughts using only plain words</td>
</tr>
<tr>
<td>Difficulty in English compositions:</td>
<td>written language is difficult</td>
</tr>
<tr>
<td>A Lack of understanding the system:</td>
<td>could not judge the quality of the system</td>
</tr>
</tbody>
</table>

### 6. Conclusion
The results indicated that many of the students received intellectual stimulation from the Web-based collaborative environments Coconuts provided, and some of the students felt the need to acquire more active vocabulary, after recognizing the level at which their vocabulary was at. We can see the high potential of the online writing system Coconuts, which would promote collaborative and autonomous learning and help students develop their writing skills. In order to make Coconuts more effective, we are planning to collect more data from learners who are engaged in Coconuts and analyze them, and at the same time improve some functions of Coconuts so that learners can make better use of this system.

**Note 1:** JACET rank refers to the rank of each word based on the New JACET List of 8000 Basic Words published in 2016 by the Japan Association of College English Teachers (JACET). This word list was compiled using the data from the British National Corpus and the Corpus of Contemporary American English.

**2:** Uppercase and lowercase texts were treated as case sensitivity.

**Acknowledgments**

This study is supported by Grant-in-Aid for Scientific Research (C) No. 16K02893 from Japan Society for the Promotion of Science (JSPS).

**References**


Title: 
Moving PastDisconnected Hurdles: Empowering Graduate Students to Affect Positive Change Through the Thesis and Dissertation Experience

Presenters and Authors:
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Target Audience:
Faculty who serve as thesis and dissertation advisors for students who are educational practitioners/professionals (primarily PreK-12 and community college teachers and administrators) and are pursuing masters and doctoral degrees in the field of education.

Abstract:
This report focuses on efforts and innovative approaches to improve experiences for graduate students who are developing, conducting and completing master’s degree theses and doctoral dissertations in the field of education. The presenters examine and reflect on the need to significantly adjust the process and focus of the educational thesis and dissertation to better match the preparation and needs of students who are practitioners in order to help these students become stronger and better educators and leaders.

The presenters recognize that the vast majority of students who pursue master’s or doctoral degrees in education do not intend to become researchers or university faculty. Rather, most of these students are looking to improve their skills as teachers and educational leaders, and will likely never conduct a major research effort beyond the thesis or dissertation. While these students have a great deal of practical experience in their field, most of them have had little or no exposure to graduate level research, scholarly literature or academic writing. Recognizing that research skills including data collection and analysis, and academic writing are essential skills for all graduate students including those in educational programs, these skills alone are inadequate in preparing educators for the realities they face as they work to conduct multi-tiered and multi- faceted research that will affect positive change and contribute to the field to improve overall student success. For many of these students the thesis and dissertation, while a
significant requirement for the degree, are viewed as major “hurdles” that are too often disconnected from the realities and complexities of the classroom and administrative office. Simply put, the commonplace approach to developing and completing the thesis and dissertation does not serve these students well. However, the requirement for a traditional thesis and dissertation in the educational doctorate and master’s degree are not going to go away anytime soon. Therefore, it is incumbent on advisors to help guide students of education through a meaningful and transformational experience that will result in building a legion of teachers and administrators who have the ability to challenge the status quo of our educational institutions, and who have the skills, knowledge, disposition and fortitude to significantly improve student learning and success at all levels of education and for all students.

The presenters use a variety of theoretical and conceptual frameworks to examine how the educational thesis and dissertation process can be improved to better serve the needs of educational practitioners. This includes the use of Role Acquisition theory (Thornton & Nardi) to examine and help facilitate the intrinsic change process in graduate students in education during the thesis and dissertation process. Transformative Learning framework (Habermas; Cranton) is used to better understand and advance developmental changes and scaffolding that are necessary to examine problematic frames of reference, openly reflect, and to emotionally change from the experience. Finally, the Loss/Momentum framework (RP Group) is used in two separate ways; first to scrutinize specific institutional barriers and supports that exist in graduate and doctoral programs in education as well throughout the university that influence the process of completing the thesis and dissertation. Second, this framework is used to identify and examine individual characteristics, skills, abilities and attributes of these students that serve as either barriers or assets to completing a meaningful thesis or dissertation.

Practical recommendations for improving the educational thesis and dissertation process will be provided. Mentoring and strategic coaching approaches will be discussed as well as new and seasoned perspectives from field. Finally, all analysis will be reconnected back into theoretical frameworks that are firmly grounded in research that stands at the forefront of education today.
Horticultural Experiential Learning through Poinsettia Fundraising Sales: Lessons Learned

Topic Area of the Submission: Higher Education

Conference Proceedings Paper

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Abstract

A critical component of an education in horticulture is hands-on experience growing plants. There are limited opportunities for students in the Department of Tropical Plant and Soil Sciences (TPSS) at the University of Hawaii at Manoa to gain this experience, and if the opportunities available are voluntary, it can be difficult to achieve good participation from students. The TPSS Graduate Student Organization (GSO) and the undergraduate Horticulture Society hold multiple plant sales throughout the year for holidays such as Valentine’s Day and Christmas. In 2016, students started growing their own poinsettia plants from cuttings instead of purchasing finished plants from local wholesale nurseries for resale, resulting in higher quality plants and very successful plant sales. However, there was still ample opportunity to increase real world experience for horticulture students and for students to gain mentoring experience and leadership skills. Therefore, students doubled production amounts from 200 plants in 2016 to 400 plants in 2017. Furthermore, in addition to the four ‘Princettia’ varieties scheduled for production, three more poinsettia varieties were added into production. A TPSS Experimental Topics class and a Special Topics class were also created in Fall 2017 to teach students about poinsettia production and marketing, which increased student participation in the project. Finally, a trial pre-sale at the department’s production greenhouse facility was conducted, in addition to increased advertising and new marketing strategies. The pre-sale and regular campus sale were very successful, with 97% of the 400 plants sold. This resulted in nearly $2500 in revenue for the students to use for team building activities, social events, and travel to scientific conferences. Customers were impressed with the quality of the plants. Collaboration with the Experimental Topics class and the Special Topics class was worthwhile, with students gaining hands-on experience in growing, marketing, sales activities, and consumer feedback. Moreover, students gained valuable leadership and mentoring skills in addition to a strong sense of pride and accomplishment. In the upcoming 2018 production season, production will include more traditional red poinsettias due to customer demand. Furthermore, a novel collaboration with the TPSS Horticultural Practices class will encourage more student involvement in Fall 2018, thereby enhancing more students’ experiential learning. Finally, expanded advertising at off-campus sites will also be done to increase traffic at the greenhouse pre-sale.

Additional index words. hands-on, experiential learning, higher education, horticulture, fundraiser, fundraising, participation, plant sales, real-world, practical experience, mentoring, marketing, collaboration
Introduction

One definition of experiential learning states it is “that learning process and accomplishment that takes place beyond the traditional classroom and that enhances the personal and intellectual growth of the student. Such education can occur in a wide variety of settings, but it usually takes on a "learn-by-doing" aspect that engages the student directly in the subject, work, or service involved” (Katula and Threnhauser, 1999). Experiential learning also comes with a number of benefits. This includes learning new skills and experiences (Bryant, 2003; Golden, 2013) and developing various interpersonal skills that employers in agricultural sectors find desirable, such as teamwork, communication, and leadership (Crawford et al., 2011; Robinson and Garton, 2008; Sample et al., 2015).

It is without question that agriculture has its place in educational curriculum. Research has indicated that the inclusion of agriculture in the classroom can serve as an effective tool for motivating student learning in many subjects due to its hands-on experience (Relf and Lohr, 2003). Furthermore, various benefits of engaging in hands-on horticultural activities, such as a greater sense of well-being, increased self-esteem, and enhanced personal satisfaction and efficacy have been reported (Blair et al., 1991; Feenstra et al., 1999; Pothukuchi and Bickes, 2001; Relf et al., 1992). In agriculture and its related majors, experiential learning is a critical component in the education of an undergraduate student. Proponents of experiential learning feel it is an essential component of an agricultural education, and that teaching “real world” situations to students should be the focus of learning (Arnold et al., 2006).

The Department of Tropical Plant and Soil Sciences (TPSS) at the University of Hawaii at Manoa has both undergraduate and graduate programs in which there are limited opportunities for hands-on learning experiences. In the past, the undergraduate Horticulture Society held plant sales throughout the year during major holidays such as Valentine’s Day and Christmas to raise money for professional development and service-learning activities.

The annual poinsettia sale held by TPSS during the Christmas season has been a long tradition that many customers look forward to every year to purchase their holiday poinsettias. However, the poinsettias sold during these fundraisers were not grown by the students. Instead, the plants were purchased from local wholesale nurseries and resold by the students for a profit. In 2016, however, the TPSS Graduate Student Organization (TPSS GSO) entered into a collaboration with the undergraduate Horticulture Society to sell student-grown poinsettias instead of purchasing them from local nurseries. The students grew four varieties of a poinsettia hybrid named ‘Princettia’. This is a newer plant that is similar to poinsettia and sold alongside traditional poinsettias during the holiday season, but has only been available on the market for a few years. These ‘Princettia’ hybrid plants proved to be quite popular with customers that first 2017 season. Overall, the shift to student-grown plants resulted in higher quality plants and also more successful plant sales.

However, the success of this new experiential learning activity was only a small step towards increasing hands-on learning for students in the TPSS department. During that first growing season, the majority of the work producing the poinsettia crop was performed by only three students. When the opportunities for hands-on learning are voluntary, it can be difficult to
achieve good participation from students. Accordingly, the primary goal during the 2017 poinsettia season was to increase student participation and therefore include more students in the plant production process. Increasing profits to fund more student activities was another important goal for the 2017 season.

**Increasing Student Participation and Fundraising Profits**

Several strategies to increase student participation in plant production activities were implemented in 2017. One of the key strategies was creating specialized classes focusing on poinsettia production and marketing. These classes incorporated poinsettia production tasks for the fundraiser plants to increase student participation in hands-on learning activities. Collaboration with these classes was worthwhile, as the students in the class were incentivized to participate in the plant production activities. Consequently, more students gained hands-on experience in growing, marketing, and sales activities than in the previous year.

Expansion of the plant sales to increase profits in the 2017 season was achieved in several ways. First, the students doubled the production of plants from 200 plants in 2016 to 400 plants in 2017. During the 2016 season, only four poinsettia hybrids were grown for the sale. Therefore, three additional traditional poinsettia varieties were added. Also, a pre-sale held at the plant production greenhouse facility was added to the regular yearly on campus sale date. The intention was to entice non-university affiliated customers to buy plants because the facility is located off-campus and therefore more accessible than the regular campus sale. Finally, advertising for the sale was increased and new marketing approaches were implemented. Advertising was extended to other outlets such as social media sites. New marketing techniques included strategic donations of plants to key executive and administrative personnel throughout the university and across the campus.

The techniques employed to increase profits from the poinsettia fundraising sale were very successful. Over 97% of the 400 plants grown were sold and the customers were very impressed with the quality of the plants. The gross revenue from the sales was $2500, with approximately $2400 as profits. This money was used for students to hold team building activities, social events, and to help offset travel to scientific conferences. Most importantly, students learned first-hand how to produce a quality poinsettia crop, and also how to market and sell this crop. This experience gave students a strong sense of pride and accomplishment that was not felt when the plants were simply bought from local nurseries and resold.

**Lessons Learned**

Upon reflection, many key lessons were learned from the past two seasons of selling student grown poinsettias as an experiential learning activity and fundraiser for students. New products, techniques and strategies were tested. Some of these were successful, while others were not. The knowledge gained will help shape future activities to improve the experience for the students and to increase learning and maximize fundraising profits.

*Traditional Red Poinsettias still in high demand*
One of the lessons learned was regarding consumer preferences toward tradition. A small number of traditional poinsettias were grown in 2017 in addition to the new hybrid ‘Princettias’ that were grown the year before. Only a small number of traditional red varieties were grown as the focus was on interesting, novel colors and varieties. During the sales, consumers appreciated the variety of new poinsettias to choose from. However, some consumers still prefer the traditional red-colored varieties. Similar consumer preferences have been reported from growers on the mainland (Drotleff, 2016). Thus, for the 2018 growing season, production of traditional red poinsettia varieties will be increased.

Small pots for offices

A large portion of the poinsettias by the students were grown in 4-inch pots to produce plants that were ideal for placement on office desktops (Figure 1). The production of these 4-inch pots seemed to be a popular size among consumers, as most poinsettias growing in these pots were almost sold out within the first hour of the on-campus sale. In future sales, 2-inch or 3-inch pots of poinsettias will be grown to test for consumer preferences for miniature poinsettias.

“Added value” Products

Students also had the opportunity to add value to their products by selling decorative pot covers. Customers were willing to pay extra for their poinsettia pots to be wrapped with green, gold, or red pot covers. These decorative pot covers instantly turn the potted plants into excellent gifts, which is highly desirable during the holiday season when there are many parties to attend. These potcovers are purchased from local wholesale vendors and sold for a premium, resulting in a quick and easy profit for the students. During future sales, the sale of these potcovers will be continued and consideration will be given to expand into decorative baskets and pots.

Holding Multiple Sales

Holding an additional pre-sale at the university greenhouse facilities off campus proved to be quite successful. It catered to early shoppers, and the off campus facility provides free parking, making it easier for the non-university public to attend the sale. The public is interested in supporting student fundraising instead of buying their plants from a retail store. The fact that the plants are student grown is an even bigger incentive that attracts the public to the sale. An additional advantage to the pre-sale held at the greenhouse facility is that it requires less labor than the campus sale because the plants only have to be moved a short distance from the greenhouse to the sales area. The campus sale requires the plants to be moved from the off campus greenhouse to campus. Moving plants also increases the chance of damaging plants during transport. In the future, more efforts will go towards advertising to the local public to increase sales at the pre-sale.

Incentivized Class Collaboration

Offering a Special Topics class created solely for poinsettia production and sales encouraged more student participation because students could learn about poinsettia production and actively participate in the production through hands-on tasks as part of established lab activities. Students also gained experience in the marketing of an agricultural product through
promoting the poinsettia sales and interacting with customers during the sales. As an added benefit, students were able to earn college credits at the end of the semester.

**Solicit Donations**

Soliciting donations helped to cover the major costs of production, especially costs associated with potting soil and plant materials. A significant amount of money was saved on plant materials, as breeding companies and plant brokers donated cuttings of the plants grown for sale. Manufacturers and distributors of pots, soil, pesticides, fertilizers, and pot covers offered their products at discounted pricing, thereby aiding in keeping production costs low. Even departmental faculty were helpful in donating materials and bench space for production. The donations received resulted in more than double the profit amount when compared to real-world costs and profits (Figure 2). In the future, it is essential to continue soliciting donations as it greatly lowers production costs and increases profits to carry out camaraderie-building activities for students.

Plant production activities such as this provide valuable hands-on learning experiences for students because they gain a better understanding of the production system from start to finish. Furthermore, during the production process they are able to apply horticultural concepts that they learn about in class such as growth regulation, fertilization, and pest control, and see the effect of such methods on the finished products.

On another level, such activities provide companies with valuable marketing feedback. Over the past two years, the TPSS GSO has introduced several new varieties to their on-campus poinsettia sales to evaluate consumer preference for such varieties. Information from past sales has shown that although consumers appreciate the look of new poinsettia varieties, some consumers still prefer the traditional red-colored varieties. On the other hand, customers have given feedback and suggested that some of the new colors could be marketed during other seasons of the year (i.e. bright pink varieties could be marketed for Valentine’s Day). Such ideas can give poinsettia production companies valuable marketing insight.

**Peer mentoring**

In higher education, teaching can take place between and among students as they work together on projects, and sometimes students can mentor each other. Indeed, peer mentoring greatly contributed to the success of the poinsettia production project. Having someone who was already experienced in the production of poinsettias facilitated in students successfully growing poinsettias and raising funds. Further, this provided valuable peer mentoring experience for the person who taught the other students how to grow poinsettias.

**TPSS 491 and TPSS 711**

In previous years, students volunteered to grow the poinsettia plants and help with the plant sales. The students were mainly TPSS undergraduate and graduate students from the two TPSS student organizations. In Fall 2016, only a few students helped on a consistent basis. To
encourage more student participation I offered TPSS 491 (for undergraduate students) and TPSS 711 (for graduate students) during Fall 2017.

TPSS 491 *Experimental Topics* is a variable credit course for the study and discussion of significant topics and problems. Being a 400 level course, it can be taken by both undergraduate and graduate students, though it is typically taken by undergraduate students. One TPSS undergraduate registered for this graded 2-credit course.

TPSS 711 *Special Topics* is a variable credit graduate course for specialized topics from various areas of plant and soil research such as growth regulation, morphogenesis, and culture and nutrition of crops. Three TPSS M.S. students registered for the graded 2-credit course.

These two courses did not have a scheduled day and time. Students worked on the poinsettia project during their free time or when a scheduled work session was announced for various activities such as rooting the cuttings, potting up the rooted cuttings, applying pesticides, and pinching the terminal shoot to control plant height and encourage branching.

**Mentor’s Perspective**

In previous years, students would buy finished poinsettia plants from local plant nurseries and then sell them at their plant sales. In 2016, they bought plants from Home Depot® to sell. It was then I decided that these practices were not giving the students valuable hands-on experience and the knowledge and skills that would be valuable to their education and to their future employers. Experiential learning can be an important part of an undergraduate curriculum in the sciences. For example, a tree climbing exercise of a field trip increased student homework scores (Bauerle and Park, 2012).

I have no experience growing potted poinsettias so we depended upon Emily Teng, a TPSS Ph.D. student, who has experience growing poinsettias at a local plant nursery. Ronald Matsuda, an Agriculture Research Technician at the Magoon Greenhouse Facilities, also provided assistance. We contacted Delilah Onofrey, License Manager, Suntory Flowers, North America, for the poinsettia cuttings.

The TPSS 491 and TPSS 711 courses for Fall 2017 “recruited” four TPSS students to assist in the poinsettia project. I foresee students becoming more involved in the crop production decisions since this is Emily Teng’s last academic year. In addition to growing the poinsettias, students could take data on the greenhouse environment, plant growth, growing media properties, irrigation water quality, and pest populations to help improve their confidence in their greenhouse poinsettia production skills (Currey and Lopez, 2017).

Students were able to couple hands-on practical experience in growing poinsettias with their knowledge of horticultural theory gained in other TPSS courses such as TPSS 402 Flower and Foliage Crop Production (Pearson et al., 2017). Rothenberger and Stewart (1995) found that students who received a greenhouse laboratory experience scored higher on the knowledge test than students without the greenhouse laboratory experience.
Conclusions

Hands-on experiential learning is a very effective and critical part of an undergraduate and graduate education in agriculture and its related fields. Conducting a fundraising project in which students collaborate to grow and also sell a crop of plants such as poinsettias for the holiday season is an excellent way of providing this experiential learning to the students.

The students in the TPSS Department at the University of Hawaii has successfully implemented a student grown poinsettia sale the past two seasons and provided the opportunity for students to experience growing this crop and also raised a significant amount of funds to spend on student activities. Also, many important lessons have been learned during these two seasons and will influence how future production and sales activities will be handled. In the 2018 poinsettia production season, production will include more traditional red poinsettias due to customer demand. A further collaboration with the TPSS Horticultural Practices class will encourage more student involvement in Fall 2018. Finally, advertising at off-campus sites will also be added to increase traffic at the greenhouse pre-sale. This collaborative poinsettia project among the TPSS GSO and students in the Special Topics classes provided a medium for gaining “real world” experiences for students.

Overall, students involved in this project gained useful hands-on experience in growing, marketing, sales activities, and consumer feedback. Moreover, students developed valuable interpersonal skills, like leadership and mentoring skills, in addition to a stronger sense of pride and accomplishment (Figure 3).

Acknowledgements

We thank Dümmen Orange, Suntory Flowers, Delilah Onofrey, Angela Mekjian, Craig Okazaki, and Ronald Matsuda for their assistance.

Literature Cited


Figure 1. Comparison between 6-inch potted poinsettias (left) and 4-inch potted poinsettias (right). Other colors of 6-inch potted poinsettias are nestled in the background among red poinsettias.
Figure 2. Comparison between profits that TPSS students made from the 2017 poinsettia plant sale (Actual Profits), due to soliciting for donations, and what profits would have looked like without soliciting for donations (Real World Profits).
Figure 3. 2017 Poinsettia fundraiser crop ready for sale at the University of Hawaii Greenhouse Facilities. Pictured from left to right are graduate students Kauahi Perez, A.J. Lindsey, Emily Teng, Peter Toves and faculty mentor Dr. Kent Kobayashi.
Although the education policy proposed by Japan’s Ministry of Education (MEXT) aims to advance use of Information and Communication Technology (ICT) in school education, teachers are still seriously contemplating whether they should utilize ICT in their classes, and if so, how it should be implemented. Focusing on use of interactive whiteboards in the classroom, this paper reviews the background of ICT and how it has been added to education. Nowadays, since university students belong to the “digital native generation,” I distributed a questionnaire at the beginning of my English language course to investigate the extent of their familiarity with the use of an interactive whiteboard in class. With seven sections in the textbook (new words, picture description, dictation, conversation, vocabulary, reading, and maps), I used the interactive whiteboard both as a visual aid and for interactional purposes. Next, I distributed a questionnaire at the end of the course to examine 1) which learning activities students found effective; 2) which one they preferred; 3) if use of the interactive whiteboard influenced their comprehension, concentration, and perception; and 4) their opinions of
the language class using the interactive whiteboard. Results indicated that the ratio of students who had previous learning experience with an interactive whiteboard was less than 20% even though MEXT has reported that the installation rate of interactive whiteboards has been increasing. Regarding learning activities, more than 60% students answered that all of the activities were effective, but that they preferred “maps” and “reading” activities. In contrast, some answered that looking at the interactive whiteboard screen sometimes disturbed their concentration, and some indicated that correcting a glitch during class wasted time. Overall, this study examined that using an interactive whiteboard in teaching language is preferable when appropriately used in certain activities. Teachers do not need to utilize it in every activity, but they should be aware about the activities that are best suited for its use.
1. **Title of the submission:**
   
   Latent Profile Analysis on Experience in a Competency-based Curriculum: Focused on Secondary School Students in Korea

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6. Abstract:

<Abstract>

Latent Profile Analysis on Experience in a Competency-based Curriculum: Focused on Secondary School Students in Korea

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The implementation of the 2015 Revised National Curriculum has been brought big changes for teaching, learning, and assessment in Korea. This new national curriculum was introduced to develop students’ six core competencies: Self-management, Knowledge-information Processing, Creative Thinking, Aesthetic Emotion, Communication, and Community competency. Empirical evidence is required on the how competency-based education affects students’ six core competencies, as the new national curriculum has been implemented in earnest. With the se contexts, the purpose of this study was to explore the relationship between profiles for experience in the competency-based curriculum and six core competencies of secondary school students using data from ‘2017 KEDI Survey Research on Student Competencies’. Specifically, data from 55 secondary schools and 2,775 9th grade students were analyzed. This study was conducted as following steps. First, a latent profile analysis (LPA) was used to classify students into latent groups based on their experience levels of ‘student-participatory activities’, ‘process-based assessment’, and ‘feedback from teachers or peers’ during their classes. From comprehensive literature reviews, these three variables have been emphasizing as key factors in determining the success of the competency-based education. Second, using the groups were divided according to the LPA, the multivariate analysis of variance (MANOVA) was conducted to identify whether there were significant differences in the six core competencies among those groups. As the results, there were statistically significant differences in those competencies development according to the students’ experience levels of the national competency-based curriculum. The findings from this study suggested important implications for establishing and enhancing educational policy in order to promote those six core competencies of the secondary school students in Korea. For example, in order to improve students’ six core competencies, it’s necessary to pay attention not only active teaching-learning activities with their peers but also appropriate process-based assessments
and tailored feedback from teachers or peers.
Submission # 484
Title: Nobody taught me that: Preparing teachers for the inclusive classroom

Topic area: Higher Education

Presentation format: Workshop

Description:
**Educational institutions have struggled to prepare faculty to create more inclusive environments, (un)intentionally creating barriers to learning for many students. Through the creation of Graduate Teaching Fellowships for Inclusion, UNCG supported instructors in a mentoring program for developing and teaching courses with equity and inclusion themes. In this workshop, participants will learn more about the program and develop practical strategies for inclusive teaching in their own setting.**

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Abstract: Nobody taught me that: Preparing teachers for the inclusive classroom

Educational institutions have increased access for whole a generation of learners that were once excluded but continue to struggle to prepare and support current and future faculty to create more inclusive environments. This (un)intentionally creates barriers to learning for many of the students we serve as educators and civic leaders. It is imperative that institutions create opportunities for our future faculty to gain and practice skills that garner inclusive teaching, thereby facilitating campus cultural change that reflects the diversity of our students. In 2017-2018, UNCG launched its first Graduate Teaching Fellowships for Equity, Diversity, and Inclusion. This program supported two graduate students in a structured mentoring program as they developed and taught courses with equity and inclusion themes and teaching practices.
These General Education courses were offered through UNCG's Residential Colleges program, allowing the Graduate Teaching Fellows to experience the benefits of High-Impact Practices that support diverse student learning. In this workshop, participants will learn more about the development of this program and lessons learned, while developing practical strategies for promoting inclusive teaching on their own campuses. This includes the exploration of key tools and approaches (e.g., rubrics, lesson planning and syllabi templates, best practices for classroom management, and reflective teaching practices) to cultivate inclusive course design and delivery. Additionally, participants will engage in critical dialogue about the realities facing our current and future faculty, in and out of the classroom, in support of inclusive student learning (this includes faculty research, service, and institutional policies and programs). Lastly, participants will develop strategies for incorporating these dialogues and practices into their own teaching communities and in conversations with fellow faculty and administrators.

Participants will gain the following from this workshop:

- Review both theoretical and practical context for defining diversity and equity in scholarly communities;
- Discuss teaching choices that can marginalize or invite students to engage in the learning process;
- Examine the burden placed on faculty from historically marginalized backgrounds to conduct the labor of inclusive teaching and how all faculty should share in a commitment to an inclusive and equity focused classroom;
- Discuss the impact and practice of inclusive teaching from multiple perspectives and backgrounds;
- Identify common challenges faced in the classroom related to a diversifying student population and education community;
- Explore the development and use of tools for inclusive course design and delivery.
1. **Title of the submission**

   Faculty Development in Higher Education: Strategies that Support Effective Teaching

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6. **Abstract**

   Quality faculty development—that which is systemic, ongoing, and directly related to course content—has been shown to positively impact student achievement (Condon, Iverson, Manduca, Rutz, & Willet, 2016). However, even when faculty development offerings related to teaching are offered, single-event delivery models continue to dominate the landscape of higher education (Beach, Sorcinelli, Austin, & Rivard, 2016). How might sustained models of faculty development be provided in ways that honor faculty members’ time while also embodying the characteristics of transformative practice?
Many university professors have little to no background in effective teaching and learning pedagogies (Boice, 1991), and successes in one’s disciplinary research do not necessarily translate to successes in teaching (Trautmann, 2008; Weimer, 2006). Many novice instructors embark on their university teaching careers woefully unprepared to facilitate student learning (Seidel, Benassi, Richards, & Lee, 2006) and find themselves discovering effective pedagogies through a trial-by-fire process of painful teaching experiences which leave them feeling disillusioned, frustrated, or bitter (Boice, 1991; Trautmann, 2008). In addition, increasing numbers of non-tenure track faculty—graduate students, adjunct faculty and clinical faculty—are responsible for teaching university courses and are expected to provide instruction that meets institutional goals related to retention and graduation (Kezar & Maxey, 2014). For these reasons, quality faculty development focused on effective teaching is of utmost importance on university campuses.

The authors—faculty support staff at a four-year land grant university—share the research regarding quality professional development, as well as their strategies for involving faculty in meaningful, transformative professional development. A differentiated model of faculty development consisting of a variety of offerings, ranging from individual course consultations to six-week cohort groups, and including face-to-face, hybrid, and online formats, demonstrate how their university’s department of teaching and learning attempts to meet the needs of a wide range of instructors. Participants of this poster session will receive ready-to-implement strategies for improving university faculty development.
1. **Title:** How to maintain Academic Integrity in both traditional and in an online environment?

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6. **Abstract:**

Academic dishonesty, also known as academic fraud or academic misconduct prohibits lying, cheating and stealing, and this has always been a concern in the environments of teaching and learning. Engaging in these unethical practices includes plagiarism which is defined as using the works of others as your own to complete an academic assignment in school, college/university or any educational institutions. This deceitful unethical practice also comprises bribery, misrepresentation, impersonation, contract cheating, fabricating data or citations and collusion etc.

With the advancement of technology, U.S. universities are offering an increasing number of online classes those attracting students from across the world. As every advancement brings new challenges, it also raises the question of how do we, the educators maintain academic honesty in an online environment? The growth of virtual classes, where enrollment is no longer limited to geographic boundaries and the abundance of readily available information have led to the creation of more challenges for educators to safeguard academic integrity. Many academic institutions, professors and teachers are relying more heavily on online academic honesty prevention tools to help combat the issue of academic dishonesty.

This workshop session will focus on plagiarism detection and prevention, demonstrate different forms of academic dishonesty and offer available online tools and tips to help ensure academic
honesty. A special emphasis will be given to Quetext, ProctorU and Respondus – three widely different tools that can be integrated with leading learning. The level of services is dependent on whether the subscription package is free or a fee based. Subscription options can be institutional or individually. ProctorU provides a solution to proctor different types of tests in different settings. Respondus provides LockDown Browser that locks down the testing environment within different learning management systems. Quetext, a plagiarism checker and citation assistant serve over one million teachers, students, and academic professionals.
Title of the submission:
Agricultural Literacy in the Context of Agricultural Education: A Multi-Level Analysis of Elementary School Students and Teachers in Korea

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ABSTRACT
Agriculture encompasses numerous values and concepts so that it should be taught in a class starting from an elementary school. Diverse of Researchers have insisted the goal of education about agriculture is agricultural literacy, which means understanding the relationship between agriculture and our lives. However, the curriculum of elementary school rarely emphasizes teaching and learning agriculture contents so that students who live urban areas have few opportunities to have knowledge of agriculture.

The purpose of this study is to explore the effect of student-level and teacher-level variables on agricultural literacy of urban elementary school students in Republic of Korea. Hierarchical linear modeling method was employed in order to test how much variation in students’ agricultural literacy was explained by student level and teacher level characteristics: student level variables were consisted of interest on agriculture, experiences with plant, natural intelligence, learning attitude. teacher level variables were consisted of agricultural literacy, agricultural experiences and agricultural awareness. The data from 1,255 students nested within 48 classes of 12 schools in urban and sub-urban areas was sampled and collected, of which 929 samples were used for the research analysis.

The major results of this study were as follows. First, interclass correlation was estimated at approximately 13.6%, which means 13.6% of teacher-level variable affected students’ agricultural literacy. Second, students’ experiences with plant, natural intelligence and learning attitude had a significant effect on urban school students’ agricultural literacy. Third, teachers’ agricultural experiences significantly affected on elementary students’ agricultural literacy significantly. Teachers who had more experiences on agriculture helped students acquire more knowledge about agriculture. Forth, the interaction effect between a student-level variable and a teacher-level variable on agricultural literacy was not significant. This study indicated the importance of not only offering students experiences-oriented curriculums but also providing teachers with opportunities to be accustomed to agriculture in order to help students become agriculturally literate. Implications for further research and practice are offered.
Stories of Journeying Through University to Graduation:
Experiences of Indigenous Women

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STORIES OF JOURNEYING THROUGH UNIVERSITY TO GRADUATION: 
EXPERIENCES OF INDIGENOUS WOMEN

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ABSTRACT
This study aims to understand factors that helped and/or hindered the academic success and persistence of Indigenous women who have recently graduated from university and transitioned into the workplace. By listening to these Indigenous women’s stories of journeying through university towards their careers, we hope to better inform the work post-secondary institutions are doing to address reconciliation, Indigenization, and decolonization. This paper reflects findings from individual interviews conducted with Indigenous female alumni from two Canadian universities.

INTRODUCTION
Post-secondary attainment rates for Indigenous women in Canada continues to rise. According to the 2011 national household survey, 13.6% of Aboriginal women aged 35-44 and 10.2% of Aboriginal women aged 55-64 years have completed a university degree or higher (Statistics Canada, 2011) yet very little research has explored their experiences through and into the work world. The focus of this research has been to hear the stories of Indigenous women successfully journeying through university and into their career. We are seeking to understand what has helped and hindered their process with the hope of improving experiences for future learners in terms of policy and practice.

The open wounds of intergenerational trauma inflicted by colonization are extensive, caused both from historical events and ongoing contemporary assaults, including murdered and missing women, placement of Aboriginal children into foster care rather than extended Indigenous families, racism and sexism (Blackstock, 2009; Bourassa, McKay-McNabb, & Hampton, 2004; Saramo, 2016). In 2011, Indigenous children accounted for 7% of all children in Canada, but represented nearly half of all children in foster care (Turner, 2016). Indigenous women were never considered inferior until the European settlers arrived. As a result of settler
colonization, Indian status was infused with Victorian ideologies where Indigenous women were perceived as property (Hamill, 2011). The patriarchal lens of colonization held racist and sexist ideologies that defined Indigenous women’s roles (Bourassa et al., 2004). These ideologies served to feed the oppression and marginalization that Indigenous women in Canada experience today. Indigenous women face extreme levels of vulnerability and marginalization, resulting in the lowest socioeconomic and health statuses in Canada (Native Women’s Association of Canada, 2007).

In today’s society Indigenous women on average make less money, are more likely to work in lower-level jobs and are less likely to be employed as compared to non-Indigenous women and Indigenous men (Richmond & Cook, 2016). Over double the amount of Indigenous women live in poverty compared to their non-Indigenous female counterparts (Aboriginal Affairs and Northern Development Canada, 2012). Indigenous women are at higher risk for alcohol and substance abuse, mental illness, suicide, diabetes, and cervical cancer. Indigenous women more frequently experience poverty and violence, have less access to safe, secure, affordable, non-discriminatory housing for themselves and their families (on and off-reserve, in rural, remote, and urban settings), and lack access to higher education, job training, employment, and related socioeconomic opportunities (NWAC, 2007). Given the complex realities Indigenous women face in society while entering university, stories of their success need to be told and shared, additionally, what is often missing from this work is the connection between degree completion and career transition. This particular project hopes to address this gap and further understanding of Indigenous women who are undergraduate alumni. We hope this work will contribute to our growing understanding of factors which promote success of Indigenous female learners, while also gathering information about barriers to success that still need to be addressed.

With respect to educational systems in both Canada and the United States, the establishment of residential schools, which began in the 19th century, resulted in a legacy of mistrust concerning formal school experiences (Hampton & Roy, 2002; Martin & Kipling, 2006; Pijl-Zieber & Hagen, 2011; Truth and Reconciliation Commission of Canada, 2015). While Canada closed its last residential school in 1996, we continue to see overrepresentation of Indigenous children in our foster care system, higher incarceration of Aboriginal men and women, lower life expectancy and other social determinants of health (Brown, 2017; Reitano,
The ways that the intergenerational effects of colonization, and more specifically residential schools, directly impact Indigenous women as grandmothers, mothers, daughters, aunties, sisters, and cousins. While we recognize the systemic issues and circumstances that intergenerational trauma continues to persist across Canadian society, for this paper we are specifically focusing on the reproduction of colonization within higher education and the resistance of Indigenous women as they journey through their university degrees onto their careers.

Within education, high school dropout rates among Indigenous peoples are almost double the national average in the US, while in Canada, about 40% of Indigenous peoples between the ages of 20 and 24 years do not have a high school diploma compared to 13% of their non-Indigenous peers (Congress of Aboriginal Peoples, 2010). Ten percent of the Canadian Indigenous population have a university degree compared to 26% of the non-Indigenous population (Statistics Canada, 2011, p. 3). When we look more closely at Indigenous alumni, we find that Aboriginal women are more likely to have graduated with a college diploma or university degree, while Aboriginal men tend to complete trades certificates (Statistics Canada, 2011, p. 6).

Indigenous student persistence rates have gained increased focus over the last 40 years due to increasing numbers of Indigenous students attending higher education, albeit with less success than their non-Indigenous peers. Within the literature, many researchers (e.g., Kuh & Love, 2000; Pidgeon, 2008; Shotton, Lowe, & Waterman, 2013; Tierney, 1992), criticize traditional retention literature for putting too much emphasis on the students’ need to adapt, rather than the institutional need to respond. Pidgeon (2008) used an Indigenous wholistic framework to show how conventional discourses on student retention often exclude Indigenous worldviews and experiences. The movements of Indigenization and decolonization across higher education systems in Canada, US, and elsewhere, calls out the ongoing colonization in our mainstream educational systems (Pidgeon, 2016a; Tuck & Yang, 2012). We need to remember that Indigenous learners are still required to navigate through an institutional system that typically does not represent their epistemologies and cultures (Apple, 2005; Pidgeon, 2008). To support success among our Indigenous learners, we must develop more inclusive education systems that are committed to eliminating racism and integrating teaching pedagogies that incorporate Indigenous ways of knowing (Shankar, et al., 2013). To that end, this study aims to
incorporate an Indigenous wholistic framework (Pidgeon, 2016a; 2016b) and a positive psychology lens to investigate success of Indigenous female graduates through their education and career pathways. In our small way, we would like to contribute to the vision outlined by the NWAC (2007) which states,

…we see Aboriginal communities where our children grow up with a strong identification of and pride in who they are and constantly seek to broaden their knowledge of the things that affect them and their relationship with the environment and the land. We see communities where all our people have an opportunity to learn our history and traditional ways while attaining a high level of academic education with the broader society. …To achieve her/his full potential an individual must achieve a balance between understanding traditional ways and values and mastering academic disciplines (p. 15-16).

While there is literature that speaks to Indigenous student experience (e.g., Archibald, et al., 1995; Pidgeon, 2018; Ryan, 1995; Shotton, 2008; Tachine & Francis-Begay, 2013), few focus specifically on undergraduate alumni female student experiences. Research focusing on Indigenous women’s experiences has generally addressed health, feminism, and education, however, very little has looked at the transition through higher education or into the workforce (McCallum, 2013; Williams, 2012). What this broader literature tells us about Indigenous student experiences is that success for these students is informed by their world-view and sense of relationality, it is not just about their academic success but how their education will help others in their communities. Indigenous students continue to face racism and discrimination on campuses and such negative experiences can directly impact their persistence. Factors that support their success include, having adequate housing, finances, and family-support systems (both for their children and extended family kinships as communities away from their own home communities). Furthermore, Indigenous student services provide culturally relevant support services and may become that home-away-from-home for many students as they journey through college or university. Having culturally-relevant academic programs and Indigenous mentors (e.g., peers, Elders, faculty, staff) all are linked with Indigenous student success. In this study, we focus our attention to Indigenous women’s experiences of completing their university degree and then transitioning into the world of work to better understand how institutions and employers can empower educational and career success that is culturally-relevant for Indigenous women and their families.
Research Purpose and Questions. This study aims to understand factors that helped and/or hindered the academic success and persistence of Indigenous women who have recently graduated from university and transitioned into the workplace. By listening to these Indigenous women’s stories of journeying through university towards their careers, we hope to better inform the work post-secondary institutions are doing, and help these institutions to align more honestly with the concepts of reconciliation and Indigenization. These stories of success and resilience, inclusive of both curricular and co-curricular aspects of the student experiences, also have the ability to inspire the next generation of Indigenous learners who may be further empowered in their journey. For the purposes of this paper, and related presentation, we are focusing our attention to the aspect of these women’s stories that illuminate the helpful and hindering factors of support during their journey through university.

RESEARCH PROCESS

Grounded in Indigenous research processes, and following appropriate cultural-protocols in British Columbia and Alberta, individual semi-structured interviews were conducted with participants to ensure their stories were respectfully reflected in this work. The semi-structured script guided the conversation of storytelling with the participants sharing their experiences in their own narrative (e.g. Archibald, 2008; Kovach, 2009). This process, recognizing the different positionalities of the research team (e.g., three Indigenous and one non-Indigenous women) was also informed by interpretative phenomenology which aims to explore the successes, challenges, and supports experienced by Indigenous women who have recently completed a postsecondary degree. This interpretive phenomenological approach aligned in the reciprocity of all research members being able to hear and share their thoughts regarding the research guided by the Indigenous Wholistic Framework (Pidgeon, 2008), as shown in Figure 1.
The Indigenous Wholistic Framework is informed by the location and place of the research and also of the researchers. Understanding place informs the cultural protocols and teachings of the Indigenous peoples upon which the research was being conducted. The framework is a visual representation of Indigenous ways of knowing and being and articulates the critical value of the relationships between the land, the individual, their family, community, province and nation. The wholistic connections between the physical, intellectual, emotional, and spiritual realms transcend the individual and all their relations, both animate and inanimate. The 4Rs, as gifted by Kirkness and Barnhardt (1991) and taken up by Pidgeon in her scholarship, guide not only the research process but also inform how Indigenous research must be understood as relational and interconnected (Pidgeon, 2018). This framework, in addition to Archibald’s (2008) seven principles of story work (e.g., respect, responsibility, reciprocity, reverence, holism, interrelatedness, and synergy) guided how the research team came to understand the experiences of these Indigenous women as they journeyed through university and into their careers.

The research study involved the co-authors and four universities in Western Canada with the aim of having 3-8 interviews per site. Within the analysis for this paper, we are focusing on interviews from only two of the four institutions, and as noted above focusing on research question 1. As this project is ongoing, our aim is to have by December 2018 have in total 20-24 participants from four universities involved in this work, so we acknowledge that the stories we share here are from our preliminary analysis of a sub-group of our participants.
**Participants.** Participants were recruited through posters and invitations through institutional list-servs, after the research team received ethics approval at the two institutions. The interviews were conducted during 2018. For this paper, data from 6 Indigenous female alumni from two universities in Western Canada have been analyzed. Each participant self-identified as an Indigenous woman who graduated with an undergraduate degree in the past 36 months. Each participant gifted us with their time and stories and were given a small culturally appropriate gift and a gift card of $25 in gratitude for their time in an effort to help us understand their experiences of academic success and career transition.

**Interviews.** Using a semi-structured storytelling approach, each interview ranged from 20 to 60 minutes in length. Each interview was recorded with participant’s permission and transcribed, and returned to the participants for verification before the transcript was analyzed. During the interviews, and even in reviewing their transcripts, participants were encouraged to reflect on their experiences, elaborate on their reflections and provide examples that they felt comfortable sharing. The interviews also gathered basic demographic information (e.g., age, birth location, employment status, dependents).

**Ethics & Mentoring.** Following the principles of Indigenous research and ethics, this project intentionally emphasized the importance of intergenerational role modelling and capacity building, as our research team has a full professor (non-Indigenous ally), an associate professor (Indigenous), an undergraduate student (Indigenous), and an Indigenous staff member (with a graduate degree). Our three research assistants (RAs) hired for this project were also Indigenous women. Each of us, based on our locations, perspectives, and experiences bought unique contributions to the project and together the project was stronger with equal participation and collaboration. Our RAs also shared their stories as part of our data collection process, congruent with a participant-researcher paradigm. The academic co-investigators undertook mentoring of the other co-investigators in terms of helping prepare them to undertake the interviews, discussing aspects of the literature in co-writing of the literature review, collaborative analysis and training using Nvivo, and co-writing of presentations and publications.
**Data Analysis.** The research team began the coding process by first discussing their overall experience and impressions of the interviews, with an opportunity to reflect on personal biases and presuppositions. Using the ideas of Indigenous story work (Archibald, 2008) and the Indigenous Wholistic Framework (Pidgeon, 2008; 2018), we explored those experiences looking at individual meaning-making and common themes (Denzin & Lincoln, 1994).

The analysis process included successive readings of the transcripts and reflections on emerging impressions. Formal coding was supported by NVivo 12 software, and began with an open process of naming codes and categorizing individual statements. Informed by an Indigenous wholistic framework and as broad categories emerged, parts of the narratives from each participant were grouped together into themes, with analysis considering depth within individual stories along with the similarities and differences across participant experiences.

**RESULTS**

This study sought to hear the stories of Indigenous women, in their own words as they journeyed through university into their careers. The analysis of participant interviews, combined with lived experiences of our participant-researchers, produced numerous themes that help us answer the proposed research questions. For this paper we explicitly focused on exploring the factors that helped or hindered the participant’s journey through university. In our analysis the following themes emerged as factors that supported their journey to graduation: the process of addressing past traumas and healing and the value of continuity of support both from family (e.g., emotional, financial, child care) and institutional communities (e.g., academic advising, career services, counselling, Indigenous student services, medical services, and tutoring). There was also threads of their narratives where their resiliency was tested, stories of conflicting values (e.g., Indigenous compared to institution) and experiences of racism were also part of their journeying and their stories speak to how such experiences impacted their learning journey.

**Addressing Trauma = Healing Through Education.** When asked why they attended university, participants were motivated do better for their children and families (e.g., role model) and to help their communities, either directly or Indigenous peoples overall. In making the choice to attend, several participants shared stories of having to face trauma (whether past experienced trauma or negative experiences that occurred to them while attending university)
and the impact that had on their time at university. The theme of coping with trauma built upon intergenerational trauma was prevalent throughout the interviews. Women expressed the challenges of healing alongside their education, or as one woman put it,

*My backpack is heavier than most. I’m not just coming here with my book and my pencil to learn, I’m packing in all this additional weight. I’m walking through the door with all of that.*

Another participant referenced trauma in this way:

*Nothing has been smooth for me however. I venture to say, that some of the life challenges has to do with not understanding intergenerational trauma what affects each of us as Indigenous People intrinsically, that traces our collective Indigenous legacy of oppression, violence, and racism, to the roots of our souls...*

The connection between learning Canadian histories, such as residential schools, and personal experiences was highlighted by these two women who stated:

*My academic pursuits were a trigger at times. My mother and all her siblings went to residential school. When working on research around residential schools and trauma I was able to see why elements of my childhood unfolded the way they did. The day I had to present my research to class I was fighting back tears trying to get through my presentation.*

*Nothing has been smooth for me however. I venture to say, that some of the life challenges has to do with not understanding intergenerational trauma what affects each of us as Indigenous People intrinsically, that traces our collective Indigenous legacy of oppression, violence, and racism, to the roots of our souls, and that I am incredibly stubborn. I didn’t mean for it to be all so hard, or to hurt my children by not being there for them, but I had a mission and in that my children were hurt. As adults they are still dealing with that, as I am.*

Another woman shared her family experiences and the impact it had on her own cultural identity and how the Indigenous student centre was helping supporting her on this journey,

*My mom comes from foster care, and so it’s like wicked dysfunction. But, as far as growing up in my culture, I didn’t. So you know, I don’t smudge. I don’t know... I know some Blackfoot, but I’m not really knowledgeable in it, but if I wanted to, I could have found that at [Indigenous Student Centre] – like I did.*
While in sharing her story, another participant acknowledged the struggle of finding balance by stating,

*After learning the academic flow, my biggest challenge was balancing two worlds. I had one foot on the concrete floor of the academic institution and the other foot bare resting on the soil of my mother trying to find my spirits way home to heal.*

This idea of walking in two worlds, the Indigenous one they come from and the Western world of the academy was common to other participants’ stories. In fact, some of the women shared that due to intergenerational trauma of residential schools, they didn’t have a lot of family support for their continuing with their education. As one women shared,

*It was really hard because I was struggling financially. I had two young children. I don’t have any family that live here in Calgary, so I was lonely a lot. I felt like I wasn’t getting a lot of cultural component. I didn’t have a lot of support from back home because a lot of my family went through residential school and they don’t see the good side to education. So they weren’t really supportive. I was almost shunned a little because I was seen as being not as traditional, not as Indian as I should be. And I was the oldest grandchild, so I should be traditionally home, looking after my Grandma. I wasn’t. So I didn’t have a lot of support, so, I found it really hard. And I also had to work, so my last two years of university I was working full time, going to school full time and sleeping about 3 hours a night. So... mentally and physically I was broken down. And I didn’t have a lot of support.*

When asked what kept her going, this woman reflected on her motivation for sticking with it, she responded,

*And just seeing the statistics that if I graduated from university then I knew that more than likely my kids would go to university, and they were my drive to keep in school. If it wasn’t for them, I would have quit!*  

The motivation for all these women to pursue education was in part for their children (if they had them) and for their families and communities. It is important to acknowledge that for some of these women, like the women’s story above, they did not have family support to pursue their education and one must be cognizant of the emotional toil and perseverance it must take to stand on one’s own for their dreams and for their children.

In listening to their stories, it was also clear the negative impact past trauma has had on these women’s self-esteem and confidence and part of their struggle through university is
regaining and reclaiming their voice and confidence. As these two women shared in telling their own stories:

*I pretty much grew up not being entirely sure what I was, stupid or bright, and almost quit school in grade 12. My adult years have been plagued by self-doubt and a sense of unworthiness, even today I struggle with it.*

*I feel like what hindered me was the idea that I felt like I wasn’t good enough. I didn’t think I was smart enough. I didn’t think that I would be able to do it. I had this voice in the back of my head, “like you’re here, but eventually you’re going to like, fall out. You’re not going to be able to do it.” And that kind of gave me motivation but it also, I felt like maybe I had a stress and pulled me down a bit.[...] Yeah, but I found that that with every course I took and the grades I was getting and the feedback I was getting, that voice became quieter and quieter with every year of university and eventually I was like “I can do this” so if it wasn’t for the support of my mom and finance, I don’t know what I would have done. I don’t think I would have made it though.*

Another thread of learning to find the strength in their voice, and how to self-advocate within the institutional system was a key part of their stories. As one women shared “I believe what helped me was experience and fearlessness to seek out and find all the resources and support that was available for Indigenous students, as well as any other non-Indigenous resource that is available to students.” The challenge was that when students identified a concern there was an inability to speak to and address the concern (e.g., racism to be discussed in more detail in this paper) to appropriate office within the institution. However, their overall resiliency, notably turning to their Indigenous teachings and cultural practices, helped these women to seek and find balance which then attributed to their overall success in completing their post-secondary education.

**Values in Conflict.** Many of our participants spoke about honouring their cultural value of humility, and found that in many ways this value was in conflict with what was expected or rewarded in academia. There was a common thread regarding a lack of emphasis on GPA for students (contrary to institutional norms and expectations that a high GPA as successful). As others have found in researching Indigenous student success (e.g., Pidgeon, 2008, 2018; Shotton, Lowe, & Waterman, 2013), success for these participants was simply to have been in a post-secondary school, to have passing marks, and being able to share what they learned with others (e.g., positive role model, intergenerational learning) and/or to give back to their families and
communities. While these women may have encountered tensions between their Indigenous values and those upheld in the academy (e.g., individualism, competitiveness), these women also recounted several stories regarding their journey that were not helpful and in fact, could of hindered them along the way. What did help them was having other Indigenous peers and supports at their institution to help them balance, while every women shared stories of trauma, they also shared stories how their cultural identity was grounding and connecting to others supported them.

*I like when I could talk to another Blackfoot person and hey have the same, you know, we have the same little lingo. So as far as the practices, like I said, I’m not too involved with them. But culture is more than that. It’s that common language; sense of humour; just, Oh, you know this person? Yeah – you know, and you know, just having a common bond. But they don’t even need to be Blackfoot.*

While holding their cultural identity, they preserved through their academic studies and the next section highlights some of the helpful and hindering aspects of the institution they encountered along the way.

**Helping and Hindering Institutional Processes.** From these women’s stories, it was clear when they were aware of the supports available, they accessed such services to support their journeys. As one participant shared, who was also using medical and disability services, her deep appreciation for the supports is clear:

*Counselling, I really really really like counselling – I saw XXX, of course, and then she left, and then there was a XXX, and so – yeah – I think their health services are really good. And the gym, OMG, the gym, I love the gym. I would go there like every night. It was just across the road, so that helped me definitely hang in there and have something to do. And the [Indigenous student centre] too, I mean, I’d go there and just visit there basically – I would go there but never do my homework there like ever, – I’d just go there and eat and say hi and whatever and you know just meet up with people and just talk. And so, that was really helpful.*

However, not all their experiences were positive. Several examples were given of times when inaccurate advising resulted in prolonging the time frame of completion of their chosen program. For example, one participant talked about having received an accommodation for an exam extension, but then the professor did not follow through and did not show up for the rescheduled date. Another participant talked about having made arrangements to stay in housing
free of charge due to an academic accommodation and was upset when she was presented with a bill by the new coordinator when she arrived back in the Fall.

Another issue when the students were not aware of supports and resources available on campus. Some of the women expressed that they did not know what was available to them until the end of their academic career, and wished they had known about them sooner. Others noted that they did not take advantage of supports and resources available on campus and several types of reasons were given - too stubborn, not feeling deserving of support, not confident in the support they would receive, not feeling worthy of the support, or not having had experience of receiving support in the past (use to doing it on their own). This reluctance could be framed in a cultural context as highlighted by a participant who stated:

*I think that they [schools] need to build these relationships with their students. They can’t just have an open door policy - they need to build their relationship because I think a lot of Indigenous women are taught to be independent and strong and they are not going to just go out and ask for help from a stranger.*

Relationships are a foundational aspect of Indigenous culture, and also from these women’s stories supporting relationships were key to their success. However, some students also felt that in being Indigenous, also meant an added responsibility of the burden of representation.

**Burden of Representation.** Burden of representation was a theme of concern, students having to represent their culture and educate while being in school to learn was a heavy responsibility. Examples of this are students being singled out in class and asked questions or perceived as the expert on Indigenous issues. This point is emphasized by an interview participant who states,

*I got burdened with being the only Indigenous student...teachers would come at me trying to make me become a consultant, when really I just wanted to learn...I had an epiphany thinking - I need to teach these people in hopes that in the future my children won’t have to come across these questions and be burdened being an Indigenous person teaching the instructor and fifty other students in the class.*

Feeling exhausted from representing the “whole” of Indigenous culture was expressed by nearly all of our interviewees.

**Racism part of their experience.** Racism in the form of institutional, student body, and community were acknowledged from the participants. As a consequence of such negative
experiences, some of the women questioned where they fit within the academic institution. For others, connecting the idea of belonging, questions whether or not it was their place as students to be the one addressing racism on campus. For some women they felt it was their obligation to not have such event perpetuated further - but there was an emotional toil to this activism and responder role. As the women above shared her story and the burden of representation, further in her story she shared her approach in dealing with such expectations,

so I would be an open book – I would let these people ask real questions that they couldn’t ask some stranger on the street. And I was quite blunt. If they were being racist or stereotypical, I would let them know, because I think that’s my gift! I’m honest. And I would let them know, and hopefully they wouldn’t just ask some random person these ignorant questions, I feel like it was their due diligence to educate themselves, but I taught them.

Furthermore, addressing where they could just be themselves on campus was important for grounding and being connected, for many of these students that place was within the Indigenous resources and supports provided on campus. Most participants spoke of the invaluable contribution made by Aboriginal staff, namely through Indigenous student services, in supporting their navigation of university by helping decipher the “rules” but also more importantly, how their cultural teachings could be an anchor of support and courage.

**Continuity of Support Transitioning to the Workplace.** A further concern expressed was a matter of the absence of post-secondary institutional support with the transition into workforce. Several alumni talked about feeling abandoned by supports upon graduation. Previously great supports that were utilized as a student, were no longer available once a graduate. Examples of these included counselling services and medical health services. The hardship of the academic to workforce transition was highlighted by one women who stated,

*It’s really hard...You’re an Indigenous person getting educated - and then at the end, it’s like - okay - where is the support now?*

In acknowledging a lack of support in navigating the transition from academic career to workforce one graduate suggested, Indigenous students need,

*programs that help with networking. That help boost confidence...or even just a get-together group of Indigenous women that can share resources, and job opportunities that they’ve heard of...just that empowerment of each other.*
Participant’s stories of transitioning from university to their career pathway was of particular interest and inquiry included asking participants to share both their personal stories and recommendations. As noted earlier, participant’s stories included a common theme of the importance of relationship building during their academic pursuits. Many times, relationships built through networking within the community, and within the educational and corporate sectors, resulted in an increased knowledge of employment opportunities. Thereby, increasing the chance of obtaining employment after graduation. It must be noted that some of our participants graduated during an economic downturn in the Province of Alberta and this was mentioned as a challenge to obtaining employment, both as students seeking employment during their degrees and as alumni seeking their first positions as new graduates. As one student shared while it was hard getting laid off, it was her relationships established with the local Indigenous community that helped her gain stable employment.

I graduated at a really crappy time, so there were a bunch of layoffs. I was getting prepped in a big company to be a human resource – an Indigenous Human Resource contractor – and I got laid of the same time that I graduated. [...] Crappy economy really hindered. But my great relationship with the Indigenous community in Calgary I think helped get my position. It’s not my dream position, but it’s helping me be stable and it’s helping me network. I think that the relationships really helped me get my position after I graduated.

Although the obstacles Indigenous women faced throughout their academic careers and transition into the workforce were profound, a common thread of strength and perseverance is interwoven throughout their shared stories.

**Strength, Resiliency & Perseverance.** These stories provide knowledge and insight into first-hand account experiences of Indigenous woman's journey through post-secondary education and transition into the workforce. Highlighting along the way how greater support can be exercised to the direct benefit of Indigenous women. The need to provide equity in order to get to equality is required for Indigenous women, in order to support Indigenous women navigating and cultivating their own stories of success. Academic institutions investment into transitional support services for Indigenous female alumni could positively impact the journey from student to career professional.
DISCUSSION

The stories of academic success and persistence from Indigenous women who have recently graduated from a post-secondary institution and transitioned into the workplace have provided opportunities for insight, understanding and awareness. Through individual interviews with these graduates, we witnessed stories of hope, strength, resistance, perseverance, persistence, resourcefulness, and achievement. Their stories have provided insight into not only how universities can better support the journey to graduation but also how employers can continue the support their success in their careers.

Recommendations emerging from this project, and notably those shared by participants, include: raising the awareness of services for Indigenous students across the institution, and in particular, addressing developing of culturally-relevant career supports for Indigenous women in the career service area for post-secondary institutions and for employers, increased relationship building with Indigenous students while they are still completing their degree. Attention can be paid also to those transition supports and the continuity of support services, especially those related to housing, child care, and counselling) to ensure the success Indigenous women had in completing their degree is further supported as they transition into their careers.

Results of this project support Pidgeon’s (2008) call for educational and employment spaces that make room to include the cultural identity of our Indigenous students. An Indigenous retention model must consider inter-generational aspects of persistence through the academy, wholistic approaches would honour that the student, family, community, and nation are all part of the persistence model (Heavy Runner & DeCelles, 2002; Heavy Runner & Marshall, 2003; Pidgeon, 2008; 2016a; 2016b). These same principles can be extended to the workplace to support the career journey of Indigenous women that honours their cultural integrity.
REFERENCES


Title: California State Policy Decision Administrative Credential Assessment to Program Implementation (ID Number 513)

Topic Area: Educational Administration

Presentation format: Roundtable

Description:

The California Commission on Teacher Credentialing has identified what school administrators should know and be able to do entering their initial education administrator position. In 2018 a statewide performance assessment, the California Administrator Performance Assessment (CalAPA) was piloted. The objective of this case study is to examine the process and impact of moving from a state policy decision to implementation in the field.

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Title: California State Policy Decision Administrative Credential Assessment to Program Implementation

California Administrator Performance Expectations (CAPEs) outline the skills and abilities one should have as a beginning education administrator and serve as the measurement of a preliminary Administrative Services Credential (ASC) candidate. They are foundational to and organized around the six California Professional Standards for Education Leaders (CPSEL), which are used to assess/evaluate education administrators in the ASC program and throughout their administrative career. In spring 2016, Evaluation Systems (ES) group of Pearson initially conducted and completed, a validity study of the revised California Administrator Performance Expectations (CAPEs). Based on the findings of the validity study, at the June 2016 meeting, the Commission adopted revised Performance Expectations and directed staff to commence with the design and development of the CalAPA.

A fifteen member CalAPA Design Team was selected to represent the full range of administrator preparation programs, administrator induction programs, and the geographic regions of California to design and develop the State Performance Assessment. CalAPA has a task-based structure and will be completed at three different times during a candidate’s preliminary program. Each task focuses on the roles and responsibilities of today's education leader, using an investigate, plan, act, and reflect leadership sequence. Completion of each task requires that the candidate either be in a school site placement or have access to a school site where they can complete the work necessary for the CalAPA. Each leadership cycle requires the candidate to engage in the investigate, plan, act, and reflect leadership sequence.

The objective of this case study is to examine the process and impact of moving from a state policy decision to implementation in the field. One of the authors was a member of the state level Design Team and both authors serve as Program Faculty in Administrative Services Credential Program that participated in the field and pilot assessment process.
Comparing Authentic Materials with non-Authentic Materials for Reading Textbooks in University level EFL Classrooms in Japan

Aya Inoue (Aichi University of the Arts)

This paper compares students’ attitudes towards authentic and non-authentic materials based on survey questionnaires. The survey questionnaires were conducted at Intermediate English classes at the same university in Japan in 2017 and 2018. In 2017, a textbook using authentic texts was used (authentic material) while in 2018 a textbook using text written by a textbook author controlling the vocabularies and background knowledge for Japanese students was used (non-Authentic material). Both textbooks focus on contemporary global issues often discussed in news media. In the survey, students were first asked to evaluate the difficulty of the textbook as well as whether they found the materials interesting or fun to read. They were further asked if they wanted to read more newspapers magazines and online news by themselves, and if they found texts that cover the latest global situations, topic and news. They were also encouraged to provide comments on how they felt about reading current global issues and what they thought about the classroom environment. The results show that the students’ overall reaction to authentic and non-authentic materials is similar. Numerical difference however suggests that the students find authentic materials motivate them to read more non-assigned readings (read outside of class) on their own after studying in class.

1. Introduction
The authenticity of teaching materials for ESL/EFL classrooms has been largely discussed (see the second chapter of Day & Bamford (1998) for a short summary). Authentic materials are expected to be a motivating force for learners, and more effective in developing communicative competencies than textbook materials (Gilmore 2011). Yet it is also pointed out that for low proficiency students, authentic materials could be hard not just because they often use difficult vocabularies or complex sentence structures but also because of the students’ lack of background knowledge.

There have been a lot of discussions about what texts should be used for
second/foreign language learners. “Authenticity” of the teaching materials is one of the long-discussed aspects of texts used in teaching foreign languages. Authentic (real-life) materials are generally defined as those written by and for native speakers and not specifically for language teaching, whereas non-authentic materials are texts developed for second language students that take into account their lack of linguistic ability and background knowledge (sometimes referred to as “simplified texts”).

The simple and most convincing reason is that the learners eventually have to deal with the world outside the classroom where authentic (real-life) language use is the norm. According to Williams (1984, p.25), “if the learner is expected eventually to cope with real language outside the classroom, then surely the best way to prepare for this is by looking at real language inside the classroom.” They are used in language teaching because they are considered interesting, engaging, culturally enlightening, relevant, motivating, and the best preparation for reading authentic texts. (Day and Bamford, 1998, p. 54).

On the other hand, authentic materials may have a negative impact for the learners. Rivers (1981, pp. 37-38) states that “when average students encounter ungraded material too soon, they are usually forced back into deciphering with the aid of a dictionary, and valuable training in the reading skill is wasted” (Rivers, 1981, pp.37-38 cited in Day and Bamford, 1998, p. 55). Also, “rushing students too soon into reading material beyond their present capacity for fluent comprehension with occasional contextual guessing… destroys confidence.” (Rivers, 1981, p. 260. ibid). In this presentation, I consider “authenticity” as in the same way as Morrow (1977) following Gilmore (2007). ‘An authentic text is a stretch of real language, produced by a real speaker or writer for a real audience and designed to convey a real message of some sort.’ (Morrow (1977, p. 13), cited in Gilmore (2007, p. 6)).

2. Research questions
As the previous discussions on authentic/non-authentic materials suggest, are there different impacts that those text give to the foreign language learners? More specifically, how do learners react to authentic and non-authentic materials differently provided the level of the materials are more or less similar? Do they find authentic teaching materials to be more “interesting, engaging, culturally enlightening, relevant, or motivating” as discussed in Day & Bamford (1998, p. 54)? In order to answer the question, the survey questionnaires conducted in the English language class at a Japanese university in 2017 and 2018 are closely analyzed. In 2017, an authentic textbook was used whereas a non-authentic textbook was used in 2018, which provided some insights in terms of
how the students receive the classes especially about the textbooks used in the classes.

3. Methods

Procedures
This paper compares students’ attitudes towards authentic and non-authentic materials based on survey questionnaires. The survey questionnaires were conducted at Intermediate English classes at the same university in Japan in 2017 and 2018 at the end of the spring semesters (15-week semester). At the end of the semester, students were asked to fill out the survey questionnaire so the instructor can lesson plan and revise the syllabus for the next year. It is an anonymous survey and students were asked to provide their candid opinions. The entire format of the survey questionnaire is attached at the end of this paper.

Participants
The survey questionnaires were conducted at Intermediate English classes at the same university in Japan in 2017 and 2018. 30 students in 2017 and 22 students in 2018 responded the survey questionnaire. A survey from 1 student in 2017 class was excluded from the analysis because it is only filled out halfway. Data from 29 participants in 2017 and 22 in 2018 was coded and analyzed (total 51 male and female university students). The majority of the students were 1st year students. The 1st language of all the participants is Japanese.

Class summary
This is a required class whose credit is counted as a liberal arts foreign language credit. Students can select which language to learn (out of English, French, German, and Italian) and when to register during the 4 years of their study. In Intermediate English class, the English proficiency level of most of the students probably fall in A2 or B1 in CEFR (Common European Framework of Reference for Languages). The goals of this class are to cultivate reading and listening skills. Two different textbooks are used in class but only one of the textbooks (the reading textbook) is relevant to the present study. The class starts with a quiz that reviews the vocabularies and some grammatical understanding that were covered in the previous class. The first half of the class is used to prepare for the TOEIC exam. A textbook focusing on TOEIC skill is used. The second half of the class focuses on reading skills using the reading textbook. The current study focuses on the second part where the reading textbook is used.
Survey questionnaire

The purpose of the survey is not primarily to evaluate the effects of authentic vs. non-authentic materials. Rather, it is given so the instructor will have feedback about the level/difficulty of the textbooks used, the amount of the workload outside of the classroom, and the pace of the class among other things regarding how class time is spent in the semester. Out of the 12 questions, 7 questions that are relevant to the reading part of the class is shown here. After each question, students selected one of the following descriptions using 5-point Likert-type scale. Seven questions and 5-point scales are as follows (the entire survey questionnaire is provided at the end of this paper in Appendix):

1. How did you find the level of the textbooks? (Media English textbook)
   - Too easy
   - Relatively easy
   - Appropriate
   - Relatively difficult
   - Too difficult

2. What did you think about how the class was proceeded? (For Media English textbook)
   - Too slow
   - Relatively slow
   - Appropriate
   - Relatively fast
   - Too fast

3. Were the frequent quizzes helpful in vocabulary building purpose?
   - Strongly agree
   - Relatively agree
   - Neutral
   - Relatively disagree
   - Strongly disagree

4. How much time did you spend weekly preparing for this class?
   - Less than 30M
   - 30M – 1 H
   - 1H – 2H
   - 3H-4H
   - More than 5H

How did you feel after reading texts about current issues such as A, B, C, and D for a semester? (Four topics were presented here in Japanese to remind students what they read about the reading materials. In 2017, ‘Matayoshi wins Akutagawa Award,’ ‘Refugees’ route to Europe through Russian,’ ‘Day care problems in Japan,’ and ‘iPS eye parts are created’ were presented. In 2018, ‘A ban on missile testing,’ ‘Influenza outbreak’ ‘Illiteracy problem,’ and ‘Animal extinction’ were presented.)

5. They are interesting, and it was fun to read them.
   - Strongly agree
   - Relatively agree
   - Neutral
   - Relatively disagree
   - Strongly disagree

6. I felt like reading more English newspapers, magazines, and online news by myself from now on.
These questions are asking about students’ evaluation on 1) level of the textbook [Level], 2) if enough class time was spent [Class Time], 3) the usefulness of the quizzes on vocabulary building [Quizzes], 4) the preparation time they spent for each class [Prep Time], 5) if they found the reading interesting and fun [Contents], 6) if they felt motivated to read more on their own [Motivation], and 7) if they found the textbook covering the recent global issues [Coverage]. The phrases in the square brackets represent the labels which will be used in demonstrating the results in section 4.

\textit{Textbook used in the two classes}

In 2017, a textbook using authentic texts was used (authentic material) while in 2018 a textbook using text written by a textbook author controlling the vocabularies and background knowledge for Japanese students was used (non-Authentic material). The level of both textbooks is similar (intermediate to advanced level). Both textbooks focus on contemporary global issues often discussed in news media, except the 2017 textbook used articles from newspaper and magazines whereas the 2018 textbook was written by authors for foreign language learners (Japanese university students).

Textbook used in 2017 (authentic material)
Takahashi, M. Itoh, N. & Powell, R. Asahi Press

Textbook used in 2018 (non-authentic material)

The Instructor did realize the difference between the 2 textbooks. The authentic 2017 textbook introduced more unfamiliar topics (medical/physiological descriptions) or concepts (Luddite Movement in the 19th century England) for typical university students brought up in Japan in the texts, and that required the instructor to spend more time to explain to support comprehension of the texts. Since the non-authentic 2018 textbook
was published earlier, the topics covered seem a bit dated (e.g., in the topic on cell phones, flip phone use was discussed rather than smart phones). Another difference is that in the 2017 textbook, texts used consist of news articles whereas in the 2018 textbook texts used are written by authors regarding specific selected themes. The 2017 textbook had some news articles about Japan while the 2018 textbook did not have any theme specifically discussed about situations in Japan.

4. Results and Discussions

Students’ responses were converted to points using 5-point scale. For example, when students were asked about the level of the textbook used (Q1), if ‘too easy’ is selected, it is converted to 1 point while ‘too difficult’ is converted to 5 points. Similarly, all the responses for questions are converted using 1 – 5 points. For the class time spent for the materials (Q2), 1 point was given to the response ‘too slow,’ and 5 points were given to the response ‘too fast.’ As for the usefulness of the quizzes on vocabulary building (Q3), 1 point was given to ‘not useful’ and 5 points for ‘useful.’ For the preparation time students spent for each class (Q4), 1 point was given to ‘less than 30 minutes’ and 5 points were given to ‘more than 5 hours.’

As for the questions regarding reading materials, conversion was assigned as follows: (Q5) 1 point was given if they ‘strongly disagree’ the content was interesting and fun to read, and 5 points were given if they ‘strongly agree;’ (Q6) 1 point was given if they ‘strongly disagree’ that they felt motivated to read more on their own, and 5 points if they ‘strongly agree;’ (Q7) 1 point is given if they ‘strongly disagree’ that the textbook covers the recent global issues, and 5 points if they ‘strongly agree.’

In sum, as for the class in general, the higher points show that the students find the textbook level more difficult, and think that the class proceeds too fast, and spend more time to prepare for the class. Also, they find the quizzes more useful. Regarding the reading materials, higher points show that the students find the reading more interesting and fun and feel more like reading non-assigned media English texts on their own, and agree the textbook covers recent global issues more.

Table 1 and Figure 1 below demonstrates the average points by each group for the 7 questions.

<table>
<thead>
<tr>
<th></th>
<th>Level</th>
<th>Class Time</th>
<th>Quiz</th>
<th>Prep Time</th>
<th>Contents</th>
<th>Motivation</th>
<th>Coverage</th>
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<tr>
<td>Authentic</td>
<td>3.57</td>
<td>3.07</td>
<td>3.67</td>
<td>2.45</td>
<td>3.52</td>
<td>3.31</td>
<td>3.97</td>
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</table>
About the classes in general (questions 1-4), the two groups found the level of the classes very similar (.02 difference). The 2018 (Non-Authentic) group found the class time a bit less sufficient (they found the class proceeded fast) (.16 difference). The 2018 (Non-Authentic) group found the quizzes more helpful (.10 difference). The 2018 (Non-Authentic) group spent more prep time for class (.41 difference). Despite the instructor’s impression that the 2017 textbooks introduced more unfamiliar topics and concepts, and the fact that the instructor had to spend more time explaining texts in 2017, the 2018 group may have found the class a little bit more challenging than 2017 group.

As for the questions about reading materials (questions 5-7), The 2018 (Non-Authentic) group found the reading more interesting and fun (.21 difference). The 2018 (Non-Authentic) group felt less motivated to read more English newspapers, magazines, and online news by themselves (.58 difference). The 2018 (Non-Authentic) group agreed less that the textbook we used was reflecting recent global situations and international topics, and news (.33 difference).

The overall pattern was similar for the 2 groups. The present study did not show the significant difference between the groups that used authentic and non-authentic reading textbooks.
However, there was an interesting cross-over (numerical difference) for the questions about [Motivation] and [Contents]. Interestingly, the 2018 group found the reading materials more interesting and fun to read, but was less motivated to read more on their own. It could show that the non-authentic materials are less motivating than authentic materials, but the numerical difference is small. It could be because the 2018 group felt less motivated to read on their own because they found the class more challenging, but again, the difference is very small. More studies are needed to confirm the implication.

There was also an interesting cross-over (numerical difference) for the questions about [Contents] and [Coverage]. Interestingly, the 2018 group that found the reading more interesting and fun felt less that the textbook was reflecting recent global situations and international topics, and news. It may be because the 2018 textbook was published earlier (2011) than the 2017 textbook (2017) and the topics covered were actually not reflecting the latest news.

5. Conclusions
The present study does not support the views that there are different impacts that authentic and non-authentic text give to the foreign language learners. Overall, learners in this study did not react to the authentic and non-authentic materials differently when the level of the materials are more or less similar. Did learners in this study find authentic teaching materials more “interesting, engaging, culturally enlightening, relevant, or motivating”? It could be that the results suggest that the students find them “motivating” but more studies are necessary to confirm the results.

Appendix

Survey Questionnaire (Originally provided in Japanese)

The goals of Intermediate English Class are English vocabulary improvement, and developing reading skills of media English, and developing reading and listening skills targeting TOEIC exam. Please answer the following questions considering these goals.

1. How did you find the level of the textbooks?
   Media English textbook
   Too easy  Relatively easy  Appropriate  Relatively difficult  Too difficult
   TOEIC textbook
   Too easy  Relatively easy  Appropriate  Relatively difficult  Too difficult

2. What did you think about how the class was proceeded?
   For Media English textbook
   Too slow  Relatively slow  Appropriate  Relatively fast  Too fast
   For TOEIC textbook
   Too slow  Relatively slow  Appropriate  Relatively fast  Too fast

3. Were the frequent quizzes helpful in vocabulary building purpose?
   Strongly agree  Relatively agree  Neutral  Relatively disagree  Strongly disagree

4. How much time did you spend weekly preparing for this class?
   Less than 30M  30M – 1 H  1H – 2H  3H-4H  More than 5H

5. Did you take any English language proficiency exam this semester, or do you plan to take it anytime in the future?

6. How did you feel after reading texts about current issues such as A, B, C, and D for a semester?
(6.1) They are interesting, and it was fun to read them
Strongly agree  Relatively agree  Neutral  Relatively disagree  Strongly disagree

(6.2) I felt like reading more English newspapers, magazines, and online news by myself from now on
Strongly agree  Relatively agree  Neutral  Relatively disagree  Strongly disagree

(6.3) I felt that the textbook we used was reflecting recent global situations and international topics, and news
Strongly agree  Relatively agree  Neutral  Relatively disagree  Strongly disagree

7. Please write any comments and suggestions regarding how you could develop vocabulary, and reading and listening skills.

Note for the question 6
*Four topics were presented here in Japanese to remind students what they read about the reading materials. In 2017, ‘Matayoshi wins Akutagawa Award,’ ‘Refugees’ route to Europe through Russian,’ ‘Day care problems in Japan,’ and ‘iPS eye parts are created’ were presented. In 2018, ‘A ban on missile testing,’ ‘Influenza outbreak’ ‘Illiteracy problem,’ and ‘Animal extinction’ were presented.
We are entering an age where media literacy is needed to surmount a variety of challenges, none the least fake news and information of varying quality and truth. This impacts not just politics, but also the ability of students to avoid logical fallacies in their academic writing that are a result of misleading information, especially in online news sources. In EFL classes, authentic materials are often considered culturally enlightening and the best preparation for reading authentic texts when they are used for high proficiency students. It is also stated that that students can also learn to be critical of the contents they read just as with those they read in their mother language. Do authentic materials have such effects on EFL learners in Japan? How do EFL learners deal with the challenges of the present-day online information? How could instructors assist such processes?

As a hypothesis we suggest a combination of: 1) reading assignments where the teacher provides questions about themed reading that are both about comprehension and critical thinking combined with critical thinking questions, and 2.) outside assignments where students do a lot of reading and the grading metric of their assignment prioritizes critical thinking and choosing high-quality sources from an array of mass media. As a case study, we report how students in a national university in central Japan received these reading assignments in two different classes: Academic English Advanced class and Special Reading Seminar. Most of the students did well with comprehension questions while some had difficulty dealing with the critical thinking questions. The effectiveness of authentic materials in encouraging critical thinking of students are emphasized as a conclusion of the case study analysis.

1. Introduction—Problems with online news: Fake news / propaganda

No one denies the impact of online news for those living this century to catch up with rapidly ever-changing globalized world. Yet online news sources are often full of unedited texts which are often intentionally aimed to direct the readers towards a certain political and/or ideological perspective. We are living the age where each individual is responsible for screening information from the Internet.

The consequences of this trend to the educational circle is that it is beneficial for students to learn skills to screen trustworthy information. Using misleading information that seems reasonable undermines reasonable arguments and politics (Stanley 2016). This is especially important because, when our pedagogy prioritizes logic and reason, and students are struggling with reading in a foreign language, they often gravitate toward what seems logical. Yet, with limited reading skills, can they really be expected to have read enough to know the problems with what they are reading or to understand subtle discursive shifts?
Aside from this, media does not always announce its bias or prejudices. This is a problem with liberal democracies. Runcimen mentions how a lot of anti-liberal things occur under the cover of democratic liberalism (2018). Similarly, Stanley (2016) mentions how a lot of racist things are said in seemingly non-racist, economic phrasing. For example, racism against African American is expressed through discussion of ‘welfare’ rather than racial slurs. Students in Asian classrooms are less likely to understand these subtle shifts because of their cultural, not to mention, geographical distance from the United States. They, simply put, are not involved in the conversations that would inform them on how to spot these subtle transgressions. They are unlikely to have been scolded about racism after discussing ‘welfare’ or ‘inner city crime,’ and are unlikely to understand when a foreign teacher does so.

Media has been a tool to teach extensive reading with the caveat that its interest and “quantity” is more important than its “quality” (Davis 1995: 329, cited in Day and Bamford 1998: 96). This caveat was written before the current proliferation of fake news and low-quality online sources of information. What then can be done to engage EFL learners in reading using mass media and the Internet? Can they learn how to be critical of the contents they read at the same time as they try to comprehend it? More specifically, how can EFL teachers design materials to encourage students to do critical thinking?

Authentic (real-life) materials read for EFL classes are often considered “interesting, engaging, culturally enlightening, relevant, motivating, and the best preparation for reading authentic texts (Day and Bamford 1998: 54)” if they are for high proficiency students. Through reading, learners develop not only vocabulary and linguistic knowledge, but also topical and world knowledge. Language learners can also be encouraged to be as critical of the contents they read in authentic texts as those that they read in their first language. An example of these authentic real-life materials includes:

- Newspaper articles
- Policy reports
- Political song lyrics, e.g. ‘music with a message’
- Academic introduction books, e.g. Routledge’s *The Basics* series

All of these materials differ from EFL text books in that they are not graded. Sometimes there are words that an EFL student has to look for outside of an EFL dictionary. Moreover, the contents of these materials often are not sanitized to make them approachable to students. By this we mean that the contents are not always safe, non-controversial contents. Furthermore, the teacher can choose these contents to reflect viewpoints that students would not usually encounter in conversation among their peers. An example of this would be viewpoints that say supporting immigrants supports democracy in the receiving country (for example Japan) by strengthening liberalism and the rule of law (based on Shipper 2008). Japanese people are often mistrustful of immigrants; therefore, they may not encounter such views in discussions with friends or family or while watching the news in Japan.

The learning does not all happen from reading authentic texts. Sometimes academic introduction books or academic-level encyclopedias are used. This is because students who often take 10 courses per semester cannot be expected to read enough authentic materials to understand the entire context, or the overall factual basis. Moreover, the teacher sometimes mentions more complicated theoretical readings and provides overview in PowerPoint.
presentations to introduce a wider variety of facts and point-of-views than students would necessarily have time or skill to learn on their own.

This paper aims to specify the challenges when encouraging students to critical thinking, and when providing training to avoid misleading information or fake news in teaching EFL in Japanese universities. Analysis of the teaching experience at a national university is conducted in order to nail down both challenges and effective teaching strategies relevant to the issues discussed here.

2. Case Study

As a case study, we report how Japanese university students received these reading assignments in two different classes: Academic English Advanced class and Special Reading Seminar. Academic English Advanced (AEA) is a semi-required upper division class that teaches listening, reading, writing, and speaking skills. The AEA class design has had 3-4 subject sections with a presentation at the end of each section about the subject and at the end of the semester the students do a presentation on something of their own choosing. Students with high test scores are not required to take AEA. The Special Seminar on Reading is an elective class with very small class sizes (I have taught between 1 and 4 students). It is completely focused on the act of reading. There are 3 reading sections, like AEA the students are required to present about something they have read about the subject matter. The students take a daily quiz about simple points about the reading, listen to a PowerPoint discussion giving factual, and occasionally conceptual analyses, about the reading. After that the students discuss comprehension and critical thinking questions about the reading with the class.

Most of the students did well with comprehension questions while some had difficulty dealing with the critical thinking questions. Comprehension questions were about specific facts that could be found by looking at the text. An excellent answer to a comprehension question would summarize a small portion of the text in the students’ own words. A fairly good answer might be to locate the passage in the text and read it aloud to the class. A critical thinking question involves asking a question about how a certain trend might change in the future or stating an opinion on a controversial issue. Some examples of comprehension questions and critical thinking questions are provided in Tables below.

<table>
<thead>
<tr>
<th>Comprehension Questions Compared to Critical Thinking Question (See Appendix 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.) Comprehension question</td>
</tr>
<tr>
<td>According to the article, are small farmers in Mexico affected by free trade and global economies? Why?</td>
</tr>
<tr>
<td>b.) Critical Thinking Question</td>
</tr>
<tr>
<td>Japan is debating removing agricultural tariffs and allowing foreign agricultural products to be sold in Japan. Could things that happened in Mexico happen in Japan?</td>
</tr>
</tbody>
</table>

| Comprehension Questions Compared to Critical Thinking Questions (See Appendix 2) |
a.) Comprehension question
What is the main conflict about immigration in Japan about?

b.) Critical Thinking Question
Is everyone concerned about Abe’s immigration policies a nationalist? Why or why not?

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Comprehension Questions Compared to Critical Thinking Questions
(See Appendix 3)

a.) Comprehension question
Is Mardi Gras a New Orleans tradition only? Why or why not?

b.) Critical Thinking Question
Is there a Japanese tradition that is similar to Mardi Gras? Why or why not?

2.1 Academic English Advanced

I have taught a few Academic English Advanced classes. These classes usually have between 6 and 20 students, though the general number is closer to 20 students. Most of the students are Japanese with the few exceptions being Korean students. Thus, the students’ ethnic and national backgrounds are often not diverse. The gender distribution varies by department. Various departments take these courses. I have taught the following departments: Science, Law, Engineering, and Arts and Letters. The departments seem to have different characteristics, though it is hard to predict which departments are more apt to learn from the readings. The science department frequently provides classes with fewer students. It is common for students to stop attending these classes before the end of the semester. To my knowledge, these are semi-required classes, not electives.¹

These classes use a variety of written materials. When I first started teaching these classes, I relied on a textbook, *Headway Academic Skills (by Oxford University Press)*. This had a high-level of content material and above-adequate explanations of academic skills needed for academic writing or reading. However, I felt that it was biased and had a cartoon image of what academic life is supposed to be like. This pressured me to write my own content materials that I thought were more appropriate, though students sometime seemed more enthusiastic about this textbook than authentic materials I use.

The classes have focused on: English language cultures, subculture, media and (in the past) immigration. The English language culture section is fairly general, but it often discusses issues of diversity and the arts. Subculture refers to rebellious youth cultures that oppose some form of authority (i.e. punk, hippies, Rastafarians, metal heads, etc.). Media refers to critical ideas about the role of mass media. These subject matters are designed to introduce students to viewpoints that are very different from Japanese culture.

Immigration has been temporarily discontinued for a variety of reasons. First of all it is a taboo subject in Japan. This does not bother me so much. It is my opinion that students should learn different viewpoints, and perhaps especially, ones which they are unfamiliar or uncomfortable with. This is part of globalism. Japan claims that when students learn English

¹ The teacher here does not read Japanese language and the university has created reforms leading to some information on classes and university policy that may be outdated due to rapid changes which are difficult to reference properly.
from a native speaker, they are being prepared for globalization. However, I have found two things problematic about this subject matter: 1.) since students often take about 10 classes, as a teacher, I have to assign readings that students can finish, e.g. media writing about immigration, and 2.) the encyclopedia I have which best introduces the subject talks about law in a way that is factually correct, but difficult for students to understand. Readings that students can finish include mass media. Often this is very episodic or very biased. I have found when the students do presentations they gravitate toward easy or biased readings. In other words, they find fairly nationalistic interpretations about immigration that make me wonder if they read the assigned reading or listened to the lectures. I am stuck in a zone of conflict between my own opinions and being fair to students’ points-of-view. The legal context of undocumented immigration in the United States mentioned in the reading by Plascencia (2014) has tacitly permitted undocumented immigration. Since undocumented immigrants are often referred to as illegal immigrants in mass media, students do not believe the reading when it explains that undocumented immigration is not illegal to the extent that theft or murder is. (Appendix 4 contains the reading questions for this assignment.)

I have developed materials about subcultures. Because of my age, I expected this to be too controversial for students. When I was growing up, the punk subculture was feared in the United States and it remains somewhat taboo in Japan. Ironically, when compared to the section on immigration, the students were fine with the introductory reading, an excerpt from Subcultures: The Basics (Haenfler 2013),2 and with reading lyrics while listening to heavy metal, punk, and reggae music. I have never figured out why this is. When asked on surveys how comfortable they are with this subject matters the answers were usually positive, in contrast to readings on culture or immigration. Some students seemed to enjoy listening to the music. I am not sure how well all of the students understood the oppositional part of the subculture concept. For example, many students who presented on punk bands for the subculture assignment presented on commercially successful ‘pop-punk’ bands who release records on large record labels. For a class of native speakers in the United States or the UK who would be more immersed in outside of class context and could be expected to do more reading, I would expect them to know that punk (and other subcultures) do not release albums on corporate record labels and are usually anti-capitalist.3 Thus, presenting on a ‘pop-punk’ band would get a C or B- grade outside of Japan, though given the low levels of reading and cultural context, I was forced to determine my grades based on the students’ English language proficiency, use of parenthetical references, and what types of sources they chose to read. I tried to direct these assignments toward more authentic subcultural examples, by giving questions about specific bands, though almost no students chose to do these questions. In the future I may ask them to comment on readings from specific zines.

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2 While this book is a non-authentic source, it has more authentic, non-sanitized content and academic terminology than the typical EFL textbooks used in Japanese classes. The book was originally found in the library as an academic text that was at an appropriate level for the undergraduate students at the university it was talked about. It mentions in summary difficult concepts and theories about subcultures from academic level books. This may be an example of a limitation to making a division between authentic and non-authentic materials.

3 There could be confusion because authentic punk bands that formed before punk music was run exclusively on independent labels are on major labels. Examples include, the Clash and the Ramones which are both authentic and known amongst Japanese students.
2.2 Special Reading Seminar

At a national university in central Japan, I have taught Special Reading Seminars to a diverse group of students. Unlike Academic English Advanced, some have been from foreign countries, such as China, France, and Central Asian countries. Some have been from Japan. One class that I taught was all engineering students. Another was all political science students. Generally this class has been divided into three themes:

- Environment
- Immigration
- Media

These themes are mentioned in the course schedule, though I do not mention the specific readings given largely due to issues of space and the fact that many other professors at my university are less specific when describing their course contents. This allows me, as a teacher, the ability to keep or change reading assignments from year to year. The criteria for doing so varies from removing unsuccessful assignments to preventing plagiarism to tailoring the reading assignments to fit current events that the students might be reading about outside of class. On one occasion, I dropped a section—music—due to a lack of student interest.

Students have had a variety of reactions to the reading assignments and classroom discussions. Compared with Academic English Advanced, the students’ reaction in this class are more expressive. I have not found anything consistent across nationality. In other words, I am not sure if my class could confirm or refute the idea that Japanese students are apolitical or right-wing, which is sometimes mentioned by foreign teachers teaching in Japan and is sometimes the attitude of teachers from Japan. Some Japanese students have disagreed with my ideas on immigration, others, have not overtly critiqued it. The worst reaction to my lecture came from a foreign student during a discussion on international politics and cultures—I am being intentionally vague about the content of the lecture and withholding their country to protect their identity. This student actually told me I was wrong and came up to the podium to lecture the class on what s/he thought was really happening with the subject matter. Personally, I take these students’ reactions to be a result of successfully encouraging critical thinking to the students. They understood (or, at least, partially understood) the assigned reading and the lecture by the instructor, engaged themselves in the content discussed there, and expressed their own opinions trying to support their own arguments.

Students’ academic background seems to influence how well they understand the reading materials in this class. In the academic year 2018, I had a small class of two students who studied law and politics. It has generally been easier for them to complete the comprehension assignments and to engage in classroom discussions. It could be due to the small class size, however, that provides more communication with the instructor.

One thing that I have noticed, is that regardless of national or academic background, students often make similar mistakes with presentations. For example, it is frequent for students to do English language reading assignments using texts written in Japanese, not English, despite the fact that the courses are EFL classes. In such cases, although the students were clearly instructed to find English language reading materials and summarize it for the assignment, they just find Japanese language reading materials and write a summary in
English. This is more frequent for Japanese students. Similarly, most students are completely unprepared to read parenthetical references and incorporate them into their writing. Hopefully this class provided opportunities to immerse them to experience such academic writing conventions. Students often make the undergraduate mistake of discussing their opinions or biases when asked to comment on opinions from the reading.

2.3 Summary of case studies

Overall, students have gained new perspectives on foreign cultures, some of it well-received, some of it shocking. The level of accuracy of their understanding is lower than it would be for classes that were not EFL classes. This is O.K. because the purpose of these classes is to promote reading of authentic material and related dialogue in English language. With the amount of reading given, expertise cannot really be expected. Indeed, students who have not yet earned a bachelor’s degree cannot be expected to be experts, nor can they expected to speak with the same accuracy and depth of knowledge as a Ph.D. student. This goes for both EFL and native speaker subject matter classes.

Students do have chronic mistakes. It is harder for everyone to understand completely international points-of-views. There are a variety of reasons for this. Some of it is that the students hold strong opinions about certain subjects or are not immersed in culture outside of class where more background context and knowledge would be gained. The amount of reading given in a non-EFL regular subject-matter class cannot be assigned to make up for this. Subject matter could be changed to be more palatable to national tastes, but this would not be global.

Another issue is that classrooms have different grade-level expectations built into them. No teacher expects every student to have a 90%-100% knowledge of a subject matter. Moreover, not every student is equally prepared or motivated to do all of the reading or discuss it in class. Some Asian students do not feel comfortable discussing their individual opinions on anything, let alone serious subjects.

Some disciplines, law and politics in particular seem most apt to understand these readings. However, most students did not express disinterest, though some seemed a little hostile or biased to the subject matter. Yet, the class seems successful if students can discuss things, whatever their opinions. There are not noticeably bad reactions to certain subject matters that can be divided up between students of different disciplines. Moreover, as a teacher, I do not always know which disciplines will be taking my class for the reading seminars before I submit my syllabus.

I have so far found that using explanatory texts, e.g. encyclopedia or introductory materials do not have a positive or negative effect on students understanding and engagement. For my classes on immigration, many students simply chose to believe what they had encountered in mass media instead of the researched facts presented in Plascencia’s (2014) entry, “The Undocumented Label,” in Undocumented Immigrants in the United States [2 Volumes’]: An Encyclopedia of Their Experience (Ochoa O’Leary, Ed. 2014). For example, students may say things in their presentations like “Japan would be better if there were no immigrants.” Aside from the problem of the fact that, through a regular-non-Japanese definition, their teacher is an immigrant, and this is hence culturally inappropriate, it does not match with the texts that we have read. (The texts that we have read do not promote
far-right xenophobia, an example of mismatching opinions) Moreover, it seems to relate more to Japanese anti-immigrant viewpoints or far-right Internet news outlets. Though perhaps too generous to the students, this is what is available for context if the Internet is their one-stop for information. It raises dilemmas about how to objectively grade students—would a lower grade for such an assignment be perceived as fair because the students used low grade sources or biased/non-objective because they have a different viewpoint? For the subcultures class, some students seemed to understand what they read in the introductory text, whereas others needed extensive explanation and board work to understand it. Indeed, for subcultures audio and visual materials may have been more helpful, though right now this is difficult to prove. Suffice to say, I got very different results. Student comprehension seems better with the introduction of PowerPoint presentations, though in the evaluations for one class, I received an unsolicited comment from students who were upset that they could not use PowerPoint during their presentations. Though it has to be noted that encyclopedias, introductory texts, and PowerPoint are all necessary, yet somewhat outside of the goals of authentic reading. As a foreign-teacher, it seems that using PowerPoint to convey materials relies on a very hierarchical authoritarian expectation of teaching, yet it helps give facts and complicated materials without resorting to textbooks and encyclopedias. This gives students more time to read authentic materials.

3. Discussion

Day & Bamford (1998: 18) pointed out that one of the necessary factors in cognitive process of fluent reading is knowledge for it is on knowledge that comprehension depends. It is important that the students have opportunities to learn background knowledge about topics that are often discussed in English language speaking worlds though they may not be discussed in the media in their mother tongue.

The analysis of the actual class teaching experience reveals a sort of “dilemma” or how the present situation often contributes to the vicious cycle of not reaching to the background context and knowledge required to understand current global issues. One of the other issues is that the students may reach toward background knowledge outside of the reading which often times is not relevant or based on their own biases. Looking for background knowledge based on their own biases undermines their ability to objectively read material from other cultures. Nonetheless, without being able to assign extensive reading, the students cannot necessarily be expected to get the appropriate background. It is hoped that this can be provided through lectures; however, there are limits of time and English-language comprehension.

Since students reading is not deep enough, they have trouble coming up with relevant or appropriate opinions to deal with reading questions that require critical thinking. (By opinions, we mean finding attractive ideas from the available range of ideas, to do this requires knowledge of context and the consequence of using certain opinions over others). It is hard for them to read accurately because they lack background context and knowledge necessary to understand certain topics. Because of this difficulty, students and teachers become dependent on the non-authentic reading materials, which cannot provide them with background context and knowledge concerning global issues. Thus, students are left inexperienced and untrained.
In the introductory section of this paper (section 1), we discussed how the authentic materials are often not sanitized and the contents are not always safe, non-controversial contents. This is because non-authentic textbooks often not only grade the vocabulary levels that are used but also change the way the contents are introduced so it is framed within the contexts that students are already familiar with or can predict easily to make them ‘approachable.’ Such readings are less likely to provoke students both in a good way and a bad way. This is exactly why we suggest the benefit of authentic, non-sanitized materials for students to encounter the viewpoints that they have never experienced in their own cultural background.

On the other hand, it is also easy to see a half-full glass as half empty, meaning it is easy to focus on students who are not doing so well with the questions and not realizing that it is the exceptionally good students who should be answering the questions well most of the time. Indeed, a foreign language class is not based on the expectation of everyone doing a perfect job with the material. One change that can be assessed is when a student changes their opinion based on a new global idea. Students do sometimes remark that they learn something that they did not know or think about before. For example, in regards to a section in the AEA class on subcultures, a student mentioned that s/he had never considered that subcultures like punk music could have a positive social message. That this is so is specialized knowledge for small, closed groups of people, even in the United States and Britain. In a reading seminar, a student mentioned that after reading the articles and listening to ideas in the lecture about the how incorporating immigrants into society shows how democratic Japan could be, s/he thought that Japanese people should do more to help integrate immigrants into Japanese society. Other students disagreed, but a debate occurred with multiple, global points of view. These new debates took time, meaning that they did not always happen while answering critical thought questions during class. However, they do show that the process of reading helped students to think differently than they would have which is important for global culture.

Furthermore, even if the students do not “get it” with the questions, the questions can help them show how complicated some of the subject matter is, and how there are often no easy answers to global cultural issues. The process of doing hard questions—while not immediately reflecting a good answer, comprehension, or critical thinking may on its own help students develop their reading skills which is one of the main objectives of both classes.

In many ways, a good point of using non-authentic readers is what Deleuze-studies scholars like Simon O’Sullivan (2006) calls “an encounter.” In an encounter, people are forced to deal with something they otherwise never have thought about. In this way, people learn critical thinking not by thinking about the same thing continuously, but rather by something that disrupts their every-day habits. Indeed, many of the non-sanitized authentic materials do that which is evident through the global subject matters and global point-of-views which students do not often encounter in regular Japanese discourses and readings.

4. Conclusion

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4 This was based partially on a PowerPoint lecture where Shipper’s (2008) work on immigration in Japan was paraphrased along with other studies on local incorporation of immigrants to Japan (Tsuda 2006).
In conclusion, the case study introduced here demonstrates that with the help of the instructor, Japanese EFL students at university level can make use of sources in the media to cultivate their critical thinking skills. Though authentic teaching materials are not effective for just any EFL students in Japan, there are certain aspects of this world that authentic materials can bring to the classrooms but not the “sanitized” materials. Motivated students with relatively higher English language proficiency are able to learn critical thinking skills and intercultural communication skills by the encounters with unfamiliar and sometimes uncomfortable perspectives and unscreened online materials. That is exactly the aspect of the globalized real worlds that they may have to face after graduating universities in a couple of years.

References
Appendix

Available at: http://www.progressive.org/news/2013/04/181722/nafta-corn-fuels-immigration

Vocabulary and Collocation

Please define the following words and phrases and write a sentence that uses the same definition used in the above article. Note, you may need to look at an online source to define certain terms:

Central to (p. 23): _____________________________________________________________________________

Fuels (headline): _____________________________________________________________________________

(Something felt) off (p. 22) _____________________________________________________________________________

Neoliberalism (neoliberal): _____________________________________________________________________________

N.A.F.T.A.: _____________________________________________________________________________

Flooded (p. 23): _____________________________________________________________________________

Backstabbing (p.24): _____________________________________________________________________________

Immigration reform; _____________________________________________________________________________

Comprehension/Discussion Questions

1.) Why is corn important to immigration? Where is yellow corn originally from? Where is blue corn originally from? Why is this important?

__________________________________________________________________________________________

__________________________________________________________________________________________
2.) Are economic issues important to this article’s argument? Why or why not?

___________________________________________________________________________

___________________________________________________________________________

3.) What is the importance of business in this article? Please explain with details about who, what, where, when, and why?

___________________________________________________________________________

___________________________________________________________________________

4.) Does the author think U.S. President Barack Obama has a better or worse record for deporting undocumented immigrants? Please explain with details such as who, what, where, when, why, and how?

___________________________________________________________________________

___________________________________________________________________________

5.) After reading this article, why do you think people from Mexico choose undocumented immigration, rather than staying in their own communities?

___________________________________________________________________________

___________________________________________________________________________

6.) According to the article, are small farmers in Mexico affected by free trade and global economies? Why?

___________________________________________________________________________

___________________________________________________________________________

7.) Japan is debating removing agricultural tariffs and allowing foreign agricultural products to be sold in Japan. Could things that happened in Mexico happen in Japan?

___________________________________________________________________________

___________________________________________________________________________

8.) On a separate piece of paper, please draw a map of all places mentioned and create a chronologically ordered timeline of events mentioned.
Appendix 2. Isabel Reynolds (October 18, 2018). “Abe wants foreigners to bolster Japan’s shrinking workforce but finds vocal resistance.” *The Japan Times* (Originally published in *Bloomberg*).

A strict immigration policy has helped make Japan one of the world’s oldest and most homogeneous societies. Now, Prime Minister Shinzo Abe’s plan to invite as many as half a million foreign workers is testing the country’s tolerance for change.

Abe is preparing to introduce legislation to allow migrants to start filling vacancies next year in sectors worst hit by the country’s shrinking population. While the government hasn’t released a target, local media including Kyodo News have reported numbers that would represent a 40 percent increase over the 1.3 million foreign workers now living in the country.

In a sign of urgency, Abe’s government has announced an April start date for the policy even before debate has begun in the Diet. The proposal is among the first he’s seeking to tackle after winning a historic third term as head of the ruling Liberal Democratic Party last month, paving the way for him to become the country’s longest-ever serving prime minister.

If passed, the legislation would amount to Japan’s most dramatic immigration overhaul since the 1990s, when it let “trainees” from Asian nations in the country. Foreigners made up only about 1.7 percent of the country’s population as of April, compared with 3.4 percent in South Korea and about 12 percent in Germany.

Abe got a reminder of the risks Sunday as more than 100 noisy protesters marched through Tokyo’s upmarket Ginza shopping district, waving Imperial army flags and urging the plan’s withdrawal. Although the group was outnumbered by police and pursued by counterprotesters chanting “racists go home,” they appeared keen to tap into anti-immigrant sentiments that have bubbled up elsewhere in the developed world.

The organizer calls itself Japan First, an allusion to U.S. President Donald Trump’s “America First” policies.

“Far-right parties have very little support in Japan,” said Eriko Suzuki, a professor who researches migration at Kokushikan University. “But there are a lot more people, a kind of reserve army, who are vaguely concerned about admitting foreigners. If the government doesn’t put together appropriate policies, that unease will increase.”

The risks of inaction could be just as great, as Japan’s declining population takes its toll on the economy. In a survey published by the Japan Chamber of Commerce and Industry in June, two-thirds of companies said they were short of workers. The number of companies folding because of a lack of workers jumped by 40 percent in the first half of the financial year, compared with the same period in 2017, according to Teikoku Databank Ltd.

Abe’s plan, set to be introduced in the parliamentary session beginning later this month, calls for creating two classes of foreign workers to serve in about 10 as-yet-unspecified industries. Lower-skilled migrants would be allowed to stay for as long as five years and barred from bringing their families. More highly skilled workers could bring family members and stay longer.

Chief Cabinet Secretary Yoshihide Suga said earlier this month that the total number of new workers hasn’t been determined.

“It’s a sea change in Japan’s immigration policy,” said Ippei Torii of Solidarity Network with Migrants Japan, who has for decades worked to support foreign workers experiencing problems. “Japan is finally getting around to thinking about how to deal with this.”
Mikio Okamura, the head of the Tokyo chapter of Japan First, called for the government to spend money on improving pay and conditions for Japanese citizens, rather than relying on foreigners.

“Before you let in foreigners, you should deal with Japan’s unemployed. We want them to use tax money to do that,” Okamura said. “Then, we would have Japanese people looking after the elderly. That would be the happiest result for the Japanese and for the foreigners, as well.”

Other more mainstream groups have expressed concerns, with Japan’s Trade Union Confederation questioning the lack of public debate in a letter submitted to the government in August. The group, known as Rengo, has said that foreign workers shouldn’t be accepted without careful consideration.

Japan has had a difficult history with attracting foreign blue-collar workers. The country invited in Brazilians and Peruvians of Japanese descent when the economy was growing, but ended up offering to pay them to leave after the 2008 financial crisis. A system of accepting mostly Asian “trainees” — launched in 1993 and officially intended to transfer skills to developing countries — turned out mostly to provide a supply of labor at less than minimum wage, while often preventing participants from leaving jobs where they were treated badly.

Japanese media regularly report on foreign students struggling with massive debts owed to the shady brokers who bring them over.

Some of these issues are tackled in an outline of the coming legislation published on Oct. 11. Under it, foreign workers must be paid at least as much as their Japanese counterparts, and they will be allowed to change jobs within the same sector.

Nevertheless, their presence will hold down wages, some economists say — working against Abe’s six-year push to raise incomes and fight against deflation. The influx of labor will also hold back necessary progress in improving productivity, said Yoichi Kaneko, a former lawmaker and Organisation for Economic Co-operation and Development economist, who now works for an IT firm.

“The labor shortage is a reality, but if you bring in foreigners, working conditions will not improve and the minimum wage will not rise,” Kaneko said. “That may be good for companies, but for the workers it’s not good at all.”

Please answer the questions in complete sentences

1.) What is the main conflict about immigration in Japan about?

________________________________________________________________________
________________________________________________________________________

2.) Why do you think Abe has chosen to make big changes to Japan’s immigration policy?

________________________________________________________________________
________________________________________________________________________

3.) Has Donald Trump’s rhetoric influenced the debate over immigration in Japan? How?

________________________________________________________________________
________________________________________________________________________

4.) Is everyone concerned about Abe’s immigration policies a nationalist? Why or why not?

________________________________________________________________________
________________________________________________________________________
5.) Do nationalists have a lot of support in Japan? Why or why not?

_________________________________________________________________________

6.) What problems arose from previous Japanese immigration policies?

_________________________________________________________________________

7.) What have been some demographic changes in immigration to Japan? (Where have immigrants been coming from and how has this changed over time?). Please find the data on Peru and Brazil and choose two additional nationalities from the following webpages and make a chart explaining them. (Pew Research Center (2018) “Origins and Destinations of the World’s Migrants, 1990-2017”)


Table 1. Changes in the Population of Immigrants from Peru, Brazil, and _________ between 1990 and 2017

<table>
<thead>
<tr>
<th></th>
<th>Peru</th>
<th>Brazil</th>
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<tr>
<td>1990</td>
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<td>2001</td>
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<tr>
<td>2017</td>
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</tbody>
</table>

7.) How well does the information you found in question 6 explain the 1993 program of requesting encouraging “Asian ‘trainees’”? Why?

_________________________________________________________________________

8.) How well does the information you found in question 6 explain the effect of the 2008 financial crisis on Peruvian and Brazilians of Japanese descent who immigrated to Japan? Why?

_________________________________________________________________________

9.) What other specific demographic data would help explain this article? (Hint: there is at least one group mentioned who are not immigrants.)

_________________________________________________________________________
10.) Please make a timeline of events mentioned in the article.

11.) Please make a relevant map for this article.
Appendix 3. Questions for History.com “Mardi Gras.” Please read the text at http://www.history.com/topics/holidays/mardi-gras and answer the following questions.

1. Is there a Japanese tradition that is similar to Mardi Gras? Why or why not?

2. Is the current Mardi Gras contemporary or traditional? Why?

3. Is Mardi Gras a New Orleans tradition only? Why or why not?

4. Are there any similarities between Mardi Gras and subcultures such as punk or reggae? Why or why not?

5. Was Mardi Gras affected by migration (people moving to different places to live and work)? How? Why?

6. Please write something about Mardi Gras that is really fascinating.
1. Make a Mardi Gras timeline.

2. Please draw a map showing places where Mardi Gras (a.k.a. Carnival) developed over time.

Directions: Answer the questions in complete sentences on a separate sheet of paper. Please use complete sentences. Rather than simply copying what is said in the reading, summarize what is said in your own words.

1. Do peoples’ perceptions of borders change how they think about the proper way to label someone who entered the United States without authorization? Why or why not?

2. How does using the term “illegal” cause confusion or hostility? What could be done to change this? Why?

3. What examples does the author give that clarify how different political groups and ideologies discuss immigration differently or similarly? Are these convincing? Why or why not?

4. Who first started using the term “undocumented immigrant.”” When?

5. How strict does the author think the law is regarding people who enter the United States without permission? What timeframe does he get examples from?

6. Draw a map of all places and countries mentioned in the article

7. Make a timeline of all events mentioned. Start from the first incident mentioned, finish with the last event (do not follow the order that they appear in the article).
1. **Title:** Identifying Six Threats to the Freedom of Education Academies.

2. **Author:** Brett J. Holt, Ed.D.

3. **Affiliation:** University of Vermont

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6. **Abstract:**

   Socrates may have been the first documented academic professional that had one’s academic freedoms infringed upon, but the threats continue today (albeit less dramatic than the public taking of one’s own life). Throughout history other famous academics (Bruno, Galileo Galileee, John Scopes, etc.) have become martyrs for academic freedom. What is the purpose of academic freedom and why is it important for academics to be granted academic freedom? And, what currently threatens the freedoms of educational academies and the freedoms reserved for the admitted faculty members? This presentation will first seek to answer both of those questions from a discourse developed by Lerfreheight & Lernfreheight in the early nineteenth century and held today by academics like Nelson (2009) and Ledoux, et. al. (2010). It is intended that this presentation will submit an overview of six ominous and pervasive threats (both internal and external) to the educational professional and the academies to which s/he represents [1) Governance/Accreditation, 2) Budget/Profiteering, 3) Special Interest, 4) Socialized Conformity, 5) Expert Identity and 6) Culture of Fear] and that succeeding conferences may provide more in-depth dialogue of each threat independently. Current examples and experiences will be provided in each category in order to orient the participant. When they occur, identified threats to the freedoms of an academy arguably diminish the integrity of the professional academies and their faculties. More importantly, after threats are identified, what can faculties do to eliminate or prevent these six threats to their academies and their faculty academic freedoms? Utilizing suggestions from select authors (Baez,2009; Wrynn, 2007; Yeoman, 2010; Capriano, 2014; etc.), this presentation will seek to provide resolution to those threats. Finally, this presentation will conclude with invited open discussion from participants to engage in dialogue in answering the question: how can we best address the six common threats to our academic freedoms?
Proceedings Submission

1. Presentation Title: *Factors that Influence Teachers’ Attitudes toward the Inclusion of Students with Disruptive Behaviors*

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   - Director of Special Education - Panther Valley School District, Lansford, Pennsylvania

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   - (Professional) 912 Coal Region Way, Lansford, Pa 18232

5. Email: Catherine.Hertzog@gmail.com

6. Abstract: *Factors that Influence Middle School General Education Teachers’ Attitudes toward the Inclusion of IDEA Eligible Students Who Exhibit Disruptive Behaviors.* This phenomenological study explored the factors that affect the willingness of general education middle school teachers to include IDEA eligible students who exhibit disruptive behaviors. Despite the legal mandate, The Education of All Handicapped Children Act of 1975, (EHA), requiring students with disabilities to be educated with their nondisabled peers to the maximum extent appropriate, many general education teachers are reluctant to accept these students into their classrooms. Research suggests that this phenomenon has been present in the education system for these last 40 years, and it is more prevalent with students exhibiting disruptive behaviors. Relatedly, inclusive practices have been explored, implemented, and analyzed; and while progress has been made, students exhibiting disruptive behaviors are included less frequently than their peers. Through consideration of participants’ individual lived experiences and an array of perspectives about the phenomenon, an improved understanding of this phenomenon surfaced. This study collected data from semi-structured interviews, focus groups, and a researcher’s journal to identify 8 factors that influenced middle school general educators’ attitudes toward the inclusion of IDEA eligible students who exhibit disruptive behaviors.
Abstract:

Background
In Japan, the wave of “active learning” has started changing the class dynamics recently; however, teachers cannot deny the fact that the type of education Japanese students have, especially before college, still tends to be traditional. It focuses on teacher-centered lessons and mechanical practices. In addition, there are a considerable number of false-learners, who have learned English for at least six years before college but need to have elementary level instructions. Also, there are not few freshmen who had little learning experience of interacting with their peers and teachers. Therefore, in EFL freshmen class in Japan, in order to create a class with students’ active engagement, instructors need to devise ways to support those false-learners who are not ready to speak up in class.

Objectives
In this study, topics and teaching materials that aim to activate students’ conceptual background knowledge and motivate them to share their personal stories, were implemented in an EFL class to see whether those topics were attractive to low-level students and helped them to share their personal stories in English.

Design
Carefully designed materials for specific topics and sharing personal stories were implemented in English conversation classes for 28 freshmen who majored in global studies in Japan. Along with the eight topics from a commercial textbook, four original topics were carried out with supportive expression forms as scaffolding. A 90-minute lesson for each of the four topics was provided. On the reflection sheet, at the end of the semester, students were asked 1) which topics were interesting to them, 2) whether or not they felt that they could speak in English, and if so, at which point they felt that way.

Results
Students’ voices showed that original topics, which tried to elicit students’ personal stories, were more attractive than the topics in the commercial textbook to target students. Also, respondents who were aware that they have acquired ability to speak in English through English conversation class referred to the fact that they could “explain about themselves in detail” and “have a lively conversation” in a pair/group.

Conclusion & Future Implication
The exploratory lesson contents were related to students’ personal memories or/and lives that they could share in class. In this way, students may have started looking at English lesson not as just one of the subjects, but a place for expressing themselves while reflecting their own lives including their feelings and thoughts. Because of the nature of sharing personal stories, students tended to get interested in listening to and asking for their peers, and then the authentic conversations empowered students to speak more about themselves, which led them to actively engaged and study positively. This study showed that the original topics were well received by the target students as interesting topics, which seemed to help
students to start using English and tell their personal stories even with limited English abilities. The instructor perceived that eliciting students personal stories by choosing/adapting topics with expression forms as scaffolding, which even lower level students could create their own stories, was the key to promote students’ active engagement.
The Effect of Gender Priming on Self-Reports

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Abstract

The Effect of Gender Priming on Self-Reports

Cory Platts, Ashley Clark, Lisa Worthy, David Boninger

Because there is considerable evidence indicating that gender of the experimenter may affect participant responses in a variety of research settings (Aslaksen et al., 2006; Benny, Riesman & Star, 1956; Fuller, 1963), efforts have turned to examining the mechanism by which this effect occurs. Flores-Macias and Lawson (2008) sampled Mexican citizens in various regions of Mexico on various political questions and found that the gender of the experimenter influenced how men and women responded. The researchers suggested that certain underlying cognitive processes could have been made more salient by certain characteristics of the interviewer. This research aimed to further investigate the underlying cognitive processes behind experimenter gender effects by analyzing priming as a potential primary mechanism. We operationalized gender priming by having participants complete a timed word search for words consistent with gender stereotypes (e.g., male stereotypical words included car, aggressive, and dominant; female stereotypical words included ballet, purse, and caring). After receiving a male or female prime (via the word search task), participants then completed a questionnaire that contained ten gender-neutral (no connection to gender stereotypes) and ten gender-relevant questions. For gender-neutral questions, we expected both male and female participants to answer similarly, whereas for gender-relevant questions, we expected differences in the responses of male and female participants. We hypothesized that participants receiving the female prime would have greater variance in their responses to gender-relevant questions than participants receiving the male prime. In addition, female participants paired with a female prime and male participants
paired with a male prime (same-sex effect) would have greater variance in their responses to gender-relevant questions than participants paired with the opposite gender prime (cross-sex effect). We examined all 20 questionnaire items for internal consistency by computing Cronbach’s alpha ($\alpha = .706$) which was lower than anticipated, but sufficient for exploratory analyses. Questionnaire items were subdivided into gender-relevant items and gender-neutral items and were used in subsequent analyses. A General Linear Model, repeated measure analysis was conducted which examined the variance for gender related questionnaire items by gender prime and participant gender. Results ($N=158$) were not statistically significant. We then isolated the two conditions in which the manipulation was the strongest (i.e. experimenter gender was consistent with gender prime). There was no main effect for prime ($N=73$, $F=1.57$ $p=.22$) or gender of the participant ($N=73$, $F=3.42$ $p=.07$). The interaction was also not statistically significant ($N=73$, $F=.84$ $p=.36$). Given the non-significant findings and the low questionnaire reliability, we chose to further examine four gender-relevant questions appearing to have the highest face validity and a wide distribution of responses. To that end, several independent sample t-tests were conducted, and results were significant for one question regarding how likely participants were to seek help for mental health problems ($N=73$, $F=16.87$ $p<.001$), such that regardless of the prime or gender of the experimenter, male participants exhibited great variance in their responses than female participants. In sum, our results were not supportive of our hypotheses. One potential explanation for the inconsistent results is our manipulation of gender priming may not have been sufficiently strong. Some participants, for instance, who completed the female prime word search, found cross-gender words (i.e. “male” instead of “female” or “car” instead of “caring”). This potentially weakened our manipulation of gender prime. Future research should look to more carefully operationalize gender priming in experimental research in
order to better understand the mechanism by which the gender of the experimenter may affect participant responses.

*Keywords*: gender effect, priming, experimenter bias, self-report
Title: Makerspaces Today’s Universities’ Engineering Curriculum

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See next page for paper
MAKERSPACES IN TODAY’S UNIVERSITIES’ ENGINEERING CURRICULUM

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ABSTRACT

Makerspaces are informal sites for creative production in the arts, the sciences, and engineering where digital and physical technologies are often used to explore ideas, learn technical skills, and create new products. Makerspaces have begun to appear in public libraries and in K-12 schools, while universities have started to turn toward makerspaces as a complement to design courses already being offered. Such spaces provide an extra-curricular means for students to engage in more hands-on projects, and they go beyond the traditional machine-shop environment, familiar to the undergraduate curriculum, by offering access to rapid prototyping equipment and conceptual design spaces coupled with a unique culture that can be transformative to users. However, while there is a push to include makerspaces in universities, there is currently limited empirical research available on makerspaces within universities. Consequently, the full effect and impact of these spaces are not yet fully understood, particularly in the context of the integration of such activities within the academic curriculum.

The Creation of Maker-spaces

Makerspaces are informal sites for creative production in the arts, the sciences, and engineering where digital and physical technologies are often used to explore ideas, learn technical skills, and create new products. Libraries and museums have designed makerspaces to promote creative activity, resource-sharing, and active engagement with materials, processes, and ideas in their collections and exhibits. As K–12 schools align their curricula with both the Next Generation Science Standards’ focus on the importance of design, technology, and engineering (NRC, 20121) and the new media arts standards across the arts disciplines (NCCAS, 20142), the

1 See: http://www.nextgenscience.org, and,
https://www.nap.edu/catalog/13165/a-framework-for-k-12-science-education-practices-crosscutting-concepts

https://www.nationalartsstandards.org/sites/default/files/NCCAS%20%20Conceptual%20Framework_0.pdf
multidisciplinary design offered in makerspaces has caught the attention of educators.

The birth of maker-spaces can be traced to the “maker movement” which began outside of the university system at the turn of our century as the next iteration of the Do-It-Yourself (DIY) culture. Makerspaces started appearing across the country and the world in the form of open spaces where members would pay membership fees for access to the technology inside, which typically includes a variety of types of rapid prototyping equipment such as 3D printers, laser cutters, and traditional hand tools. These spaces enable the users to express themselves creatively and to be innovative. As the price of the technology associated with “making” (such as the cost of 3D printers) declined, it allowed for greater development of makerspaces, and such spaces began to spread into more locations. Makerspaces have begun to appear in public libraries and in K-12 schools, while universities have started to turn toward makerspaces as a complement to design courses already being offered.

The term “makerspace” has only been in use since the publication of Make magazine in 2005, and the subsequent launch of Maker Faire (2006), an event that demonstrated the popularity of making and it showcased new technologies. These events led to the ‘Maker Movement’ and the introduction of makerspaces, physical locations “where people gather to share resources and knowledge, work on projects, network, and build” within a collaborative environment (Educause 2013). Typically, these makerspaces employ specialist staff, contain 3D printers and laser cutters, and offer facilities to conduct coursework, personal and collaborative projects.

Makerspaces are also known as hacker-spaces, hack labs and fab labs. While each term may have a slightly different focus, all provide opportunities for informal, hands-on learning. The concept of the university makerspace is relatively recent, with the first dating back to roughly 2001 at MIT.

The NMC Horizon Report: 2016 Higher Education Edition lists the time-to-adoption of maker-

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5 Maker Faire - A Bit of History https://makerfaire.com/makerfairehistory/
   See also: http://makerfaire.com/maker-movement/ and https://makezine.com

6 Educause. (2013). 7 things you should know about…: Makerspaces.
   http://www.educause.edu/library/resources/7-things-you-should-know-about-makerspaces


8 See: MIT Makersystem https://project-manus.mit.edu/mit-makersystem

spaces, within the higher education context, as four to five years. While there is a push to include
makerspaces in universities, there is currently limited empirical research available on the impact
and sustainability of establishing maker spaces on academic campuses (in disciplines such as
engineering).

Makerspaces and the Universities’ Engineering Curriculum

In Engineering, the recently released ASEE Transforming Undergraduate Education in
Engineering (TUEE) Phase I report\(^\text{10}\) highlights the diminishing focus on creativity in the
undergraduate curriculum\(^\text{11}\). In addition, research points to the need to improve vital STEM
skills that are currently underdeveloped in graduating engineers, a gap noted by Hyewon (2016):
“traditional curricula seem to reflect what teachers regard as important rather than what skills are
actually required”\(^\text{12}\). In recent surveys employers have complained that job applicants lack
“soft skills”: interpersonal and communication skills. They can pass a calculus exam, but they
can’t identify or solve problems on the job, or negotiate, or lead a meeting.

These soft skills, obtained through hands-on experiences, are becoming just as important, as is
the number of credit hours or semesters that students have accumulated toward their academic
degree\(^\text{13}\). According to the creators of the Conceive-Design-Implement-Operate initiative
(CDIO), skills beyond strictly technical knowledge such as interpersonal skills and critical
thinking are in high demand in industry\(^\text{14, 15}\). Fostering these skills is, however, no easy feat in
the already tightly packed engineering curriculum. The current system has a heavy emphasis on
theory and on mathematical modeling as opposed to more practice-based curricula, which was
the standard engineering education until the modern approach gained favor in curricular changes

\(^{10}\) American Society for Engineering Educators (ASEE) (2013). Phase 1: Synthesizing and
Integrating Industry Perspectives. Arlington, VA.

Innovation Capabilities of Undergraduate Engineering Students”, Journal of Engineering

Data,” Journal of Science Education and Technology, 25, 284-301.

\(^{13}\) Hullinger, Jessica (2015). “This is the Future of College,” Fast Company Newsletter, May 18


that occurred between 1935 and 1965\textsuperscript{16}. As a result of these changes, many engineering students do not spend much of their time engaged in actual design until late in their degree program\textsuperscript{17}.

Consequently, makerspaces provide an extra-curricular means for students to engage in more hands-on projects and develop a large range of the skills that are currently being underdeveloped. Makerspaces go beyond the traditional machine-shop environment, familiar to the undergraduate curriculum, by offering access to rapid prototyping equipment and conceptual design spaces coupled with a unique culture that can be transformative to users\textsuperscript{18}.

One example is Case Western Reserve University’s Sears think[box] which is widely recognized as one of the best campus makerspaces in the U.S. Launched in 2012 it is a seven-story building with each level arranged around the evolution of project development. The first floor serves as community space, with subsequent floors for ideation, prototyping, fabrication, open workspace, entrepreneurial resources, and incubator space, respectively. The 4,500 square-foot facility is managed by four full-time staff and 25 teaching assistants, and it is open to the entire university and Cleveland community. Users of the space have free access and only pay for the materials they use\textsuperscript{19}.

Examples of Maker-spaces at the University of Southern California

The University of Southern California (USC) houses the Jimmy Iovine and Andre Young Academy for Arts, Technology and the Business of Innovation, founded in 2013\textsuperscript{20}. Situated entirely within a makerspace environment, its educational program fuses engineering, business, and arts education to produce innovative, entrepreneurial graduates. An essential part of the program requires students to build products and they spend much of their senior year

\begin{itemize}
  \item \textsuperscript{19} Fischer, Michael (2018). “The 4 Components of Case Western Reserve University’s Successful Makerspace,” \textit{EAB}, April 18, 2018. “In only a few years, think[box] has achieved noteworthy results. Students have secured 12 patents and launched businesses from the makerspace, including a business that incorporates bio-monitors into athletic clothing so people can track their movement and biometric data throughout the day.” \url{https://www.eab.com/research-and-insights/facilities-forum/expert-insights/2018/four-components-of-case-westerns-successful-makerspace}
  \item \textsuperscript{20} See: \url{http://iovine-young.usc.edu/about/index.html}
\end{itemize}
creating prototypes\textsuperscript{21}.  

The USC Viterbi School of Engineering and USC Libraries are in the process of reimagining the University’s Science & Engineering Library into a top-tier engineering undergraduate MakerSpace\textsuperscript{22}. The facility, funded by the Baum family, will provide a central area for hands-on innovation, experimentation, design and entrepreneurship. When completed it will significantly expand and enhance USC Viterbi’s facilities and provide students with a state-of-the-art center that fosters collaboration and innovation.

As part of the planned USC Viterbi’s Baum Family Maker-Space, the Library’s ground floor will consist of two main elements: (i) shared workshop and machine-shop space, these to be used for designing and hands-on fabrication by USC Viterbi’s undergraduate students, and (ii) dedicated spaces for student design and competition teams. This dual purpose will support capstone and other design classes, student laboratory innovation ideas and projects, as well as the extracurricular student competition groups. The third floor will provide areas supported by the Science & Engineering Library. The redesign of the existing library space will promote a collaborative research and hands-on environment in a space that encourages creativity and experiential learning.

According to USC Viterbi’s Dean Yannis C. Yortsos, “This project strengthens the undergraduate engineering experience as it relates to design, experiential learning, and entrepreneurial mind-set (…) Ideate-design-build spaces are vital to our students’ experience, and they contribute to their development as engineers, makers and innovators.”

Assessment of Makerspaces’ impact

In their paper, “An Assessment Instrument of Technological Literacies in Makerspaces and FabLabs,” Paulo Blickstein at al. note:

“How are we to objectively assess work that is open-ended and creative? Traditional assessments of science and technology neither capture the particular types of learning in which students are engaged in fabrication settings … [Educators cannot] rely on existing determinations of learning outcomes to establish how well fabrication settings function pedagogically. Specific instruments are needed to quantify student confidence in their mastery of fabrication technologies, so these instruments must go beyond measures currently


employed in general computing and in information and communication technologies.”23 (p. 151)

While there is a push to include makerspaces in universities, there is currently limited empirical research available on makerspaces within universities, particularly in the context of the integration of such activities within the academic curriculum. Consequently, the full effect and impact of these spaces is not yet fully understood,

In this context, two guiding research question (among three) proposed by Sheridan et al24, are still not fully answered:

1. How and to what ends are tools, materials, and processes used in each makerspace?
2. What are the arrangements for learning, teaching, and collaborating in each space?


Title: The Scientific Method: Wherein Be Mathematics, A Linguistic Artform Neither Necessary Nor Sufficient?

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The Scientific Method: 
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ABSTRACT

The present paper is a response to mathematician Quinn’s conclusion in the January 2012 issue of the American Mathematical Society’s NOTICES: ‘Mathematics is not science because their criteria for validation are different: internal vs. external (p. 31)’.

We respond by undertaking herein a sequence of reports and observations relating mathematics to its role(s) in Science. We undertake this first by reviewing simulation methodology, that applicable to authoring and then deeming credible an algorithmic description of the dynamic behavior of some/any particular naturally occurring system of phenomena.

We nonetheless first examine in detail the adjustments, which an author must undergo in order to represent the stochasticity (randomness) so prevalent in most naturally occurring systems. Once such a model has been programmed, one must also describe the statistical techniques which can be employed in order to conduct experiments with the model’s responses (outputs), including therein the principles by which the model’s generation of randomness can be known to meet the statistician’s requirements for random sampling and statistical independence, ready then for the subsequent statistical computations. Two Principia of Seeding are thus established.

We also note near the center of the paper that a model’s author must be aware of the requirements of our Modern Science, to meet its goal; viz., for any model to provide the truth(s) of Nature revealed by the particular model.

We therefore expend considerable effort to review to history of Science, and thereby uncover our Modern Science’s ‘Method’. The Scientific Method is herein revealed to be an historically conducted, six-stage model-building process, any scientist’s model to be grammatically prepared in a choice among: (a) a natural language, first-person grammar; (b) mathematics, in the third-person; OR, (c) an algorithmic computer-programming language (second-person language).

Hence, we return to the issue of the role(s of mathematics in Science. Authors in the history of Science have revealed that our Modern Science is natural philosophy, but today’s natural philosophy requires that today’s scientist (unlike that of the ancients) must begin via the observation of some naturally occurring phenomenon, followed ‘immediately’ by mental reflexion thereon.
The six-stage model-building process defining our Modern Science, we show, is actually a quite isomorphic ‘mimicry’ of Nature’s own (single) process for ensuring biological survival. This biological process, we show, was ‘conducted’ first by any plant or animal species chemico-genetically (the six stages becoming apparent), then once the ‘higher’ species of animals (those with memory-and-recall capability) enhanced their members’ survival to their respective ages of puberty (again that same six-stages remaining apparent, now in the chemico-neural system).

A concomitant conclusion arises: viz., our Modern Science is historically conducted as a mimicry of a previously unknown biological process, that accounting for the survival of all Life of Earth to date. A strict adherence by any prospective scientist to the ‘Scientific Method’ derived herein becomes paramount in guiding him/her.

Near the paper’s end, we address several issues re mathematics in Science: 1. Is Mathematics Sufficient for Science? 2. Is Mathematics Necessary for Science? 3. How does the linguistic distinction between mathematics and computer-programming reveal which differing naturally occurring phenomena are better served by each? To model the dynamics presented in Nature by decision-making is not better served today by mathematics, but rather by algorithmic computer programming.

Furthermore, one should not infer that mathematics cannot be successfully used by a scientist; yet, we ask (and then conclude) what are the attributes of the language of mathematics which warrant its longstanding position in secondary and tertiary education as a requisite curricular entry.

Though the present paper considerably emends that in our paper presented to this Conference in 2018, it builds considerably thereon but serves as a replacement thereof.

0. INTRODUCTION

Science is that human activity devoted to the search for the very explanation for (i.e., for the truth about) any particular naturally occurring phenomenon.

The primary points of our paper are three in number:

(A) The depiction of simulation methodology (i.e., algorithmic model-building) as a well-organised and stepwise procedure reveals, when placed in its historical record/context, Modern Science’s ‘Method’;

(B) The Scientific Method, describable near-algorithmically as a six-stage model-building process, is one quite biological, this shown to be founded on the single survival process (first chemico-genetic, then via chemico-neural) for ensuring survival; and,

(C) The (unsubstantiated) correlation that Modern Science’s historical success relies on mathematical model-building (grammatically third-person), rather than on a scientist’s recognizing that his model may be just as successfully completed if presented in another chosen linguistic format: viz., in a natural language (first-person description) or in a computer-directed programming (algorithmic, second-person) language.

We examine the historical record of humanists and philosophers to arrive at the distinction between the ‘science’ of the ancient Greeks and our current Modern Science. Both humanist Sarton and historian Butterfield concluded that this ‘evolution’ in advancing human
knowledge (science) was an historically increasing appreciation of the value of natural philosophy, particularly when placed in contrast with the quite conjectural speculations applied by the early Greeks’ efforts (then acting as their earlier natural philosophy) to understand the observed world.

Cotes, a mathematician, had much earlier noted that the use of natural philosophy—in order to advance science—required that observation, plus needed reflexions thereon, must precede any scientist’s model (conclusion) describing some particular naturally occurring phenomenon [Preface, Newton’s quite mathematical PHILOSOPHIAE NATURALIS PRINCIPIA MATHEMATICA, London: 1713 ed.].

Yet, nowhere did Newton or Cotes (or others of the ‘Founding Fathers’ of the 17th-Century Royal Society of London) require that the use of mathematics be necessary in order to ensure that a proposed contribution to Modern Science be deemed successful [Today, we would note C. Darwin and, more recently, Nobel Laureate KZ Lorenz].

We therefore examine the quite recent literature of the philosophy of science [TEOREMA 28(2): 35-44, 2009], using its near-algorithmic description of the ‘Scientific Method’ in order to understand the historical role of mathematics in science. We expand on mathematician Quinn’s conclusion [AMS NOTICES, 59(I): 31, 2012] that ‘mathematics is not science’ in order to observe, further, that mathematics is neither necessary nor sufficient for science (or, for any scientific investigation). We then also examine the appropriateness (quite limited) of ‘Applied Mathematics’ to the Scientific Method.

We view Science as that human activity devoted to the search for the very explanation for (i.e., for the truth about) any particular naturally occurring phenomenon, this definition being quite in consonance with that of the Oxford English Dictionary, yet finding that the latter does indeed distinguish between ‘truth’ in Science and that of mathematics. Our approach throughout the paper is directed by this directive of truth-seeking, yet not that which also differs from that which attends religion.

We will, in the initial Section [I] following, relate the historical distinction between the science of the ancient Greeks and our ‘Modern Science’.

In a following Section [III], we extract from the current literature of the philosophy of science a description of the revelation, in TEOREMA (2009), of Modern Science’s Method (i.e., the Scientific Method). We there also relate how this ‘Method’, this model-building process mimes (incredibly precisely) biology’s model-building process accounting for the survival of all Life on Earth to date.

Yet, this conclusion regarding the near-algorithmic description of Modern Science’s ‘Method’ arose as a result of simulation methodology, the organised procedure by which one can programme an algorithmic model which will then be considered ‘believable’ (i.e., credible or, better, ‘scientific’). We therefore first proceed [Section II] to describe both this ‘simulation methodology’ and, furthermore, how statistical procedures can be implemented and employed in
order to build confidence in any algorithmic model whose author had selected to represent randomness (stochasticity) within.

Also, in the fourth Section [IV]: we move to understand what has quite recently arisen in the literature of mathematics: conclusions not only that (1) ‘mathematics is not science’ (Quinn, 2012), but also assert that (2) we need to assure that biology become more mathematical (Reed, 2015) in order to become ‘more scientific’. The first remains quite true, but the second virtually requires refutation.

In the fourth Section [IV], the resulting understanding of the limited role of mathematics—even that of ‘applied mathematics’ (as it is so often practiced)—in Science is developed as an implication of the earlier description here of the Scientific Method being Mankind’s guide to truth-seeking.

In Section V, we present a Summary of the paper’s content.

Then, in Section VI, we provide both Biographical Information and the ‘References’ for the paper.

I. MODERN SCIENCE AS NATURAL PHILOSOPHY, CORRECTED

In mid-20th Century began a literature describing the history of science, literature actually distinguishing the earlier science from our “Modern Science”, a term applied to that appearing after the 17th Century organisation of the British Royal Society, though already originating with the humanists of the 15th and 16th, even the 14th, Centuries.

The humanist/historian Sarton (1952; 1936) became one of those founders, he being one who appreciated that science has become what we now describe as:

Science: that human activity dedicated to the search for the very explanation for (i.e., for the truth about) any particular naturally occurring phenomenon.

In 1962, he had noted (pp. 162, 178, 242,…..) that the earliest science related in ancient Greece to a ‘natural philosophy’. He had earlier noted (Sarton, 1952: Preface, xi) quite explicitly:

“My main interest... is the love of truth, whether pleasant or not. Truth is self-sufficient, and there is nothing to which it can be subordinated without loss. When truth is made subservient to anything else, however great (say religion), it becomes impure and sordid.”

In a book entitled, Origins of Modern Science, 1300-1800, Herbert Butterfield (1957) noted that there is indeed a difference between the ‘natural philosophy’ of ancient Greece and that of our ‘modern era’:

“...that thing, which we call science, and which might rather be called natural philosophy, was first and foremost a series of ancient texts upon which one commentary after another would be compiled... “.
Butterfield’s allusion to the chronology of ancient texts’ commentary about naturally occurring phenomena essentially reports that an exposure to the need for finding ‘truths’ became more and more frequently a desire of humanists.

The recognition of this ‘newly established requirement’ of our “Modern Science” for truth-seeking had become apparent within the Royal Society (Densmore, 2004: p. xii): “[For Isaac Newton,] Everything was deduced, [he] using mathematical demonstrations, from observation-based conclusions about how our world [truly] works.”

Indeed, the mathematician Roger Cotes (1713), in the ‘Preface’ to the 1713 (2nd) Edition of Newton’s Mathematical Principles of Natural Philosophy, had noted that “[Isaac Newton], noting the condition for conducting natural philosophy: viz.,

‘From some select phenomena they [the natural philosophers now] deduce, by analysis, ... the more simple laws....’.”

Modern Science had then come to realize that the ‘philosophical conjectures’ of the earlier ‘natural philosophers’, though they had often sought to understand aspects of the world, would fall short because they had not realized the pertinence of founding their ‘speculative models’ directly on observations. We note that this has become the fundamental (a quite defining) feature characterising our Modern Science from other academic activities, though the search for truth(s) about the natural world is to remain paramount to all.

As we relate in the ‘concluding notes’ to Section III, the quite intimate connexion between our human extra-corporeal model-building (i.e., Science) and the single biological process accounting for survival, the pertinence of adhering assiduously to the Scientific Method becomes more apparent.

II. COMPUTERISED SIMULATION: ALGORITHMIC MODEL-BUILDING

The advent and increasingly widespread use in mid-20th Century of the electronic computer led to the recognition that the computers, being directed by a human’s written computer programme, could be used to mime decision-making activities. This capability provided(-s) to an author a simulation of an activity whose dynamics frequently were altered instantaneously and/or randomly in time (rather than continuously, as with most physical phenomena, such as he gravitational or the celestial/astronomic). One should note that any computer programme, being a set of algorithmic descriptions for processes and/or intrinsic decision-making therein, is actually a simulation model for some particular process under study.

Any of these simulation models are compiled as a collection of subroutines, each quite algorithmic. Since the algorithm was early on (Wheatley and Unwin, 1972) ‘defined’:

“An algorithm is a mathematical recipe, and from this its meaning has been extended to cover a recipe in any field of activity.”,
then one can quickly understand that any simulation model be—unlike the models which describe (though mathematically so) regular, continuous changes in the typical among the real-world and physical phenomena—of a second-person grammar. The reflective will note that mathematics, when used by a scientist, is actually of the third-person grammatically:

\[ F = mX\alpha, \text{ where } F \text{ is } 'this', m \text{ is } 'that', \text{ and } \alpha \text{ is } 'the second derivative of...'. \]

Despite the requirement that any computer programme must be, like that of any sequence of mathematical statements, impeccably and correctly logical, the algorithm’s second-person characteristics provides the model-builder (scientist) with an opportunity to represent not only dynamic but also random changes, features so common to decision-filled biological and/or social ‘systems’ (as opposed to strictly physical phenomena).

Indeed, mathematician Kemeny (see Dewan’s preface, 1968) has conjectured to Editor Dewan that “the advantages of computer programming languages over mathematical structures, may lie in their being algorithmic [p. 3].”

Thus have arisen two issues within ‘computer science’ regarding these algorithmic (‘simulation’) models:

A) How can one establish the [scientific] credibility of any such model, other than requiring that any skeptic ‘wade through’ (looking for errors, or ‘bugs’) the immense number of computer-programming instructions constituting a sizeable model? AND,

B) If one incorporates representations of randomness in any simulation model in an effort to reflect the often stochastic nature of the phenomenon under study (producing then a stochastic simulation model), then how can one statistically analyse credibly the results (outputs) of successive runs of (i.e., of \( n \) successive encounters with) the stochastic simulation model?: How can one generate the random phenomena such that the results (outputs) of \( n \) successive encounters with the model can be randomly and reliably subjected to the well-established techniques of statistical methodologies (Mihram, 1972a): e.g., regression, statistical tests of hypotheses?

We shall discuss each of these two issues: The first (Sub-section A) in a manner which recognizes the search for the credibility (of grammatically second-person models) as actually the same quest attending any scientist’s written/published model, whether that model had been authored grammatically in either third-person mathematics (à la Newton, e.g.) or first-person description (natural language: à la Darwin).

In the second (Sub-section B), we review how the requirements for using the well-established statistical methodologies (randomness, statistical independence) can be met by properly employing the resulting requirements, for any programmed and then computerized stochastic simulation model, attending the statistician’s ‘experimental unit’, the ‘block’, the ‘treatment(s)’, and including the ‘random blocking’ and its affiliated ‘variance component(s)’.
We provide herein two *Principia of Seeding* (the ‘Fundamental’ and then the ‘General’), which, when followed, assure that the responses from (i.e., the outputs of) the successive encounters with a dynamic and stochastic simulation model and within a statistical experimental design can be analysed properly via the established procedures of statistical methodologies.

A. The Credibility of an Algorithmic (Simulation) Model

The early literature of computer science dealt with the recognition, particularly at the Rand Corporation in the 1950s/1960s, of two separate requirements: viz., *the verification and the validation* of any computer programme (and, therefore, of any simulation model). Probably because early computer programmes were authored as a sequence of punched cards (whether a card contain a computer-directed instruction or an accompanying data-entry) to be ‘read’ by a computer: The means by which the rectitude of these punched cards was established were at the time via the use of a “verifier”, a machine which allowed a [second] individual to re-type each instruction/data-point so as to uncover thereby any erroneous typographical entries within the already typed/punched cards.

Hence, the term, ‘*verification*’, was one implying a more general notion: that the orthographic/grammatical rectitude of a simulation model’s underlying (defining) algorithmic programme, was being established. The term, ‘*validation*’, then arose as the recognition of the separate need, in order to believe the outputs (responses) from any computerised programme, for one to establish [given the input conditions used to define a particular encounter with (run of) the computerized model] that these responses be in accord with the results/measurements which would arise in the real-world phenomenon/‘system’ which the author(s) had claimed to be represented by their model, once programmed and then computerized.

Of course, these two separate criteria [for the truthfulness of any other human statement (model) of any aspect of reality] are identifiably the same as those required by Mankind from time unmemorable.

Historically, even humanists, being the predecessors of the modern-day scientists, recognize (Johnson, W., 1997 [1954]) these two separate aspects of “understanding (truth-gathering)”:

Johnson stresses questioning:

“What do you mean?” [the Scientific Method’s Stage III, below],

before asking:

“How do you know?” [the Scientific Method’s Stage IV, below].

The fact that this ‘double’ requirement dealing with credibility arises—not only with the historically recent arrival of algorithmic computer-programming but also, much earlier, with any claim/model expressed in a natural language—provides the basis for our discussion [see below] of the requirement for *establishing the scientific credibility for simulation models*.

Nonetheless, the simulation methodology itself became a describable process (Mihram, 1972c) of six, essentially sequential, stages; yet, this recognition of a need to include within that
methodology the two aspects (‘verification’, then ‘validation’) of any model’s credibility meant that two (or three) steps to represent correctives [typographical/grammatical; in accordance with Nature; and/or perhaps, understandably, overlooked grammatical errors], would need to be described in the “model-building process”:

0. Questions to be answered, Using the Model, when Completed/Programmed
I. Systemic Analysis [Observations/Data + Reflexions Thereon]
II. The Model [Programmed Algorithmic (Simulation) Model]
III. Verification ['De-bugging']
IV. Validation [Correspondence of Computerised Model’s Outputs with the Modelled]
V. Successful Model [Credible (Extendably) to New Investigations (Stage 0, anew)],

with the three correctives representable as feedback-loops:

\[ \text{III} \Rightarrow \text{II}: \text{ Logico-grammatical Correction}; \]
\[ \text{IV} \Rightarrow \text{I}: \text{ Re-examination of the Analysis of the Modelled (Natural) System}; \text{ and/or} \]
\[ \text{IV} \Rightarrow \text{II}: \text{ Any Earlier Overlooked Requirement for Precision in the Model}. \]

In the paper’s Section III (below), we relate this feedback-filled six-stage model-building process (for the construction of a programmed simulation model) to the literature of the history of science, revealing that this very same process actually describes isomorphically the progress of science (of Modern Science). Somewhat astonishing is the resulting recognition that the historically-based ‘Scientific Method’ is itself the same as this quite algorithmic description (above) for attaining credible simulation models, these models themselves of an algorithmic linguistic grammar.

B. Stochastic Simulation Models: Principles for Applying Statistical Methodologies

When an author recognizes, while attending to the programming of an algorithmic simulation model, that some aspects (or sub-phenomena) of the ‘system’ to be modeled have a degree of uncertainty (e.g., in its measurement), then one can incorporate these in the programming probabilistically. But, then, one further recognises the need for an ability to structure, or design, experiments with a series of encounters with (i.e., successive runs of) the programmed and stochastic computerized model so as to infer, probabilistically, the effects due to any set of changes in the experiment’s defining characteristics.

Hence, one needs to ensure that the conditions for the applicability of existing statistical analytic techniques can be applied to such simular experimentation via the employment of statistical experimental designs.

First, we make a distinction that between the model, having just been programmed, then that having been computerised, and then that having the specification of its input conditions (the latter better defined as the \textit{environmental conditions for the computerised model}) made. The statistician would recognise the computrised model, still awaiting the specification of each member of the (multivariable) vector, \( \mathbf{x} \), of its environmental conditions, as an \textit{experimental unit},
yet one among a barely finite number of such units, there being one for each assignable value of the stochastic model’s *juxtaposed random-number seed*, S.

We shall return below to the description of S, itself as a juxtaposed vector, but for the present we note that, once the model has been computerised, then a statistician would note that a *treatment* will have been applied to the computerised model (= the *experimental unit*) simply by the specification of all (each of) the elements of the experimental conditions, x. However, since one typically wishes to ‘experiment’ with only a specific few, a subset, x_T, of the elements of x, then the statistician would term the specification of the remaining experimental conditions, x_B, as providing a [statistician’s] *block* of experimental units, since they would meet the defining characteristic of a block: viz., any group of experimental units treated alike. (The vector, x, of experimental conditions becomes representable as the juxtaposition: x = (x_T | x_B).

Once the specification of the value for each element within the ‘block’ of the experimental units has been made, then one can specify the value for each of the remaining experimental conditions, one for each encounter in the experimental design, thereby defining a ‘treatment’ for each experimental unit in the block. Additionally, each treatment specification will need be accompanied by a value of the model’s seed (itself juxtaposed, as described below), selected randomly and without repetition from encounter to encounter: S = S_0, O = 1,2,...,n = number of experimental units in the (*similar*) experimental design.

By way of a review here: First, the (algorithmic and dynamic and stochastic) simulation model has been programmed; this model will then need be computerised; and, then, in order to provide any encounter with (run of) the model, specification of two (sets of) input conditions will need to be specified: x = x_0, and (randomly selected) S = S_0. For this single specified encounter with the model, one will obtain the model’s output (*its similar response*). This similar response is the equivalent of a *randomly drawn sample* of size 1 from the implicit statistical distribution for the resulting encounter’s output, a random variable: Y = Y(S; x_0).

One should note that the computerised model, before having specified its environmental condition, x_0, becomes the statistician’s *experimental unit*, but itself one of the barely finite number of experimental units (one for each randomly assignable seed, S). Hence, if one seeks to learn of the underlying properties (e.g., mean, variance) of the probability distribution for the implicit random variable, Y = Y(S; x_0), then one can note that, for a fixed environmental condition, x_0, each randomly specified seed value, S_0, provides one random draw from this distribution; yet, unless this seed-value continually and randomly differs throughout the sample of n similar responses, the very same output, Y, would be permitted/instructed to result.

Hence, the need to adhere to the [Fundamental] Principium of Seeding:

*The sequence of seeds, one for each experimental unit’s specification, x = x_0, within the n experimental units constituting the similar experiment, must be randomly and without repetition selected.*
Adherence to this Fundamental Principium throughout the repetitions will ensure that one meets the statistician’s requirement for both experimental error and will result in a random sample of the n simular responses.

When of course one next wishes to meet the statistician’s requirements for properly designing an experiment with the programmed and now computerized, stochastic simulation model, then the requirement for principled selection of each of the n (here separate) environmental conditions, \[ x = x_1, x = x_2, \ldots, x = x_n \], remains. The resulting requirement here is for one to continue to adhere to the (now General) Principium of Seeding, whose necessity will become quite apparent once one has recognized the more general categorization of seeds for stochastic simulation models.

Beforehand, however, is an often overlooked advantage of using properly the mixed congruential pseudo-random number generator, a mathematical formula which, used recursively, then generates (once its randomly selected and numerical seed-value, S, has been specified) a sporadic sequence of integers, each integer appearing once and only once until eventually the seed-value re-appears. The generator’s proper specification (by each of two properly chosen integers, a and c) results in a random ‘shuffling’ of a deck of numbered cards, the random specification of the seed-value then ‘cutting’ randomly this shuffled deck, therefore permitting the provision of the equivalent of the statistician’s ‘random sample, without replacement: one of size n’. Here, one’s adherence to the Fundamental Principium of Seeding becomes rather obvious, providing a ‘random sample’ of integers for any randomly selected seed-value.

The recursive mathematical formula for the mixed congruential \( = \text{MCG} \) pseudo-random number generator is ideally specified (for the computer whose numerical ‘word size’ is \( b \) binary bits) by accepting, as the maximum value of integer to be generated: \( m = (2^b - 1) \), thereby essentially providing typically over a billion separately ‘integer-labeled’ cards for shuffling. Even the very ‘random’ look of any sequence of the successive and sporadic integers generated may leave many persons uncomfortable about accepting their ‘statistical independence’, particularly since the sequence is so mathematically specified, each number arising from the value of its predecessor in the sequence.

The MCG, however, provides both an opportunity for a user first to shuffle the numbered deck (via a separate and independent selection of both \( a \) and \( c \) and then to randomly ‘cut’ this randomly shuffled deck by (also independently and randomly) selecting the seed-value. Using the advantage afforded by the computer’s word size, one need restrict the selection of only the random assignment of one [viz., \( a \)] of these three ‘parameters’, its value to be restricted to being one among this set of ‘every other odd integer: 1, 5, 9, 13, …’). Nonetheless, the resulting sequence will contain every odd and every even integer, 0, 1, 2, …, \( m = (2^b - 1) \), once and only once until the properly initiated MCG generates its originating seed-value, S.

Unfortunately, much of the literature about the MCG implies that one needs to ‘test statistically’ any specified generator in order to determine if this particularly chosen/specified generator is providing a ‘random’ sequence. One should reflect on the very nature (above described) of the MCG: making certain that one, before each simular experiment is to be defined
for the computerized simulation model, has made statistically independent assignments of each of the MCG’s ‘shuffling’ and its ‘cutting’ parameters.

One might still point out to any continuing skeptic—of the randomness resulting from this proper specification of the MCG’s three parameters—an analogy: the acceptability of the randomness arising when bridge-players shuffle-and-cut their full deck of playing cards: Even if such a random preliminary shuffle-and-cut would happen to result in the very sequence appearing in any ‘newly purchased’ deck: \[\text{♣}A,2,\ldots,K; \text{♦}A,2,\ldots,K; \text{♥}A,2,\ldots,K; \text{♠}A,2,\ldots,K\], that dealing of the cards would be acceptable to the players (as just another among thousands of shuffles which provide a rather un-challenging ‘bidding’ result): Indeed, such a ‘shuffle’ could randomly arise for the MCG \text{I}F \text{indeed one day the properly and independently selected values of } a \text{ and } c \text{ should both happen to be the integer “1”}.

The use of the mixed congruential pseudo-random number generator in any similar experimentation is therefore quite acceptable, yielding randomness and experimental error without concern, provided that one has adhered to the Fundamental Principium of Seeding.

One should note that the very frequent ‘experimenter’ with a stochastic, dynamic, and algorithmic simulation model might be wisely advised to have available (and ‘on-line”) ready access to his own separate MCG for the purpose of having a source of ‘random’ assignments for his/her next similar experiment’s parameters’ specifications (like the frequent Monte-Carlo analyst or statistical sampler).

Thus behaving, such an individual has a ready source of seedings (and, thus, of random numbers) for each occasion. An approach for these ‘frequent users’ might well be their employing (monthly?, annually?) a random re-assignment of the MCG’s parameters: Perhaps even the designers of new computer operating systems might consider such an approach, even with periodic updates of the MCG’s parameter specifications, so as to provide for even the occasional user, an assurance of a ready source of the (pseudo-random) numbers, these being the equivalent of the “sampling without replacement” deemed quite ‘random’ by most experienced statisticians.

Nonetheless, two further matters regarding the topic, simular experimentation, remain for clarification: the understanding of how other categories of stochasticity (other than that provided via the MCG’s) can be recognized as having their own initiating seed-values; and, the resulting need for a more ‘General’ Principium of Seeding for properly conducting the resulting simular experimentation.

An investigator, while conducting his observation(s) of the system (phenomenon) to be modeled, may note that some randomness can be ‘captured’ in the observational Stage I, and some might not require the use of a pseudo-random number generator for their ‘generation’. One can categorise these:

1. Data collected during (or before) the observational stage can be represented by their own cumulative probability distribution, in which case random ‘drawings’ could be made therefrom by using a/the model’s MCG;
2. Data collected during (or before) the observational stage can be ‘fitted’ statistically to a pertinent mathematical probability distribution (e.g., the normal or Gamma distributions), in which case (again) random ‘drawings’ could be made therefrom by using a/the model’s MCG;

3. A pre-recorded time series (e.g., a sequence of hourly recordings of temperature and wind speeds and directions, at airports worldwide, could provide, a set of series from which a randomly selected series could then provide for the model this pertinent (stochastic) data;

4. Data collected as a time series during or before the phenomenon’s observational stage, could be statistically ‘fitted’ to a mathematical time series (e.g., a Poisson process), though this series would likely require its own proper ‘random’ initiation at the start of each simular encounter within the simular experiment.

Hence, a (usually quite sizeable) stochastic simulation model may require that each of the encounters defined by a simular experimental design may need to have not just one, but rather several, seeds, one or more from each, e.g., of the categories here noted. If so, one might rather consider the resulting set of a model’s k seeds, if juxtaposed, as a single, univariate seed:

\[ S = (S_1 | S_2 | \ldots | S_k) \]

Nonetheless, the principle regarding the assignment of the values for the successive seeds in a designed simular experiment remains the same: For this juxtaposed seed-value, its selection should be randomly, statistically independent, and without repetition selected from the set of its assignable seed-values.

However, there does remain one further technique which a statistician might choose to employ in a simular experiment. One might deem valuable the ability to conduct experimentation which would allow one to use throughout the designed experiment a particular (fixed, though randomly selected beforehand) recorded time series. For example, an ability to examine the effect of, say, random springtime weather (vs. the general, or other, calendar periods), so that this particular ‘semi-seed’ would need be randomly selected (from the available recordings’ own sequentially assigned ‘seed-values’, yet then used repeatedly throughout the designed simular experiment.

To do so means to a statistician that one has created a “random block” of simular experimental units. The resulting statistical analysis now can account for this variation, but the procedure for the analysis is that for “variance components”.

As a result, one needs to adhere to the General Principium for Seeding:

*The seed-values for specifying the successive encounters in a designed simular experiment must provide that each (save perhaps one, if needed to permit use of the statistician’s ‘variance components’) be statistically independently, uniformly, and randomly selected from its set of assignable seed-values for each encounter within the experiment.*

C. *Algorithmic Programming: Linguistic Format for Successfully Capturing Biological Dynamics*
Before having recognized the conclusions reached above, we ask: Why would it matter that computer programming is actually not mathematics, despite its requirement for a logical rectitude quite equivalent to that required by the language of mathematics?

Clouding this answer, virtually concurrently with the advent, mid-20th-Century, of the digital computer, was the capability then (still: now) to employ long-established, though frequently computationally inordinate, mathematics, a result which was deemed as one that might prove useful in modeling the dynamics of phenomena via time-dependent difference/differential equations. Because these dynamical equations are so successful in describing physical, yet non-biological, phenomena, one could quite naturally hope to “apply” successfully these time-dependent equations in order to “model” the dynamics of biological systems as well.

Many have failed to appreciate that the difference—distinctively separating computer programming from the language of mathematics—provides the ideal understanding as to which of these two disciplines, oft-called, yet mis-labelled, ‘mathematical sciences’, is better suited to capture the dynamics of any real-world system containing one or more biological components.

This distinctive difference lies in the algorithmic nature of computer programming, yet not to be confused with the occasional use in mathematical theorem-proving (viz., of the ‘algorithmic proof’). Mathematician JG Kemeny (1968) had noted—at an early conference on the (computer-based) modeling of large-scale systems—that such computer-based models would prove better than comparable mathematical modeling. Editor Dewan’s post-conference interview of Kemeny noted that Kemeny’s conjecture was founded on a belief that the “algorithmic nature” of computer programming would likely provide the advantage.

As noted above, Wheatley and Unwin (1972) had noted that the term, ‘algorithm’, refers not only to a ‘mathematical recipe’, but also to any recipe. We (1985/1984) have noted a quite grammatical distinction here:

Mathematics, when used by a scientist, is in the third-person:

“\[ F = mX \alpha, \]

wherein \( F \) is force, \( m \) is mass, and \( \alpha \) is the second derivative of position with respect to time.”

Yet, statements in a computer-programming language are in the second-person:

“\[ \text{IF IB a,b,c} \]

a conditional Go-to instruction, very precise, but not one within the language of mathematics.

Similarly, the sentence/statement, “\( X = X + DX \)”: as an (algorithmic) computer-programming statement, directs the computer to:

“Find the current value of the respective memory locations which you (computer) have defined as \( X \) and \( DX \), then find their arithmetic sum, then assign to the location \( X \) the resulting value of this sum”;

though a mathematician would replace the sentence with its linguistic equivalent in mathematics:

“No matter the value of \( X \), \( DX = 0 \)”
The pertinence of this distinction has been made quite well within the literature of biology. In his book, *LIVING SYSTEMS*, JG Miller (1972) found that there are seven ‘levels’ of living/biological systems, from the cell, organ, organism, to… society, yet at/within any level there are 17 critical sub-systems, the central one of which is the ‘decider’, which receives inputs from all the others and transmits instructions appropriately thereto.

Thus, at the center—of the attention of one attempting to model the dynamics of any living system—should be the decider (one very typically not monotonously regular), whose representation is rather ideally captured algorithmically (as opposed to mathematically).

One needs to distinguish further a common computer-user’s error: viz., *any* computer programme, including one pre-packaged, provides a deduced algorithmic model. However, many of the mathematically-based routines give the impression that they provide a truly algorithmic model of the dynamics attending the numerical ‘solution’ of a (set of) time-dependent differential equation(s). Yet, they are actually numerical computational schemes appropriate for the (numeric) solution, rather than being a set of algorithms specifically authored so as to represent the dynamics learned from having just observed a particular naturally occurring (biological) phenomenon. The mathematical computation routines provide too readily (for a well-meaning biologist) an impression that he/she is behaving as a scientist, yet without having met the ‘maxim’ of Modern Science: that one first observes Nature, then reflects thereon, *before* beginning Stage II (the Artwork, the Model).

This behavior essentially copies that of many unwary users of ‘statistical regression packages’: Many know that, if anyone had \( n \) data points \([(x_1,y_1), (x_2,y_2), \ldots (x_n,y_n)]\), then one can ‘fit’ a curve/line (e.g., \( y = a + bx \)) amidst the points: Being such a mathematical result, one dealing indeed with measurable/recorded real-world observations, it becomes facile to assume that one, so behaving, must have produced a ‘scientific model’. Yet, one need realize that one can well here have actually decided on the model (this modeling format/language) *before* making the observations (before recording the data).

Students of biology do need to be aware that the ‘mathematisation’ of their presentations will not necessarily assure that any resulting conclusion (model) will be scientific (OR: ‘be more scientific’). Mathematics should always be considered merely as an *alternative* linguistic format for making their presentation (model). Biologists would do well both to read, e.g., Nobel Laureate KZ Lorenz’s paper [above] and to learn a bit of computer programming.

D. A Note Aside: A Preparatory Note on Seeding the Model Encounters Required by Science’s Perscrutation and Confirmation Tests

The literature of simulation methodology notes that the methodologist be prepared to conduct, once the algorithmic model has been programmed and then computerised, two measures in order to establish the model’s credibility: first, its thorough scrutiny (i.e., debugging); then, the examination/comparison of the exercised model’s outputs [*responses*] with any natural system which the model should be able to mime [presented as Stages III and IV in the Figure 1 below].
This/These need be done even if the model itself includes stochastic elements, meaning that model responses themselves will be requiring subsequently statistical methodology(-ies).

**One-sample statistical tests for a stochastic model’s scrutiny (perscrutation)**

Typically, a model-builder will recognize that the specification of some particular specified environmental condition, \( x = x_0 \), when accompanied with a randomly selected seed, one for each of the \( n \) successive encounters with (‘runs of’) model, will (if having been properly programmed) provide a random sample of some very particular random variable. One need only undertake these \( n \) so-exercised encounters of the model, then perform the appropriate one-sample statistical computation for the \( n \) responses to determine/infer that the stochastic model’s algorithms have been (probabilistically) correctly programmed. One repeats such simulations until sufficient confidence is attained in the model’s algorithms.

**Two-sample statistical tests for a stochastic model’s responses’ confirmation with Nature**

If an (already successfully scrutinised) stochastic model is to be deemed ‘scientifically credible’ (See next Section, III), then its random responses will need be statistically compatible with (physical) observations made on any real-world system that the model’s environmental condition, \( x = x_0 \), would be expected to represent. Hence, the stochastic model is to be initiated \( n \) times with this particular condition, and each encounter accompanied with a seed-value selected in accordance with the Principium of Seeding (above), the \( n \) responses duly recorded; then, a separate random sample of \( m \) observations from the modeled (i.e., the real-world phenomenon) separately recorded [\( m \) need not equal \( n \)], followed by the statistician’s procedure for a two-sample test of the distributional coherence of the model’s responses with those of the modeled system.

By these one-sample and then two-sample statistical tests, one can obtain a (probabilistic) confidence in the credibility of a dynamic, even though stochastic, model.

**III. MODERN SCIENCE’S METHOD**

Before continuing to this conclusion [Section IV] on the somewhat limited role of mathematics (i.e., more limited than has been typically promulgated) in Science, we first here undergo the development of the ‘Scientific Method’, by which we mean the ‘Method’ by which historically our Modern Science has proved so successful in achieving its goal: viz., to provide truths about Nature, statements which provide the very explanation for any particular naturally occurring phenomenon.

In this Section III, we first describe (Sub-section A) the “Scientific Method”, derived from the literature of both science and the history and philosophy of science. The resulting method, of six stages and three feedback loops, is rather astonishingly captured, quite isomorphically so, by the model-building process as that of simulation methodology, introduced
above [Section II.A]. The historically-conducted Scientific Method itself is thus actually a near-algorithmic process.

In the present Sub-section (B), below, we will move to a discussion of the three linguistic options, available to any scientist, for providing his/her ‘model’ of the naturally-occurring phenomenon which he/she (and/or others) have reached by reflecting on the observation(s): a natural language (first-person description); mathematics (third-person formalisation); or algorithmic, computer-programming (second-person). We devote therein (B) considerable material re mathematics, a language often considered to be the “queen” of science. We then place mathematics in a more proper perspective: itself not science; not necessary for science; and, not sufficient for science.

A. The Near-algorithmic Description of Modern Science’s Method

Stage 0. At any point in time, Mankind has an accumulation of our “Human Knowledge” (Mihram, D. and G. A. Mihram, 1974 [1971]: the total collection of all libraries and museums (including cave-wall drawings and petroglyphs) worldwide.

Stage I (Observations + Mental Reflexion Thereon). One of us, intrigued by some naturally occurring (i.e., observable) phenomenon, seeks to understand it (its behavior or change). One can improve one’s memory of the ensuing investigation (observation) by recording data, if needed. The investigation will typically arrive at an understanding [The “Aha!” experience] and probably wish not to retain, like a hermit, this conclusion to himself/herself.

One might add that the “insight”, the Aha! Experience, arisen as a result of the investigator making an analogy with another matter either familiar to him (or ‘familiar’ because this other material exists in a library/museum). This result is a quite natural one [cf. Mihram, D. and Mihram, G. A., 1974], a conclusion reached late in its 1971 manuscript. This conclusion also appeared shortly thereafter in Konrad Lorenz’s Nobel Prize Acceptance Address (1973). Lorenz then (1974) wrote: “I have read with interest your paper [Mihram, D. and Mihram, G. A., 1974 (1971)]. I have added to my thoughts that everything we know is founded on an analogy.”

The epistemological foundation for our insights [‘Aha!’] is therefore analogy-making, itself an ‘everyday’ experience for each of us, rewarded eventually whenever a particular analogy is proven later to be a new contribution to recorded Human Knowledge.

Stage II (Artwork). The non-hermitic among us will need to relate his discovery, via a selected artwork format, to others (to the nation, e.g.). Today, the vast majority of these are authored (written) as a “model”, though presented as a manuscript to a pertinent publication’s editor.

Stage III (Perscrutation). The model is presented first to an editor for his publication’s review. Here, the first of two credibility tests is considered: viz., the logico-grammatical scrutiny. Done thoroughly, we refer to this Stage as Model Perscrutation. If any logico-grammatical errors (including, e.g., any false implication that the model is a new contribution to Human Knowledge) are found, then the manuscript is returned (III→II) to the author for correction (and/or withdrawal, if deemed too erroneous). Nonetheless, the purpose of Perscrutation is to eliminate logical and/or grammatical (and/or any mathematical) errors in the manuscript/model.
Stage IV (Validation). Science, using Mankind’s primary desire for locating any truth re Nature, does require a further (a second) procedure for establishing a (now published) model: viz., any impeccably logical conclusion which would need to exist (perhaps even elsewhere in Nature), if his published model is indeed true, must be found also to be so. Else the ‘model’ needs to be subjected to further examination: Either (IV$\uparrow$I), in which feedback loop the original author (and or colleagues elsewhere) seek to re-examine the particular naturally-occurring phenomenon in order to then ‘re-author’ the model with corrections; Or, (IV$\uparrow$II), in which it is revealed that, earlier (in Stage II), the erroneous presentation of an aspect of the published model was not (even if inadvertently) noticed.

Stage V (Knowledge Augmentation). The resulting (corrected, if and as needed) published model becomes an extension of Human Knowledge, available now (V$\uparrow$0) in the new expanded ‘pool’ of humanity’s knowledge.

Two notes aside: One can view the steps of this model-building process in (Grosser, 1962): The discovery of Neptune arose in the effort to understand why Newton’s 17th/18th century gravitational model was, in the 19th century, no longer predicting (providing) the location of Uranus. Grosser’s quite concise book reveals that Newtonian gravitation remains a truth among those provided historically by the Scientific Method.

We present this result (the Method of Modern Science = the Scientific Method), depicted as the rightmost diagram of Figure 1, displaying therein the three (four) feedback loops connecting the six Stages “of the model-building ‘Process” [cf. Mihram, 1972b).

Similarly, the historically early conflict of Darwin’s scientific conclusion (1859) regarding evolution required such ‘Confirmatory’ testing, the result being most profoundly established by the ‘discovery’ of the sexual transmission of ‘genetic models’ to create a ‘next generation’ for the species (i.e., the discipline of genetics serves as the utmost scientific confirmation of Darwin’s published model).

Described here quite algorithmically, the Scientific Method (that of our Modern Science) displays therein the three (four) feedback loops connecting the six Stages (0 through V), the six stages being essentially conducted sequentially:

- Extant Knowledge {Stage 0}
- Observation + Reflexion $\Rightarrow$ Insight {Stage I}
- Artwork (The Model) {Stage II}
- Perscrutation {Stage III}
- Nature’s Confirmation {Stage IV}; and
- Knowledge Augmentation {Stage V},

though these stages are shown historically to be feedback-laden, the Method incorporating thereby:

{III$\uparrow$II} Logico-grammatical correction;
Re-examination of the originating observations;
yet also Earlier overlooked linguistic precision.

**Figure 1: Model-Building**

THREE BIOLOGICAL MODEL-BUILDING WORLDS ARE BUT ONE:

1. Chemico-genetic
   - GENE POOL
   - SYSTEMIC ANALYSIS (INSIGHT)
   - INTERCOURSE (GAMETE)
   - CHROMOSOMIC LOGICAL COMPARISON
   - NATURES AFFIRMATION
   - KNOWLEDGE AUGMENTATION

2. Chemico-neural
   - EXISTENT KNOWLEDGE
   - ASSOCIATIVE REFLECTION
   - HYPOTHEtical CONJUGATURE
   - LOGICAL COMPARISON
   - EMPIRICAL COLLABORATION
   - EXTENDED KNOWLEDGE

3. Extra-corporal (Man-made)
   - EXISTENT KNOWLEDGE
   - OBSERVATION + REFLEXION
   - ARTWORK (THE MODEL)
   - PERSCUTATION
   - NATURES CONFIRMATION
   - KNOWLEDGE AUGMENTATION

Hence, the six-stage model-building process for simulation methodology (Mihram, 1972a) serves as the model for the Scientific Method itself: This, now established as a six-stage model-building process, one having, isomorphically, the same three corrective feedback-loops as exists in simulation methodology [cf. Section II-A, above].

Two concluding notes to this Section III:

   The six-stage model-building process describes our (Mankind’s) near-algorithmic, yet ever-progressive [Sarton had added that the ‘progress’ of mankind is a function of the development of science, the only human process which is really a cumulative, also (like mathematics, the most international).] advance in Human Knowledge, but also reveals its quite biological foundation(s):

   *First here*: the genetic (chemico-genetic) model-building process by which any species, plant or animal, ‘conducts’ (though non-cognitively so) its survival (isomorphically stage-by-stage and feedback-loop—by—feedback-loop to the diagrammatic Scientific Method);
Second here: the genetic model-building process evolved (in the ‘higher’ species of animals: those whose members possess a neural capacity with the capability of memory-and-recall) to one conducted in a chemico-neural model-building process, itself isomorphically ‘miming’ the earlier chemico-genetic process for survival, yet ‘conducted’ so as to enhance the survival of any of its members to achieve its age of puberty.

This pair of results serves to provide a striking ‘Confirmation’ of J.Z. Young’s 1964 conclusion about the single feature distinguishing (i.e., characterizing) Mankind among the species.

2. A ‘Conclusion Aside’ here rather naturally follows: viz.,

If there be any second ‘scientific method’, it, too, should be expected to exhibit that it is one also accountable for the survival of all Life on Earth to date.

The reader can find these conclusions reached in the Spanish journal for the philosophy of science: TEOREMA 28/2: 35-44, 2009.

B. The Scientist’s Three Linguistic Options

The present-day scientist should be quite cognitively aware of the three linguistic alternatives, and to choose wisely among these:

- first-person description (natural language)
- second-person algorithms (programming languages)
- third-person formalisations (language of mathematics).

One’s linguistic decision could well await the conclusion of Stage I (the Aha!) of the near-algorithmic Model-building Process of Modern Science, as described in the preceding Section, but the diagrammatic procedure (Figure 1) will, whatever decision is here made, serve as a quite historically-established guide.

Nonetheless, a scientist should be aware that his written model/manuscript could be authored in one of three linguistic formats. For example, Darwin (typical of biological and social scientists to date) used, in first-person grammar, a natural language (e.g., English). Yet, Newton (typical of physics, astronomy, or chemistry scientists) used the more demanding language of mathematics in third-person grammar. Yet, today, we have, especially valuable to biological/social scientists as a (another quite demanding) language: second-person (algorithmic) computer programming.

IV. MATHEMATICS ≠ SCIENCE

Under this Section’s title, we find that, of the three linguistic choices of a prospective scientist for expressing his/her model, mathematics is not such a required or necessarily desired or preferred choice:

- mathematics is (itself) not science (not a science);
- mathematics is not necessary for science;
Mathematics is not sufficient for science; and,

Applied mathematics can be useful to scientific progress, but its ‘foundation’ as qualifying to be scientific—just because it mimes the theorem-proving procedure of [pure] mathematics—is incorrect.

We are reminded that Cotes, himself a mathematician, noted that the use of natural philosophy—in order to advance science—required that observation, plus needed reflexions thereon, must precede any scientist’s model (conclusion) describing the particular naturally occurring phenomenon at hand [Preface, Newton’s quite mathematical PHILOSOPHIAE NATURALIS PRINCIPIA MATHEMATICA, London: 1713 ed.].

Yet, nowhere did Newton or Cotes (or other of Modern Science’s ‘Founding Fathers’ of the 17th-Century Royal Society of London) require that mathematics be necessary in order to ensure that a proposed contribution to Modern Science be deemed successful [to wit: C. Darwin (1859) and, more recently, Nobel Laureate KZ Lorenz (1973b)].

Yet, the recognition of this ‘newly established requirement’ (of our “Modern Science”) supporting truth-seeking had become apparent within the Royal Society (Densmore, 2004: p. xii):

“[For Isaac Newton,] Everything was deduced, [he] using mathematical demonstrations, from observation-based conclusions about how our world [truly] works.”

Indeed, the mathematician Roger Cotes (1713), in the ‘Preface’ to the 1713 (2nd) Edition of Newton’s Mathematical Principles of Natural Philosophy, had there noted that [Isaac Newton], had demonstrated the condition for successfully conducting natural philosophy: viz.,

‘From some select phenomena they [the natural philosophers now] deduce, by analysis, … the more simple laws…’

Modern Science thus came to realize that the ‘philosophical conjectures’ of the earlier ‘natural philosophers’, though they had often sought to understand aspects of the world, fell short because they had not realized the pertinence of founding their ‘speculative models’ on observations. We note that this has become the fundamental (a quite defining) feature distinguishing our Modern Science from other academic activities, though the search for truth(s) about the natural world is to remain paramount to all.

In this historical perspective, the mathematician Quinn (2012) noted that mathematics is not science; their validity criteria differ. Whereas a scientific publication, even one written in mathematical expressions, requires an examination external to the model (i.e., rather, to Nature), a mathematical treatise/model’s is internal.

Then, mathematics is not necessary for science: to wit, the description by Darwin (1859), plus the Nobel Laureate Konrad Lorenz’s conclusion (1973b) that “I have [He has] never published a paper with a graph in it.” Biologists and social scientists should pay heed to his
Furthermore, mathematics is not sufficient for science: a conclusion by More (1915), Dean of the College of Arts & Sciences at the University of Cincinnati:

“mathematics is [treated as if it is] the only true science, yet…mathematics is not a science because it deals with abstractions and ignores concrete phenomena.” (p. 151)

One should note that the Dean, More, was acknowledging [cf. Mihram, 2015] the continually recognized feature of mathematics: in academia, virtually the only discipline which provides statements which are irrefutably true. Yet, the Dean, More, appreciated that mathematics does not meet the requirement of science: viz., to be concerned about naturally occurring phenomena, rather than with those of strictly human mental construct (lines, circles, numbers, triangles, …).

Then, the current fascination for achieving personally a mathematical ‘status’ among biological/social scientists is likely prompted by the praise accorded (even in secondary education) to mathematics (e.g., Euclidean geometry, wherein one learns that he/she can arrive at conclusions which are irrefutably established truths.

The applied mathematician, so conditioned mentally, frequently and willingly attempts to employ the mathematician’s theorem-proving steps:

Postulates
Deductions
Conclusion ['Q.E.D.'].

Indeed, by then including, as one postulate, an already well-established scientific model (e.g., Newton’s gravitational model), and subsequently adding others dealing with, say, specific sports equipment and/or forces and/or velocities, then one “derives” a conclusion (e.g., perhaps, the advantage of a specific tennis player’s stroke). Such an individual then presumes that his own conclusion here is scientific; yet, this is not a truly new advance in scientific knowledge (one to have been founded on a new and direct observation of Nature), but instead will simply serve to provide another confirmation test for the original (here, the earlier postulated) scientific model of Newton.

Actually, the six-stage model-building process of the Scientific Method is not a mimicry of the three-step mathematician’s proof. Any scientific model must, of course, satisfy any ‘Confirmation’ test, so that the procedure of the applied mathematician (here described) does serve Science a bit, but it is not truly yielding new Knowledge: rather, only a (now more newly) confirmed Knowledge (cf. Figure 1, rightmost).

Nonetheless, mathematics, as for any of the natural languages, is a linguistic option for a scientist to prepare his model. However, biological and social scientists should consider second-person computer-programming, yet avoiding the temptation to employ already programmed
computational routines which, being quite mathematically-based, are actually just numerical evaluations for a series of time-dependent mathematical expressions.

The present-day scientist should be quite cognitively aware of the three linguistic alternatives, and to choose wisely among these:

- first-person description (natural language)
- second-person algorithms (programming languages)
- third-person formalisations (language of mathematics).

One’s decision here should well await the conclusion of Stage I (the Aha!) of the near-algorithmic Model-building Process of Modern Science, but the diagrammatic procedure (Figure 1) will, whatever decision is here made, serve as a historically-established guide.

We ask further: Does an Applied Mathematicians, by Mimicking Mathematical Theorem-proving, qualify as a Modern Scientist, or Not?

The Scientific Method (outlined above) incorporates a result that is required by our Modern Science, one that is the conclusion of mathematician R. Cotes (1713) affront Newton’s quite mathematical treatise (1677): viz., that the initial stage {I} of any scientific investigation must be both observation of a naturally occurring phenomenon and mental reflexion thereon, this stage being recognized as a necessary correction to the ancient (Greek) “natural philosophy”, wherein speculative conjectures, oft not originating in Nature, were permitted. This earlier ‘mistake’, we note below, is even today incorporated rather unwittingly by many applied mathematicians seeking to obtain results qualifying as science.

Many, many persons, including Applied Mathematicians, believe that the Scientific Method must be (and/or believe that it is) merely a direct result of applying, as noted above, mathematical theorem-proving, and, thereby, providing truths (the goal of Science) which, yet presumably truths which will ‘therefore’ be as irrefutable as those of Euclid’s *Elements*. Yet, it has become a commonly held belief that, to behave as a mathematician—even when dealing with explanatory conjectures regarding any particular naturally occurring phenomenon—could hardly fail to be ‘scientific’ and, thereby, arriving elsewhere than at the truth regarding the phenomenon at hand.

Yet, our mathematical theorem-proving procedure consists of only three steps:

i. Axiom(s)/Postulate(s);
ii. Logical Deductions(s);
iii. Conclusion [ = ‘Q.E.D.’ ],

though many an Applied Mathematician adds an additional step, expecting as the resulting goal to become as a result a ‘scientist’:

iv. Comparison (of Conclusion) with Nature,
particularly feeling quite confident of attaining the goal because of having, as a ‘Postulate’, an earlier, quite well-established scientific conclusion (model).

Two points here: first, this ‘expanded’, four-step, theorem-proving procedure fails to be in accord with the Scientific Method’s six-stage model-building process because the theorem-proving has been conducted as if by one of the ancient [Greek] natural philosophers, and, therefore, fails to have incorporated Modern Science’s requirement that any scientific investigation—in order to qualify as having concluded with a new truth about Nature—must be initiated [Stage I] with observations of Nature, and not with a mathematical postulate/axiom.

Though, secondly, this application of this extended (four-step) theorem-proving procedure can still, in a rather unexpected way, fall within (i.e., contribute to) the Scientific Method (cf. Figure 1, above) by serving as if the initiating ‘Postulate’ [Stage I] were an already well-established scientific conclusion (model), yet one only seeking its own further Confirmatory Testing [its Stage IV].

One could note here the recent activity in the ‘Physics-of-Sports’ literature, wherein frequently typically, Newton’s Law(s) are ‘taken’ as one Postulate, then incorporating others (weight, speed of ball, club, racquet, …), obtaining then by logical deduction a measurable result which can then actually serve as a further Confirmatory Test for the initiating ‘Postulate’ (itself that earlier, already well-established, scientific model): Of course, should this implicit ‘Confirmatory Test’ fail, Science would itself be served with a note that perhaps the initiating observation(s) leading to the earlier scientific conclusion must now be re-examined.

We co-authored (Mihram, Danielle [w/G. Arthur Mihram] (2017) for and presented to the AAAS’s Annual Meeting (Boston) the following abstract:

**Background:** We examine the acceptability of certain academic disciplines as both art and science. **Methods:** We review the literature of academia, science, and history to do so. The dictionary-directed definition of ‘Science’ is that human activity devoted to the search for the very explanation for (i.e., for the truth about) any particular naturally occurring phenomenon. The society devoted to the teaching of mathematics [the Mathematical Association of America (MAA)], founded 1915/6 in Ohio, is currently celebrating its centenary. In that 20th-Century year, LT More (University of Cincinnati’s Dean of Science and Arts), on limitations of science, implied the uniqueness of mathematics among the disciplines (viz., our own): Mathematicians provide statements which are irrefutably true, an attribute sought as a hope for any practicing scientist. He also then noted that mathematics is not science, since it deals only with abstractions (points, numbers, circles, e.g.), not real-world phenomena. **Results:** British 19th-Century University “Calendars” list mathematics as a language, an art, not a science. Indeed, as late as the 1950s, an undergraduate degree in Mathematics was a “Bachelor of Arts”; but, beginning in the mid-1950s, probably due to the Russian Sputnik missile, a “Bachelor of Science” degree became an alternative for the graduating student. Nonetheless, our AAAS had chosen to list as the first Section among scientific disciplines: Mathematics (Section A). More had thus also concluded that mathematics is itself not sufficient for Science. Historians of Science can also observe
that \textit{mathematics is not necessary for Science} [to wit: Darwin (1865); plus, Nobel
Laureate KZ Lorenz’s 1973 note on the fashionable fallacy of dispensing with description
(in favour of mathematics); and, also sociobiologist E. O. Wilson’s 2013 comments both
that pioneers in science only rarely make discoveries by extracting ideas from pure
mathematics and, cogently, that superior mathematical ability is similar to fluency in
foreign languages]. \textbf{Conclusion:} These historical perspectives have now been
confirmed in January 2012 by a “Notice” for the American Mathematical Society:
Mathematics is not science since their respective validity criteria differ: internal vs.
external confirmations. Scientists, artists, linguists, and mathematicians should be
aware that, when categorizing disciplines, academic curricula should provide better and
appropriate distinctions.

\textit{Some remarks concerning the perceived promise of mathematics to the biological sciences:}

The present material reflects our reaction, one only a bit unfavourably, to Reed’s quite
assertive titular claim (2015): viz., that mathematical biology is good for mathematics. Though
we would not wish that his conclusion be false, we are prompted to relate this matter to the oft-
overstated role of mathematics in/throughout science, a discussion initiated in the mathematical
literature by F Quinn (2012), his conclusion being that mathematics is not science since their
respective “criteria for validity are radically different”: Science depends on comparison with
reality (being therefore \textit{external} to any scientist’s [mathematically-expressed] model), whereas
mathematics’ test is \textit{internal} (to the mathematical literature or manuscript).

We do note at the outset of this discussion that \textit{Science} is Mankind’s search for the very
explanation for (i.e., for the truth about) any particular naturally occurring phenomenon. (Indeed,
the \textit{O.E.D.}, 2\textsuperscript{nd} Ed. (1989) provides a rather lengthier, though here a quite consonant, entry (no.
4.a), yet with a note in entry no. 5.b:

“branches of study that relate to the phenomena of the material universe and their laws,
sometimes \textit{with implied exclusion of pure mathematics}. This is now the dominant sense
in ordinary use [emphasis here added]” (2009).

Though historian (and mathematician!) Sarton had earlier (1936) viewed mathematics as
just one of several ‘sciences’, he did quite pointedly note that the increasing success of our
(Modern) \textit{Science} is an historical “recall” of the natural philosophy of the ancient Greeks,
particularly Anaxagoras (V. c, BC) (cf. pp. 162 and 242).

In the context of Reed’s relating mathematics to biology, we return to Quinn’s conclusion
(2012) that mathematics is not science. Whither its necessity or sufficiency thereto?

\textit{(1). Mathematics is Not Necessary for Science:}

The literature of biology provides several examples:

\begin{enumerate}
\item a. Charles Darwin’s 1859 publication, \textit{THE ORIGIN OF SPECIES BY MEANS OF NATURAL
SELECTION, OR THE PRESERVATION OF FAVOURED RACES IN THE STRUGGLE FOR

LIFE: If it were not for the publisher’s use of pagination and/or chapter-headings, the lengthy book contains no mathematical content [excepting Darwin’s inclusion of one chronological hypothesis using thirteen numbered (I, II, … XIII) entries!].

b. Nobel Laureate (ethologist, biologist of animal behavior) KZ Lorenz’s note in NATURWISENSCHAFTEN [60(1), 1973: “On the Fashionable Fallacy of Dispensing with Description [in Favour of Mathematics]…. I have never published a paper with a graph in it.”.


(2). Mathematics is Not Sufficient for Science:

A quite early observation, one made by the University of Cincinnati’s Dean [LT More (1915)] of Arts & Sciences, had noted in 1915, the founding year of the Mathematical Association of America [MAA] (within Ohio) had understood that a mathematician deals with mental abstractions (lines, numbers,…) rather than the scientist’s having initially observed naturally occurring phenomena, then reflecting thereon (= Stage I of the Scientific Method).

We are quick to note that any scientist is entitled to employ mathematics in his/her model [Artwork: Stage II] of a naturally occurring phenomenon, though Reed [(2015) perhaps could have noted that, in addition to “Most of science is biology.”], most biologists (including Darwin, Lorenz, and Wilson) did not feel compelled, in order to convey their respective findings, to express their conclusions/models, in the language of mathematics.

An interesting ‘Note Aside’ in this very context is the naming, Teorema, of the Spanish journal of the philosophy of science, founded mid-20th Century: Would not this have been an implicit acknowledgement of a connexion between the truth-seeking goal of Science and the continual truth-bearing capacity of mathematics (as exposed in its theorems), despite the fact that this journal of philosophy is infrequently mathematical?

As another ‘Note Aside’ here: One can examine Nineteenth-century British universities’ annual ‘Calendars’ (= catalogs) to find that, as a discipline, mathematics is listed in the College/School of Arts, not that of Sciences. (Indeed, undergraduates attaining in mid-20th Century in the USA a ‘Bachelor’s’ in mathematics were thereafter given a choice: rather than the usual ‘Arts’ degree, one instead in ‘Science).

(3). Another ‘Mathematical Science’: Algorithmic Programming, the Linguistic Format for Capturing Successfully Biological Dynamics

Before establishing the conclusion reached here, we ask: Why would it matter that computer programming is actually not mathematics, despite its requirement for a logical rectitude quite equivalent to that of the language of mathematics?

Clouding this answer here, virtually as was concurrent at the advent, mid-20th-Century, of the digital computer, was the capability then (still: now) to employ long-established, though
frequently computationally inordinate, mathematics, a result which was deemed as one that might prove useful in modeling the dynamics of phenomena via time-dependent difference/differential equations. Because these dynamical equations are so successful in describing physical, though non-biological, phenomena, one could quite naturally hope to “apply” successfully these time-dependent equations in order to “model” the dynamics of biological systems as well.

Many have failed to appreciate that the difference—distinctively separating computer programming from the language of mathematics—provides the ideal understanding as to which of these two disciplines, oft-called ‘mathematical sciences’, is better suited to capture the dynamics of any real-world system containing one or more biological components.

This distinctive difference lies in the algorithmic nature of computer programming, yet not to be confused with the occasional use in mathematical theorem-proving (of the algorithmic proof). Mathematician JG Kemeny (1968) had noted—at an early conference on the (computer-based) modelling of large-scale systems—that such computer-based models would prove better than comparable mathematical modeling. Editor Dewan’s post-conference interview of Kemeny noted that Kemeny’s conjecture was founded on his belief that the “algorithmic nature” of computer programming would likely provide the advantage.

Wheatley and Unwin (1972) had noted that the term, ‘algorithm’, refers not only to a ‘mathematical recipe’, but also to any recipe. We (1985/1984) have noted a quite grammatical distinction here:

Mathematics, when used by a scientist, is grammatically in the third-person:

“ \( F = mX\alpha \) , wherein \( F \) is force, \( m \) is mass, and \( \alpha \) is the second derivative of position with respect to time ”, whereas statements in a computer-programming language are in the second-person:

\[ \text{IF IB a,b,c } \]

is a conditional Go-to instruction, very precise, but not one within the language of mathematics.

Similarly, the sentence/statement, “ \( X = X + DX \) ”:

as an (algorithmic) computer-programming statement, directs the computer to:

“Find the current value of the respective memory locations which you (computer) have defined as \( X \) and \( DX \), then find their arithmetic sum, then assign to the location \( X \) the value of this sum”;

though a mathematician would replace the sentence with its equivalent:

“No matter the value of \( X \), \( DX = 0 \).”

The pertinence of this distinction has been made quite well within the literature of biology. In his book, LIVING SYSTEMS, JG Miller (1972) found that there are seven ‘levels’ of living/biological systems, from the cell, organ, organism, to…, society, yet at/within any level there are 17 critical sub-systems, the central one of which is the ‘decider’, which receives inputs from all the others and transmits instructions appropriately thereto.
Thus, at the center—of the attention of one attempting to model the dynamics of any living system—should be the decider (one not monotonously regular), whose representation is rather ideally captured algorithmically (as opposed to mathematically).

_A Cautionary Note Aside_

One needs to distinguish further a common computer-user’s error: _viz._, _any_ computer programme, including one pre-packaged, provides a deduced algorithmic model. Many of the mathematically-based routines give the impression that they provide a truly algorithmic model of the dynamics attending the numerical ‘solution’ of a (set of) time-dependent differential equation(s). Yet, they are actually numerical computational schemes appropriate for the (numeric) solution, rather than qualifying by being specifically authored as a set of algorithms written to represent the dynamics learned from having just observed a particular naturally occurring (biological) phenomenon. The mathematical computation routines provide too readily a well-meaning biologist with an impression that he/she is behaving as a scientist, yet without having met the ‘maxim’ of Modern Science: that one first observes Nature, then reflects thereon, _before_ beginning Stage II (the Artwork, the Model.

Such behavior essentially copies that of many unwary users of statistical regression packages: Many know that, if anyone had _n_ data points \[ (x_1,y_1), (x_2,y_2), \ldots, (x_n,y_n) \], then one can ‘fit’ a curve/line (e.g., \( y = a + bx \)) amidst the points: Being such a mathematical result, one dealing indeed with measurable/recorded real-world observations, it becomes facile to assume that one, so behaving, must have produced a ‘scientific model’. Yet, one need realize that one can here have actually decided on the model _before_ making the observations (recording the data).

Students of biology do need to be aware that the ‘mathematisation’ of their presentations will not necessarily assure that any resulting conclusion (model) will be scientific. Mathematics should _instead_ always be considered as an _alternative_ linguistic format for making their presentation (model). They would do well both to read, e.g., Nobel Laureate KZ Lorenz’s paper [above] and to learn a bit of computer programming.

Reed cannot be profoundly attacked for his essay (2015). Mathematics is, nonetheless, quite tangential to biology, even though the recognition of its language in assisting with the understanding (and/or exploitation) of elements of Nature is quite useful. For example, the ready comparison of alternative additive chemical mixes in agriculture is much more available to any biologist who has been sufficiently mathematically prepared to investigate and understand the mathematician’s ‘linear algebra’, permitting one to conduct well-designed experiments.

Yet, there is a more fundamentally founded reason (requirement) that any university/college graduate has successfully completed a course in mathematics: _viz._, as was recognized by the ancient Greeks, training in mathematics results in having disciplined the adolescent’s mind to attain—for his/her ensuing adulthood—the ability to reach logically-derived, hopefully very nearly irrefutably so, conclusions.

We should indeed encourage (require?) students of biology to ensure that mathematics appears in their own university transcript: Similarly, computer programming, this from among our
‘mathematical sciences’. Of course, if one were to join those further voices who expect that every university/college graduate be ‘scientifically literate’, then this encouragement [cf. Mihram, D., 2017], fully implemented, would become an even more welcome conclusion here.

Yet, the resulting understanding of the limited role of mathematics in Science arises as an implication of the description (above) of the Scientific Method as Mankind’s guide to truth-seeking, particularly in the context of its own ‘isomorphic equivalence’ to the single biological process, one conducted (first genetically, then neurally) for survival.

V. SUMMARY

The paper answers two questions dealing with the educational relationship between mathematics and science: viz., (A) Is mathematics sufficient for Science?; then, (B) Is mathematics necessary for Science?

The questions arise today as a result of the 2013 publication by mathematician Quinn’s conclusion in AMS’s January issue that year: viz., that mathematics is not science (AND is not a science) since their respective criteria for validity differ: external vs. internal confirmations of correctness, of providing advancements in Human Knowledge. Other historical commemorative ceremonies, within our academic field of mathematics, have questioned the basis for the longstanding inclusion of mathematics (as a requisite subject) in the curricula of tertiary (and secondary) education, particularly as those early 20th-Century activities have led us to remember the truly educational benefit for training in mathematics.

First, the mathematician Frank Quinn, in his paper on the history of mathematics, concluded: “To a first approximation, the method of science is ‘find an explanation and test it thoroughly’, while modern core mathematics is ‘find an explanation without rule violations’.

Secondly, when viewed in the definitional context of “science”:
[viz., Science is that human activity devoted to finding the very explanation for (i.e., for the truth about) any particular naturally occurring phenomenon.], then the distinction of Quinn reveals that mathematics is indeed different from Science.

We do note here that mathematics became historically a requisite ingredient in the educational STEM curricula because it dealt so directly with truth (and therefore with truth-seeking). Indeed, we two see now that mathematics is rather unique among the academic disciplines in that it (with the possible exception of the philosophy of logic) provides statements which are irrefutably true.

Pursuing the matter of the ‘truth-content’ of human statements, we ask (and answer) the two questions, (A) and (B), on the sufficiency and on the necessity of mathematics for Science.

The recent ceremonial commemoration of the Mathematical Association of America’s [MAA’s] Centenary of its formation (initiated in Ohio in 1915 among mathematical educators) allowed us to re-discover a leading academic administrator’s conclusion [LIMITATIONS OF SCIENCE, NY (1915)] that mathematics (i.e., that pure mathematics) is not science since it deals strictly with abstractions (points, numbers, lines, circles, triangles, e.g.) and not with any naturally occurring phenomenon, as required by the definition of Science.

Nonetheless, we note that the rectitude of Science requires a logical persistence on the part of scientists (and any ‘doubter’), one that is of the very nature of the attitude accompanying the (pure) mathematician.
Indeed, we do concur that truth-seeking must remain as the academic goal, particularly as we have shown here that the aforementioned “Scientific Method” is a six-stage model-building process, yet one which mimes isomorphically the very biological process (first ‘conducted’ genetically by each plant and animal species, then conducted neurally by the ‘higher’ species of animals possessing the neural capability of memory-and-recall) which has ensured the biological survival of all species on Earth to date.

We conclude that mathematics need remain as a requisite in the tertiary (and the secondary) educational STEM curricula as a result of its inherent encouragement of this last-mentioned biological role. Furthermore, the longstanding virtue of mathematical education in disciplining the adolescent mind for adulthood is emphasised.

VI. REFERENCES


“Human Knowledge: Role of Models, Metaphors, and Analogy,”


Wilson, E.O. (2013), Great Scientists Don’t Need Math, *Wall Street Journal* 5 April 2013. [See also *AMS Notices* 60, No. 7, 837-8.]


### Biographical Information:

G. Arthur Mihram, Ph. D.:
- His biographical sketch has appeared both
  - in the 20th Century in Marquis’s *Who’s Who In America: 2000ff* and

Danielle Mihram, Ph. D.:
- Her biographical sketch appeared in Marquis’s *Who’s Who Among American Women*.

♣ ♦ ♥ ♠
From a macro level institutes of higher education expect academic programs to adapt to changes within the discipline as well as in the market place and globally. With increased competition in the world of higher education it is incumbent upon academic program leaders to find new ways to innovate and meet the needs of perspective students and society. This session discusses how one department comprised of 8 distinct programs integrated elements of a strategic planning process from a futuristic perspective to develop a department mission, vision, and goals at the micro level across interdisciplinary lines. A framework was created using traditional methods of strategic planning, with a view towards the future, utilizing Amy Webb’s The Signals Are Talking: Why Today’s Fringe Is Tomorrow’s Mainstream (December 2016). Webb explains how to forecast and manage technological change with a view towards the fringe.

This framework engaged all department faculty in cross disciplinary collaborative conversation, with department faculty leaders taking the lead to facilitate dialogue on department wide goals identified by the department faculty. Academic program leaders along with the department chair serve as the leadership team for the department. With an eye towards distributive leadership the academic program directors in collaboration with the chair and department faculty will facilitate the conversation towards an action plan and implementation of each department wide goal. This process incorporated a formula of collaboration + engagement + exploration = innovation. The goal:

- Build a department identity
- Examine the present and future
- Develop a mission, vision, values that keep the present in front of us while also exploring the future

This presentation highlights the goal setting roles and experiences of the academic program directors involved in this metamorphosing process. A model of distributive leadership grounds the department work ensuring all department faculty are empowered to support innovation.
Beginning in 2016, the voices of women around the nation and globally have re-emerged with great energy. Threats to issues women care about such as protections for children, civil and social rights have exploded in demonstrations such as the Women’s March in Washington DC and the “Me Too Movement”.

The United Nations Commission on the Status of Women (UN CSW) was established in 1946 to advocate for many of the reasons women today are mobilizing. The recent session of the UN CSW was convened in March 2018 with a priority theme of “Challenges and opportunities in achieving gender equality and the empowerment of rural women and girls”. The presenters served as delegates to this commission, participating in panels facilitated by women and men from all over the world. Topics pertinent to women were explored highlighting how the empowerment of women, and issues important to women were being addressed globally. While the panel session titles did not appear to be specifically related to education, the presenters found that every panel session was deeply rooted to education. It was through this lens that the presenters identified four common themes that resonate in the field of education. These themes are as follows:

- Education is critical to the empowerment of women and the security and well-being of children.
- The need to advocate for positive change which impacts our young children of today threads through issues pertaining to the advocacy of women.
- While the rights of young girls are implicitly called out as a result of young girls becoming women, the rights of young boys are not called out explicitly.
- In order for gender equality to occur both genders must be at the table.

This presentation will highlight the lessons learned, epiphanies gleaned, and how these lessons learned changed the lens of two seasoned educators.
In this globalizing world, higher institutions are expected to produce graduates with global competence and it is assumed that intercultural experience would facilitate them to acquire such skills. However, not all the university students can afford going abroad in this economically challenging era. Isn’t there a way to have them have similar intercultural experience without leaving their country? In order to answer this question, two intercultural collaborative service learning projects were implemented in a rural Japanese village.

The aims of this project are to develop global competence and a deeper intercultural understanding through thinking about a global issue such as depopulation in the countryside. The participants of these projects are 12 Japanese and 19 Taiwanese high school and university students in total. They lived in a private house in a rural area for 8 to 9 days, and engaged in environmental work such as removing snow from the roof tops of private houses or cultivating abandoned farmland. Students also had interactions with local people and it helped them to give suggestions about revitalizing the community in their final group presentation.

In order to assess the impact of this project on the development of students’ global competence, both quantitative and qualitative data were collected. A survey was administered to Japanese students before and after the projects and it includes the Intercultural Effectiveness Scale (Mendenhall, Bird & Oddou, 2008) Willingness to Communicate Scale (McCroskey & Richmond, 1987), and Semantic differential scale about the image of Taiwanese (Aikawa, 2007). Qualitative data includes students’ daily journals, recorded reflection meetings, and a post-group interview about students’ personal developments.

Overall, the results of the survey revealed that Japanese students have become more efficient intercultural communicator, more willing to talk to people with different cultural backgrounds. Their image about Taiwanese also has become more positive and accurate. The qualitative data revealed that this experience helped them to develop problem-solving skills, critical thinking, and self-awareness. This presentation also provides pedagogical implications on how to implement effective service learning projects without leaving one’s country.
Students Are Learners, Not Consumers

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Abstract

Students in higher education are members of a community, a social institution in which learning is a vital and reciprocal exchange among people. To view learning as a commodity, such as items produced in industry, devalues the purpose of learning and the effect it has on the progress of the community structure. The researchers present the idea that students are not consumers but learners because one the benefits of higher education is the development of a learning community and professional organizations.

Keywords: Community, Higher Education, Learning Community. Learning Organizations
Students Are Learners, Not Consumers

Introduction

The indispensability of university education in the acquisition of critical skills and disciplines such as teaching, medicine, engineering, accounting, architecture, and the administration has widely been acknowledged. Higher education is vital for promoting socio-economic, personal, and professional development for American citizens. This necessity explains why people struggle to obtain educational opportunity. In the United States, the importance of education is often stressed starting at our conception because let’s face it; we live in a world with a competitive job market and in which citizens want to make the most money that they can. A college or university degree is, therefore, almost essential for a stable financial future although there are other routes to that economic destination. One thing is sure, higher education, once a service provided to all students, has turned into a commodity loaded with an overall consumer element.

Universities in the United States are internationally known as the leading institutions in higher education and have been successful in recruiting students of all nationalities, ethnic groups, and religions for their student population. However, at a time when the benefit of a college education has never been more significant, state legislatures and policymakers have made going to college less affordable and less accessible to the students who are in the most need. For example, despite recent increases, in higher education funding, in a decade since the Great Recession, state spending on public colleges and universities are well below historic levels with overall state funding for public two- and four-year colleges in the 2017 school year was nearly $9 billion below its 2008 level, after adjusting for inflation (Camera, 2018). The funding
decline has contributed to higher tuition and reduced quality in public higher education. It has also changed the educational experience.

As the burden of financing higher education has shifted from the state to parents and students, these stakeholders have advocated for more participation in the educational process and students studying at universities are increasingly being defined as customers rather than learners. The decrease in financing higher education has been caused by the necessity to recruit and retain students. College students and their parents who believe that they are consumers rather than learners adopt a consumer paradigm. This paradigm frames their educational expectations, and they view professors as their employees, universities as consumer markets, and degrees as commodities.

Although most educators have rejected this approach, this chorus is getting louder and the problems associated with this paradigm shift increases. The underlying foundation of this view is the belief that higher education is like any other industry with inputs, such as students, subsidies, tuition revenue streams, and philanthropic support. Higher education outputs are graduates, increased social mobility and higher standards of living. Finally, there are external forces that regulate the industry’s behavior, such as government agencies and accreditation groups.

The notion that students are customers has been swimming in university waters for a long time. Is it a constructive way of thinking about the relationship between students and college education? We doubt it. If one considers higher education just another industry, the argument goes, then market forces would serve it well, and it should open to competition by reducing the support universities receive from the government while increasing the responsibility of the student, the customer, in paying for educational services. This model might make sense if our
goal was to produce widgets or some other commodity more efficiently. However, university education does not fit into this paradigm.

Education is not a commodity, and things get complicated when we compare students to customers. Some researchers suggest that institutions of higher education in the United States encounter problems that are unique to the market environment. These problems include competition for resources, escalating costs, and resource constraints. In response to these problems, higher education systems within this kind of environment tend to borrow strategies from organizations operating in the most competitive environment – the business sector market-based exchange has a corrupting effect on the teaching and learning process.

However, as early as 400 BC, Socrates understood that doing so was a mistake. Establishing such a relationship creates “merchants of knowledge,” as he put it, who are willing to give students what they want rather than what they need to keep the money flowing. Introducing this market-based exchange, explained Socrates, had a corrupting effect on the teaching and learning process (The Guardian, 2018).

Higher education is a significant investment. Students want value for their money because a future of debt is frightening. Viewing students as consumers dramatically change the teaching and learning relationship. Therefore, students are no longer recipients of universities and colleges offerings, but what they, the students, want to study. There is a danger, however, when we discuss higher education only in financial terms. It shifts the conversation away from how universities develop students as learners, thinkers, and future leaders (The Conversation, 2018). As the faculty member, I do not see myself as front-line staff, but many of my students believe I am because I am connected to students in the university environment. Many students associate other faculty members and me with a clerk in a department store. For example, when a
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student feels that I, as a faculty member, have been unfair or their concern has not been adequately addressed, the dean is quickly summoned. Just this semester, when I scheduled a quiz, a student threatened to take me to the Dean. My retort was to “schedule the appointment, and I will be there.”

Beyond the insulting implications associated with a perceived expectation of privilege or entitlement, I was perplexed by this student’s limited familiarity with academic freedom. However, reflecting deeper upon similar responses among other students, I began to notice a pattern that could be the likely result of this consumerism state of mine among students. As their “employee,” I am expected to meet their expectations, even when they do not coincide with the objectives of the course and even when they infringe upon my academic freedom. According to Wilson (2015), academic freedom, in itself, is seen as dangerous because it protects dissent when certain members of society, as in the case with my aforementioned students, are focused on political correctness and perceived unity. Ultimately, for these students, it is about getting what they “pay for.”

**Universities are Learning Communities**

The hallmark of higher education is the development of the individual as well as the whole society (Johnson, Musial, Hall, Gollnick, & Dupuis, 2008) university environments create, maintain, and support a professional learning community and organization not only for their students but for their faculty as well. A university should be a community of persons united by collective understandings, shared interests and values, common and communal goals, bonds of reciprocal obligation, and a flow of sentiment, which makes the preservation of the community an object of desire, not merely a matter of prudence or command of duty. Community implies a form of social obligation governed by principles different from those in the marketplace and the
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state. According to Katz (1987), the university is a marketplace, but it is a marketplace of ideas, a theory which states that every idea has its importance, and it is up to the market to churn out the truth. The theory of ‘Marketplace of Ideas’ suggests that freedom of expression in the market will eventually lead to the discovery of the truth by the society which is the goal of many of our institutions of higher education.

Schwab asserts, “The importance of community lies in its contributions to three distinct but related factors. It is indispensable to the development of individuality. It is necessary for the maintenance of our social and political structure. It is essential to satisfying conviviality, the interplay of persons as persons without which existence of men as social animals is barren.” (Schwab, 1976).

Schwab believes that through educational opportunities that “community can be learned” and by providing enriching activities that human learning can be a “communal enterprise.” He states. When the learning is the development of latent capabilities, our first trials are undertaken only with the support of members of our community. Further development occurs only with the support of members of that community. Even “experience,” as a form of learning becomes experience only as it is shared and given meaning by transactions with fellow human beings (Schwab, 1976).

Schwab believes that there are seven propensities of community, which benefit all members of the higher education institutions. These are:

1. A propensity to find, with others, everyday needs and wants which confer on self and others a sufficient identity of purpose and endeavor to constitute an immediate group.
2. A propensity to see others as affording states of character, competence, and habit which complement one’s own, thus marking each person a part of another who is distinctly other.

a. Other students differing in ethnic-religious-social, class styles, attitudes, and values, as well as children of different talents and abilities.

b. Other adults are differing in the same ways and affording a variety of models.

3. A propensity to seek the realization of the complementarities of self and others by welcoming problems, which call for the joining of diverse talents and attitudes.

4. A propensity to recognize other and different groups as bearing the same relations to one another that diverse members of an immediate group bear to one another, and to seek the similar realization of the complementarities of these groups.

5. A propensity toward reflection -- alone, with another, in group-on past actions and consequences; their circumstances; the means employed; the desirability of the ensuing gains and losses.

6. A propensity toward service, toward the giving and receiving of comfort in disappointment and congratulations on achievement, a propensity deriving from past actions and undergone with others.

7. A propensity toward the accrual of symbols of past achievement of a group, and past members of it, and the celebration of these persons and moments by way of the symbols accrued. (Schwab, 1976).

The community is the hallmark of a "learning organization," and it is a place where people of various cultures, ethnicity, thoughts, and ideas are continually learning how to learn together. In a learning community, individuals work together to achieve intellectual and social
understanding. People in learning communities are committed to thinking differently about the educational environment and realize that constructing learning communities have and will continue to require changes in the University’s environment. One is to change the work -- the tasks -- that students do in University. Another is to change the participation structures, the class organization -- how students and the faculty work together in learning. Senge (1990) states, “Perhaps the most salient reason for building learning organizations is that we are not only starting to understand the capacities such organizations must possess” (page or paragraph information). The authors believe that this propensity for caring, this sense of connection to all people, must be fostered in the University setting because without these feelings, without these connections, the University is a mindless entity—a corporation whose primary goal is for profit, answering to a group of consumers who are often looking qualify their enrollment and degree attainment via paid tuition.

The Pros and Cons of Student Consumerism

There is no question that college is expensive. It is a big-ticket item where the student makes, careful decisions about which school to attend, how much he or she should pay, and what subject to study. The upsurge in consumerism has matched the objectives of campus administrations who now attempt to meet every student’s need to drive has created dramatic consequences. For example, recent higher education innovation includes customer service desks to facilitate one-stop shopping and name tags coupled with service desks which have led students to think of a university as one large department store (The Conversation, 2018).

To begin exploring a framework on how to address student-consumer expectations, it may be helpful to provide a framework for education providers. Although there are several
approaches available, Zeithaml, Parasuraman and Berry (1990) categorized student-consumer service expectations into five overall dimensions:

- **Reliability**: the ability to perform the promised service dependably and accurately;
- **Tangibles**: the appearance of physical facilities, equipment, personnel and communication materials
- **Responsiveness**: the willingness to help customers and provide prompt service;
- **Assurance**: the knowledge and courtesy of employees and their ability to convey trust and confidence
- **Empathy**: the caring, individualized attention provided to the customer. How a college or university chooses to respond to these dimensions may indeed be the key to how well a student connects with an institution (Abeyta, 2013-2014)

According to *Criticizing the Image of Student as a Consumer*, a student is defined as a person who studies or investigates, and faculty is described as related to a branch of learning or the learned professions (Bickel, Birtwistle & Kaye, 2018). Consumerism implies that students will want to see visible, tangible benefits from their studies, whether regarding an inherently-valuable qualification or as a route to a particular form of employment. Students of a consumerist bent are unlikely to be interested in studying or working at anything which has no apparent connection with their grades or future employment prospects but is increasingly ready to challenge as inaccurate any grades that are not as high as they feel they require for their chosen career path. Student consumerism has resulted in state policymakers wanting to eliminate liberal arts courses and concentrated on employment. However, liberal arts education is essential to full participation in a democratic society, and the trend toward mass higher education has produced a virtual abandonment of the traditional relationship between professor and student.
The emphasis on the ‘market value' of a college or university degree has blurred the distinction between education and training.

Not for Profit Universities

In the 19th-century for-profit colleges in the United States offered students the moon. These schools were in the business of packaging, commodifying and selling degrees with the help of politicians, i.e., Trump and others, who promoted these ventures and cut regulatory red tape for a for-profit higher education goliath. In a for-profit institution, almost all of this cash comes directly from taxpayer-supported student financial aid programs. Essentially, for-profits take those funds and spend them on advertising and profit distribution than on teaching. These colleges and universities are not funded by state or federal taxpayer dollars and derive all of their revenue from tuition, similar to a private university. However, unlike a private university, the goal is to acquire a profit as a private company. In other words, for-profit colleges have to participate in the essential element of consumerism--marketing. Without marketing, they cannot attract a growing student body to create a profit. Moreover, where there is marketing, there are consumer traps.

The Obama Administration appeared to be against for-profit institutions in higher education. His administration thought that businesses should not make profits from education, which they consider a public good. Also, they cited for reasons for their disdain:

1) If a student is trying to get into college and struggling with rejections, it makes sense to apply to a for-profit college with a high rate of acceptance. However, high acceptance rates are often tied to a lower quality of education. For-profit institution creates too much debt for students who cannot afford it.
2) Half of the tuition at for-profits goes toward something other than academics. Accreditation for a for-profit does not always mean that a for-profit college is reputable.

3) Many for-profit colleges attract students by becoming accredited, but recent studies suggest that accrediting bodies may not use stringent standards. Money may also be a motivator for accrediting bodies. (Nonprofit Colleges Online, 2018)

A recent report by Northeastern University's Center for the Future of Higher Education and Talent Strategy has concluded that employers—specifically, human resources (HR) leaders—are now increasingly interested in candidates' credentials, not merely their degrees. The study also found that most HR leaders no longer view online degrees or credentials as inferior to those earned on campus. However, does this mean that the stigma that once shrouded online education has finally lifted? (Etherington, 2018).

**Conclusion**

Be it the student who feels his tuition pays my salary and I should, therefore, reevaluate my grading or students’ desire to take only specialized classes without the benefit of fundamental skills developed in liberal arts courses, the sense of entitlement, as well as the need for instant gratification, as products of student consumerism, the potentially negatively impact on society is rooting itself in the fabric of the academy. If students are viewed as consumers, the need to satisfy will begin to outweigh the greater needs of a global community. This is not only counterproductive for society as a whole; it does not even benefit students. The problem with student consumerism lies in the fact that when universities conform to this approach, they place student satisfaction above student development, the expansion of existing knowledge, research progress, and innovation.
Universities are learning communities, at least they should be, and are designed to help advance individuals and society. Therefore, students must conform to the community in which they are about to participate, and they must view college and universities as microcosms of and gateways into these global communities. They cannot expect to enroll in universities and approach their studies as if they are purchasing a Whopper from Burger King. They cannot expect to “have it their way.” To preserve the integrity of the academy, and more importantly the development and advancement of future generations, we must cater to learners, but we cannot conform to consumers.
References


The Influence of NASA’s High School Aerospace Scholars (HAS) Program on Students’ STEM Attitude and 21st Century Skills

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Abstract:

Science, technology, engineering, and mathematics (STEM) education is a critical need for the future of the U.S. workforce and national security; however, in the past decade, the number of U.S. high school students who expressed interest in becoming scientists and engineers dropped from 36% to 6%. As a result, a significant amount of investment has been made to encourage students' interest in STEM fields. Several research studies have been conducted on STEM attitude and have found that a student's career choice is positively associated with their attitudes, expectations, and aspirations developed during their high school years. However, the potential for STEM learning offered in out-of-school-time (OST) settings has been overlooked; and as a result, very few research studies have been initiated to identify the characteristics of OST STEM programs and their effects on STEM attitude and 21st-century skills. The High School Aerospace Scholars (HAS) program is an OST STEM program that aims to encourage and inspire Texas high school students to pursue STEM degrees and careers. This NASA sponsored program gives Texas high school juniors the opportunity to participate in an interactive online learning experience highlighted by a week-long summer program at the Johnson Space Center. The purpose of this research study was three-fold: (1) investigate how much influence and success NASA’s HAS program has had on student attitudes towards STEM learning and 21st century skills, (2) determine the effectiveness of the HAS program from the perspective of the parents of students participating in the HAS program, and (3) determine the effectiveness of the HAS program from the perspective of the program facilitators. The research instrument used for data collection included open-ended student surveys which students, parents, and program facilitators completed at the end of the week-long, on-site learning experience at JSC. In total, 265 HAS student participants, 146 parents of HAS students, and 34 HAS program facilitators completed the research survey. This research study will contribute to the growing body of research focused on OST STEM programs by revealing evidence of positive effects of the HAS OST program on students’ STEM attitude and 21st century skills.
Introduction

Background of the Study

The unemployment rate in the United States (U.S.) is at historically low levels. In May 2018, approximately 223,000 jobs were created, and the U.S. unemployment rate fell to 3.8% which was the lowest rate since December 2000 (Bureau of Labor Statistics, 2018). As the U.S. has transformed from a manufacturing economy to an information-based economy, employment in STEM fields has grown exponentially. Georgetown University’s Center for Workforce and Education Center report on STEM suggests that eight million U.S. jobs will be STEM-related and there will be 2.4 million job openings in STEM by 2018 (Carnevale, Smith, & Melton, 2011). But with the aggressive growth in technological advances, the number of STEM jobs has already surpassed the projected Georgetown number. The Bureau of Labor Statistics (BLS) report revealed there were 8.6 million STEM jobs in the U.S. representing 6.2% of U.S. employment. Although STEM employment represents only a fraction of total U.S. employment, it has been growing faster than non-STEM jobs. According to the BLS, STEM jobs are expected to grow 8.9%, while non-STEM jobs growth is expected to be 6.4%.

Despite the increased demand, employers are having difficulty filling a large number of jobs that need an educational background in STEM (Engler, 2012). A 2008 Interagency Aerospace Revitalization Task Force report acknowledged that the aerospace industry faces significant challenges in “ensuring that adequate supply of individuals with higher educational achievement is available to work” (p.10). Lack of workers who do not have adequate skills for the 21st century workplace threatens economic growth. America’s economic future depends on the professionals who are knowledgeable in
STEM areas, and this lack of interest in strategically important fields such as STEM is alarming (Adkins, 2012).

Employers often complain that new college graduates do not possess skills needed for the workplace. A workforce skills preparedness report which surveyed 63,924 managers in the U.S. revealed the soft skills that new graduates are lacking (PayScale, 2016). Overall, 60% of managers feel critical thinking/problem solving is lacking the most among recent graduates. Other soft skills lacking among recent graduates are communication (46%) and interpersonal skills/teamwork (36%).

Research suggests that equipping students with a set of broad skills which they need beyond the classroom is extremely important in the 21st century workplace (National Research Council, 2008). A 2013 Association of American Colleges and Universities study reported that 93% of 300 U.S. employers believed that critical thinking, communication, and being able to solve complex problems were more important than a prospective employee’s major (Hart Associates, 2013). One of the most widely adopted 21st century skills frameworks is developed by Partnership for 21st Century Skills (P21). The P21 is a national advocacy organization that encourages K-12 education institutions and States to embed technology and 21st century skills into school curricula (Partnership for 21st Century Skills, 2006). National Education Association (2014) and P21 have suggested that the most critical 21st century skills for K-12 education are known as the Four Cs: (1) creativity, (2) critical thinking, (3) collaboration, and (4) communication.

As a response to the widening lack of interest in STEM, federal agencies, corporations, non-profit organizations, K-12 and higher education institutions have
initiated several efforts to increase student interest in STEM fields. The 2008 National Research Council (NRC) report suggested that engaging elementary and secondary students in the National Aeronautics and Space Administration’s (NASA) mission is essential for “motivating and inspiring students to consider STEM careers” (NRC, 2008, p. vii). Since the Apollo 11 landing on the moon’s surface in 1969, NASA not only led the world in scientific and technological advancements but also increased American students’ interest in STEM fields. In order to inspire and motivate more students to pursue careers in STEM and prepare a highly skilled workforce, NASA created the Education Affairs Division in 1993; later named the NASA Office of Education (Office) (NASA, 2006). According to the Office, the agency is dedicated to building a stronger STEM workforce; trained to address the many challenges of the 21st century. The Office has three primary education goals: (1) contribute to the development of the STEM workforce by education and employing future scientists, (2) attract and retain students in STEM disciplines by engaging and educating elementary and secondary students, teachers and faculty, and (3) inspire and engage individuals of all ages in NASA's mission (NASA, 2006).

Research has proven that only a certain number of students have the opportunity to enroll in some STEM courses; student numbers are even lower for underrepresented minority students. A 2018 report by the U.S. Department of Education Office for Civil Rights demonstrated that only 73% of U.S. high schools offer chemistry, 60% offer physics, 78% offer advanced mathematics, and only 50% offer calculus in the 2015-2016 academic year. Wang, Ye, & Degol (2017) stated that the opportunity to pursue STEM is
not equally available to U.S. youth; thus, underrepresented minority students’ career choices are constrained and beyond their control.

One of the approaches to overcome this constraint is increasing STEM learning opportunities in an out-of-school setting (NRC, 2015). Considering that children of school age spend 80% of their day outside of school, previous work has been limited to the in-school time learning and failed to address the OST interventions (NRC, 2015). Many OST STEM programs utilize strategies that support STEM learning such as project-based learning, problem-based learning, hands-on learning experiences, and connecting STEM to everyday life (Falk et al., 2016).

In an effort to encourage and inspire Texas high school students to pursue STEM degrees and careers, NASA Johnson Space Center (JSC) offers an out-of-school-time (OST) interactive online learning experience highlighted by an all-expenses paid weeklong summer program at the JSC. This OST learning experience is called High School Aerospace Scholars (HAS) and as part of the interactive online learning experience, students are required throughout the school year to successfully complete learning modules covering past, current, and future space exploration. HAS students, guided by HAS online reviewers, are expected to complete each module in four weeks. Students have the opportunity to chat with NASA subject matter experts (SME) during completion of the online modules.

The goal of the OST HAS program is to encourage Texas high school juniors to pursue STEM degrees and careers; thereby, increasing Texas’ high-tech workforce. The HAS program developers describe two major outcomes for the program: (1) contribute to the development of the STEM workforce in disciplines needed to achieve NASA’s
strategic goals through a portfolio of investments, and (2) attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty (Davey & Davis, 2016). Approximately 40 students are selected to attend each on-site experience where they receive briefings from NASA astronauts, engineers, scientists, and mission controllers. Students work collaboratively alongside NASA personnel to design a mission to Mars; as well as complete four Mission to Mars modules. At the end of the week, students present their own mission to NASA scientists, engineers, administrators, family members and other community leaders (Davey & Davis, 2016).

Statement of the Problem

STEM plays a direct role in driving economic growth in the U.S., and the highly qualified STEM workforce is essential for the stability and the growth of the U.S. economy (Rothwell, 2013). However, the National Science Board (NSB) (2015) noted that there is a declining interest of U.S. students in STEM fields for the last several decades. In recent years, the number of U.S. high school students who expressed interest in becoming scientists and engineers dropped from 36% to 6% (Augustine, 2007; Provasnik et al., 2012).

The 2015 Programme for International Assessment (PISA) ranked U.S. students 31st in mathematics and 19th in science out of the 35 Organisation for Economic Co-operation and Development countries. The results from the same study also revealed that U.S. students ranking in mathematics and science declines as the grade level goes up. The PISA results are extremely concerning since research suggests that lack of student interest in science is a factor for reduced enrollment in science courses, which leads to the
shortage of STEM workforce (Klein & Rice, 2012). This lack of interest in STEM fields among U.S. students, significant budget cuts in school funding, lack of quality STEM programs and curricula, and the increasing global competition in a technology-based economy is indicating severe future implications for the U.S. (Carnevale et al., 2011).

Purpose of the Study

The purpose of this research study was three-fold: (1) investigate how much influence and success NASA’s HAS program has had on student attitudes towards STEM learning and 21st century skills, (2) determine the effectiveness of the HAS program from the perspective of the parents of students participating in the HAS program, and (3) determine the effectiveness of the HAS program from the perspective of the program facilitators.

Significance of the Study

More than ever before, students have opportunities to learn STEM related topics in a wide variety of settings, including OST programs, summer programs, museums, parks and online activities (NRC, 2015). OST STEM programs are an effective tool that is designed to increase achievement in STEM topics; thus, fostering additional interest in STEM. However, the potential for STEM learning offered in out-of-school settings is often overlooked (NRC, 2015) and very few research studies have sought to identify the characteristics of out-of-school STEM programs and their effects on STEM attitude and 21st-century skills. The findings of this research study can provide additional knowledge and understanding to researchers, policymakers, and practitioners regarding the relationship between OST STEM programs, STEM attitude, and 21st century skills; as
well as assist school districts and curriculum experts in identifying characteristics of OST STEM programs that can produce positive outcomes for their students.

**Research Questions**

The researchers have developed the following research questions to align with the intent of this research study:

RQ1 - What are the HAS participants' attitudes towards STEM learning and 21st-century skills?

RQ2 - What are the parent's perceptions of the HAS program?

RQ3 - What are the facilitator’s perceptions of the HAS program?

**Methodology**

Due to the nature of the HAS program and NASA’s strict confidentiality rules, the research methodology was accomplished by using secondary raw datasets and archival materials obtained from the HAS program Primary Investigator (PI). The researchers contacted the NASA HAS program Principal Investigator (PI) and acquired the archival documents related to the HAS program dating back to 2009. The acquired documents included: (1) the research surveys, (2) the raw survey dataset for program participants, (3) the raw survey dataset for parents, and (4) the raw survey dataset for facilitators. The collection of the secondary raw datasets occurred through open-ended surveys to obtain the perspectives from the HAS program participants, their parents, and the HAS program facilitators.

**Research Design**

Creswell and Clark (2011) describe mixed methods as “method that focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study
or series of studies with the premise of using both approaches in combination to provide a better understanding of research problems than either approach alone” (p. 5). The mixed methodology was appropriate for this study because it allowed the researchers to use all the tools available and gather more comprehensive evidence which resulted from both statistical and thematic analysis. In addition, mixed methodology enhances legitimation by implementing descriptive precision and numerical precision into research (Mills, Wiebe, & Durepos, 2010).

Research Instrument

The research instrument used for the data collection included open-ended student surveys which students completed at the end of the week-long, on-site learning experience at JSC. The survey had a total of 15 questions: (a) descriptors of the participants: gender, ethnicity, zip code; (b) behavior-related retrospective questions: STEM learning, STEM careers, student experiences, attitudes, and expectations; (c) questions related to the impact of the HAS program; and (d) open-ended questions to gain more understanding of the HAS program. The survey to collect data from the HAS participants’ parents and the HAS facilitators included questions to evaluate student impact of the HAS program. The parent survey had a total of 10 questions, and the facilitator survey had a total of 4 questions. The facilitator and parent surveys also included open-ended questions.

Participants

The participants for this research study were the HAS student participants, their parents, and the program facilitators. The term student participants is defined as children who participated in the HAS program and a high school Junior at the time of the
program. The term *parents* is defined as one of the HAS program participant’s primary adult caregivers that includes mother, father, grandmother, grandfather, or other adult relatives. The term *program facilitators* is defined as (a) certified Texas teachers who serve as onsite counselors at Johnson Space Center, (b) mentors who are NASA employees, during the week-long summer experience of the HAS program.

All HAS student participants included in this study attended one of the weeklong on-site sessions held at Johnson Space Center between June 14 and July 31, 2015. The HAS student participants were selected based on the following criteria: (1) completion of the application by deadline, (2) content of the required essay, (3) nomination from a Texas State Representative, (4) completion of graded coursework, and (5) geographic diversity.

**Data Analysis**

There was a total of 265 HAS program participants that completed the research survey. Parent and facilitator surveys were completed by a total of 146 parents and 35 facilitators, respectively, at the end of the HAS program sessions. The researchers provided a descriptive analysis of data for all variables in the study including means, standard deviations, and range of variables. The Statistical Package for Social Science (SPSS) was used to examine descriptive statistics and the collected quantitative data. The t-test and Chi-square statistical tests were utilized by the researchers to examine the comparison of groups and association between variables. A qualitative computer data analysis program, MAXQDA 2018, was used to code and analyze the qualitative data.

**Validity and Reliability**
Qualitative and quantitative instruments have different standards of validity and reliability. The researchers conducted t-tests and Cronbach’s alpha to assess the reliability of the quantitative items measuring specific constructs. Independent t-test procedures were conducted to determine whether two groups (male and females) differed in terms of their attitudes, evaluation, and perception about HAS program.

One of the strengths of qualitative research is its validity which determines "whether the findings are accurate from the standpoint of the researcher, the participant, or the readers on an account" (Creswell, 2014, p. 201). Triangulation is one of the primary strategies for qualitative research where the researcher validates data through cross verification from two or more data sources. (Creswell, 2014). The researchers used triangulation to assess the accuracy of findings by examining data sources from the standpoint of HAS program participants, parents, and facilitators, and literature review.

Findings

A total of six weeklong on-site HAS program sessions were held at JSC between June 14 and July 31, 2015. The research survey was distributed to all students, their parents, and program facilitators participating in the 2015 HAS program at JSC. A total of 265 HAS student participants completed the survey at the end of the program. Based on the zip codes provided by the study participants, 108 Texas cities and towns were represented in the on-site summer experience; however, the majority of the student participants were from major Texas cities, i.e., Houston, Dallas, Fort Worth, Austin, San Antonio, and El Paso.
Table 1 provides a description of demographic variables of the student respondents (N=265). As shown in the table, the majority of the student respondents was male (66.8%), not Hispanic or Latino (72.8%) and White (75.5%).

Table 1
*Frequencies and Percentages for Demographic Variables (N = 265)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>177</td>
<td>66.8</td>
</tr>
<tr>
<td>Female</td>
<td>88</td>
<td>33.2</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Hispanic or Latino</td>
<td>193</td>
<td>72.8</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>72</td>
<td>27.2</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alaskan or Native American</td>
<td>7</td>
<td>2.6</td>
</tr>
<tr>
<td>Asian</td>
<td>46</td>
<td>17.3</td>
</tr>
<tr>
<td>Black or African American</td>
<td>10</td>
<td>3.8</td>
</tr>
<tr>
<td>Native Hawaiian or Pacific Islander</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td>White</td>
<td>200</td>
<td>75.5</td>
</tr>
</tbody>
</table>

RQ1 - What are the HAS participants' attitudes towards STEM learning and 21st-century skills?

In Table 2, more than half of the responding students indicated that they participated in NASA, Science, or Math clubs after school (58.1%). The rest of the students stated they did not have after-school clubs, but if their school did they would participate in these clubs (41.5%). Only 3% noted that they would not participate in after-school clubs if their school had such a program.

Table 2
*Frequencies and Percentages for Participation in Clubs (N = 265)*

<table>
<thead>
<tr>
<th>Participation Options</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participates in NASA, science, or math clubs after school</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The findings in Table 3 reveal that the behavior students exhibited the most in school was contributing to a group/team effort ($M = 8.77, SD = 1.71$). The behavior the students exhibited the least was planning ($M = 8.77, SD = 1.71$). The behavior students exhibited the most during the HAS program at JSC was contributing to a group/team effort ($M = 9.41, SD = 1.08$). The behavior the students exhibited the least at JSC was planning ($M = 8.05, SD = 2.12$). Paired t-test procedures were conducted to determine whether students behaved differently across settings (school and the HAS program). As shown in Table 3, students took significantly more initiative [$t(264) = -5.34, p < .001$], did more hands-on work [$t(264) = -5.82, p < .001$], felt more listened to [$t(264) = -7.73, p < .001$], did a lot more planning [$t(264) = -7.12, p < .001$], and contributed to a group effort more [$t(264) = -6.19, p < .001$] within the context of the HAS program than within the school. They also felt significantly less stressed during the HAS program than in school, $t(264) = 8.50, p < .001$. The only behavior that was consistent across settings was taking on leadership responsibility, $t(264) = -1.16, p = .247$.

Table 3
Descriptive Statistics and Paired t-test Results for Behaviors Students Exhibited in School and During the HAS Program ($N = 265$)

<table>
<thead>
<tr>
<th>Variable</th>
<th>School</th>
<th>HAS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>No</td>
<td>111</td>
<td>41.9</td>
</tr>
<tr>
<td>Yes</td>
<td>154</td>
<td>58.1</td>
</tr>
<tr>
<td>School doesn’t offer such clubs, would participate if it did</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>155</td>
<td>58.5</td>
</tr>
<tr>
<td>Yes</td>
<td>110</td>
<td>41.5</td>
</tr>
<tr>
<td>School doesn’t offer such clubs, not interested in participating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>257</td>
<td>97.0</td>
</tr>
<tr>
<td>Yes</td>
<td>8</td>
<td>3.0</td>
</tr>
</tbody>
</table>
The variables pertaining to the HAS program were tested and analyzed, and the items that were measuring specific constructs were grouped together into subscales. Reliability of these subscales was assessed via Cronbach’s alpha. As stated by Nunnally and Bernstein (1994), a measure is moderately reliable if its alpha is .70 or higher. All measures met this criterion and were thus moderately reliable.

As shown in Table 4, students were most positive about their understanding of the NASA program ($M = 9.72, SD = .67$). They were least positive about learning using NASA resources ($M = 9.21, SD = 1.06$). Nevertheless, the mean score above nine indicates that students still valued NASA learning resources.

Table 4

<table>
<thead>
<tr>
<th>Item/Subscale</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usefulness ($\alpha = .77$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participation in the program was a good investment of my time.</td>
<td>9.58</td>
<td>.89</td>
</tr>
<tr>
<td>My personal learning objectives were met.</td>
<td>9.06</td>
<td>1.40</td>
</tr>
<tr>
<td>Understanding of NASA ($\alpha = .76$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have a better understanding of NASA’s mission.</td>
<td>9.59</td>
<td>1.00</td>
</tr>
<tr>
<td>I learned something new about NASA.</td>
<td>9.81</td>
<td>.74</td>
</tr>
<tr>
<td>I think NASA does important and exciting work.</td>
<td>9.75</td>
<td>.69</td>
</tr>
<tr>
<td>Learning with NASA ($\alpha = .89$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I prefer learning with NASA resources.</td>
<td>8.97</td>
<td>1.58</td>
</tr>
<tr>
<td>I enjoy learning with NASA resources.</td>
<td>9.39</td>
<td>1.20</td>
</tr>
</tbody>
</table>
I enjoy learning when I use NASA materials. 9.27 1.26
Interest in STEM ($\alpha = .83$) 9.39 1.13
This experience inspired me to learn more about STEM. 9.38 1.32
I want to take more courses in STEM after learning with NASA. 9.42 1.21
As a result of this experience, I am more interested in a career in STEM. 9.38 1.39

Independent t-test procedures were also conducted to determine whether males and females differed in terms of their attitudes, evaluation, and perceptions about HAS program. Test statistics were evaluated at a two-tailed alpha of .05. The findings in Table 5 show that males and females did not differ significantly in terms of their usefulness, understanding, learning with NASA resources, and interest in STEM ratings.

Table 5
Descriptive Statistics and Independent t-test Results for Attitudes across Gender (N = 265)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>SD</th>
<th>Females</th>
<th>M</th>
<th>SD</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usefulness</td>
<td>9.30</td>
<td>1.02</td>
<td>9.38</td>
<td>1.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understanding of NASA</td>
<td>9.69</td>
<td>0.65</td>
<td>9.78</td>
<td>0.72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning with NASA</td>
<td>9.20</td>
<td>1.16</td>
<td>9.24</td>
<td>1.37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest in STEM</td>
<td>9.37</td>
<td>1.06</td>
<td>9.43</td>
<td>1.26</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < .05$. ** $p < .01$. *** $p < .001$.

The findings in Table 6 reveal that ratings for the overall program differed significantly across gender, $t(217) = -2.57, p = .011$. Females had significantly higher overall program ratings ($M = 9.65, SD = .84$) than males ($M = 9.34, SD = 1.09$). Ratings for application and understanding also differed marginally across gender, $t(181) = -1.96, p = .051$. Females had significantly higher application and understanding ratings ($M = 9.71, SD = .70$) than males ($M = 9.53, SD = .74$).
Table 6
Descriptive Statistics and Independent t-test Results for HAS Evaluations across Gender (N = 265)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall program</td>
<td>9.34</td>
<td>9.65</td>
<td>-2.57*</td>
</tr>
<tr>
<td>Online lessons</td>
<td>8.08</td>
<td>8.41</td>
<td>-1.56</td>
</tr>
<tr>
<td>HAS program</td>
<td>8.82</td>
<td>8.88</td>
<td>0.43</td>
</tr>
<tr>
<td>Application and understanding</td>
<td>9.53</td>
<td>9.71</td>
<td>-1.96</td>
</tr>
</tbody>
</table>

*p < .05. **p < .01. ***p < .001

In Table 7, the activity students found most beneficial was hearing from a panel of NASA employees about their education and care (M = 9.74, SD = .66). The activity the students found least beneficial was answering the online problems (M = 7.89, SD = 2.03).

Table 7
Means and Standard Deviations for Benefits from Attending the HAS Program (N = 265)

<table>
<thead>
<tr>
<th>Item</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figuring out the online lessons</td>
<td>7.92</td>
<td>2.01</td>
</tr>
<tr>
<td>Answering the online problems</td>
<td>7.89</td>
<td>2.03</td>
</tr>
<tr>
<td>Working with other students interested in science and engineering</td>
<td>9.39</td>
<td>1.34</td>
</tr>
<tr>
<td>Problem solving in the simulation (during the summer experience)</td>
<td>9.31</td>
<td>1.21</td>
</tr>
<tr>
<td>Evening competitive activities</td>
<td>9.17</td>
<td>1.31</td>
</tr>
<tr>
<td>Having mentors from NASA during the summer experience</td>
<td>9.66</td>
<td>.82</td>
</tr>
<tr>
<td>Hearing from a panel of NASA employees about their education/care</td>
<td>9.74</td>
<td>.66</td>
</tr>
</tbody>
</table>

The findings in Table 8 reveal that perceptions about working with other students interested in science and engineering differed significantly across gender, t(186) = -2.05, p = .042. Females had significantly more positive perceptions (M = 9.63, SD = 1.27) than males (M = 9.28, SD = 1.37). Perceptions about problem solving in the simulation also
differed significantly across gender, $t(211) = -2.50, p = .013$. Females had significantly higher more positive perceptions ($M = 9.56, SD = 1.03$) than males ($M = 9.19, SD = 1.28$). Lastly, perceptions about evening competitive activities differed significantly across gender, $t(222) = -2.39, p = .018$. Again, females had significantly more positive perceptions ($M = 9.42, SD = 1.06$) than males ($M = 9.05, SD = 1.40$).

Table 8
*Descriptive Statistics and Independent t-test Results for HAS Benefits across Gender (N = 265)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figuring out the online lessons</td>
<td>7.85</td>
<td>8.07</td>
<td>-.84</td>
</tr>
<tr>
<td>Answering the online problems</td>
<td>7.84</td>
<td>7.99</td>
<td>-.56</td>
</tr>
<tr>
<td>Working with other students interested in science and engineering</td>
<td>9.28</td>
<td>9.63</td>
<td>-2.05*</td>
</tr>
<tr>
<td>Problem solving in the simulation (during the summer experience)</td>
<td>9.19</td>
<td>9.56</td>
<td>-2.50*</td>
</tr>
<tr>
<td>Evening competitive activities</td>
<td>9.05</td>
<td>9.42</td>
<td>-2.39</td>
</tr>
<tr>
<td>Having mentors from NASA during the summer experience</td>
<td>9.63</td>
<td>9.73</td>
<td>-.88</td>
</tr>
<tr>
<td>Hearing from a panel of NASA employees about their education/care</td>
<td>9.70</td>
<td>9.81</td>
<td>-1.31</td>
</tr>
</tbody>
</table>

*p < .05. ** p < .01. *** p < .001.*

The findings in Table 9 show that interest levels in all areas increased significantly after students participated in the HAS program. According to the results, interest in pursuing a career in NASA and STEM-related fields increased significantly after students participated in the HAS program.

Table 9
*Descriptive Statistics and Paired t-test Results for Interest in Area and Pursuing a Career Before and After the HAS Program (N = 265)*

<table>
<thead>
<tr>
<th>Area</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>-----</td>
<td>----</td>
<td>-----</td>
</tr>
</tbody>
</table>

16
The findings in Table 10 show that interest in pursuing additional courses in STEM and geography increased significantly after students participated in the HAS program.

Table 10
Descriptive Statistics and Paired t-test Results for Interest in Pursuing Additional Courses Before and After the HAS Program (N = 265)

<table>
<thead>
<tr>
<th>Course</th>
<th>Before M</th>
<th>SD</th>
<th>After M</th>
<th>SD</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science</td>
<td>7.69</td>
<td>2.29</td>
<td>8.77</td>
<td>1.88</td>
<td>-11.05***</td>
</tr>
<tr>
<td>Technology</td>
<td>6.98</td>
<td>2.63</td>
<td>8.37</td>
<td>2.19</td>
<td>-11.63***</td>
</tr>
<tr>
<td>Engineering</td>
<td>7.50</td>
<td>2.68</td>
<td>8.80</td>
<td>2.07</td>
<td>-12.36***</td>
</tr>
<tr>
<td>Mathematics</td>
<td>7.21</td>
<td>2.68</td>
<td>8.18</td>
<td>2.36</td>
<td>-9.64***</td>
</tr>
<tr>
<td>Geography</td>
<td>4.34</td>
<td>2.56</td>
<td>5.57</td>
<td>4.34</td>
<td>-5.37***</td>
</tr>
</tbody>
</table>

* p < .05. ** p < .01. *** p < .001.

As shown in Table 11, the intent to pursue STEM-related activities increased significantly after students participated in the HAS program.

Table 11
Descriptive Statistics and Paired t-test Results for Frequency in Activities Before and After the HAS Program (N = 265)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Before</th>
<th></th>
<th>After</th>
<th></th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visit the NASA website</td>
<td>3.48</td>
<td>2.53</td>
<td>7.48</td>
<td>3.45</td>
<td>-18.14***</td>
</tr>
<tr>
<td>Talk to my family about NASA</td>
<td>4.63</td>
<td>2.68</td>
<td>8.13</td>
<td>2.41</td>
<td>-19.95***</td>
</tr>
<tr>
<td>Ask a teacher about space</td>
<td>4.91</td>
<td>2.81</td>
<td>7.32</td>
<td>3.76</td>
<td>-11.37***</td>
</tr>
<tr>
<td>Ask a teacher to do more NASA activities</td>
<td>3.19</td>
<td>2.51</td>
<td>6.46</td>
<td>4.08</td>
<td>-13.90***</td>
</tr>
<tr>
<td>Read a book about space</td>
<td>5.25</td>
<td>2.99</td>
<td>7.99</td>
<td>4.51</td>
<td>-10.40***</td>
</tr>
<tr>
<td>Consider doing a science fair project</td>
<td>4.67</td>
<td>3.07</td>
<td>6.64</td>
<td>2.97</td>
<td>-14.15***</td>
</tr>
<tr>
<td>Visit a museum, science center, or planetarium</td>
<td>6.84</td>
<td>3.38</td>
<td>8.62</td>
<td>4.26</td>
<td>-10.67***</td>
</tr>
<tr>
<td>Watch television shows that have a STEM theme</td>
<td>7.43</td>
<td>2.84</td>
<td>8.74</td>
<td>3.24</td>
<td>-10.70***</td>
</tr>
<tr>
<td>Do more STEM activities</td>
<td>7.46</td>
<td>2.42</td>
<td>9.13</td>
<td>3.47</td>
<td>-9.24***</td>
</tr>
<tr>
<td>Share my experience on social media</td>
<td>3.29</td>
<td>3.32</td>
<td>5.87</td>
<td>4.76</td>
<td>-13.14***</td>
</tr>
</tbody>
</table>

* p < .05. ** p < .01. *** p < .001.

Table 12 shows that the participating male students were most interested in pursuing a college internship at the NASA Center (91%). This was followed by a high school internship at the NASA Center (86.4%). The female students were most interested in pursuing a college internship at the NASA Center (89.8%) followed by a high school internship at the NASA Center (87.5%). As stated, male and female interests were generally similar. They differed in terms of taking high school online learning classes, \( \chi^2(1) = 3.98, p = .046 \); a greater percentage of females (47.7%) were open to taking online classes in high school in comparison to males (35%). They also differed in terms of their interest in Micro-g Next, \( \chi^2(1) = 5.81, p = .016 \); a greater percentage of females (65.9%) were open to participating in Micro-g Next in comparison to males (50.3%).
In analyzing the qualitative data collected (N=265) on the participants’ perceptions regarding the benefits of the HAS program and the program’s effects on 21st century learning skills, a total of 14 different benefit themes emerged upon completion of the data analysis. The most mentioned benefits of the HAS program by the student participants were: (1) career & college exploration, (2) interacting with NASA mentors & employees, and (3) teamwork skills. And the least mentioned themes, collectively, were: (1) creativity skills, (2) increased motivation, and (3) critical thinking skills.

The findings in Table 13 reveal that perceptions about benefits of the HAS program differed across gender, particularly in themes such as: increased confidence, teamwork skills, communication skills, and learn about NASA.

Table 13
Perceptions on Benefits of the HAS Program across Gender (N = 265)

<table>
<thead>
<tr>
<th>Themes</th>
<th>Female n</th>
<th>Female %</th>
<th>Male n</th>
<th>Male %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being with like-minded students</td>
<td>17</td>
<td>19.3</td>
<td>31</td>
<td>17.5</td>
</tr>
<tr>
<td>Interacting with NASA Mentors/Employees</td>
<td>30</td>
<td>34.1</td>
<td>60</td>
<td>33.9</td>
</tr>
</tbody>
</table>
When student participants were asked about the benefits of the HAS program, the most mentioned theme among female and male participants was the college and career exploration (35%). According to the coding results, the students believed the HAS program helped them to explore careers, particularly related to NASA and STEM; and identify college majors they believed beneficial to pursue for a STEM career. The second most mentioned theme among female and male participants was interacting with NASA mentors and employees (34%). According to the coding results, the participants believe that the opportunity to interact with NASA mentors and employees such as astronauts, engineers, scientists, flight controllers and interns is one of the major benefits of the program. Thirdly, the most mentioned theme was teamwork skills (30%). According to the coding results, the participants believe that the skills gained related to teamwork is one of the major benefits of the program. The fourth most mentioned theme was communication skills (20.4%), and the fifth most mentioned theme was learning about NASA (20%).

RQ2 - What are the parent's perceptions of the HAS program?
As shown in Table 14, the majority of the parents (N = 148) reported that their child had not participated in a NASA program in the past (92.6%). Parents indicated that their child was able to prioritize to complete both school and NASA work (64.9%). Almost all parents believed that their child would participate in NASA programs in the future (98%); and all but one parent would recommend the HAS program to other parents (99.3%).

Table 14

*Frequencies and Percentages for Participation in NASA Programs (N = 148)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child participated in NASA program in the past</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>137</td>
<td>92.6</td>
</tr>
<tr>
<td>Yes</td>
<td>11</td>
<td>7.4</td>
</tr>
<tr>
<td>How child dealt with time commitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t know, child managed on his/her own</td>
<td>32</td>
<td>21.6</td>
</tr>
<tr>
<td>Prioritized to get both school and NASA work done</td>
<td>96</td>
<td>64.9</td>
</tr>
<tr>
<td>Struggled with finding time to do NASA work</td>
<td>10</td>
<td>6.8</td>
</tr>
<tr>
<td>Got support from reviewer</td>
<td>2</td>
<td>1.4</td>
</tr>
<tr>
<td>Used some of the suggestions from the orientation</td>
<td>3</td>
<td>2.0</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>3.4</td>
</tr>
<tr>
<td>Child participate in future NASA programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>3</td>
<td>2.0</td>
</tr>
<tr>
<td>Yes</td>
<td>145</td>
<td>98.0</td>
</tr>
<tr>
<td>Recommend HAS program to other parents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>.7</td>
</tr>
<tr>
<td>Yes</td>
<td>147</td>
<td>99.3</td>
</tr>
</tbody>
</table>

Table 15 illustrates that parents believed their child benefited from the HAS program because of their exposure to role models and their experience with their mentors ($M = 9.59$, $SD = .75$), as well as the opportunity to problem solve ($M = 9.59$, $SD = .80$).
The least appealing aspect for their children was learning about NASA ($M = 9.39$, $SD = 1.22$).

Table 15  
*Descriptive Statistics for HAS Characteristics ($N = 148$)*

<table>
<thead>
<tr>
<th>Participation Options</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning about NASA</td>
<td>9.39</td>
<td>1.22</td>
</tr>
<tr>
<td>Mentors and role models</td>
<td>9.59</td>
<td>.75</td>
</tr>
<tr>
<td>Problem solving</td>
<td>9.59</td>
<td>.80</td>
</tr>
<tr>
<td>Being with other students interested in science</td>
<td>9.49</td>
<td>.92</td>
</tr>
<tr>
<td>Being with smart students</td>
<td>9.43</td>
<td>1.08</td>
</tr>
</tbody>
</table>

Paired t-test procedures were conducted to determine whether parent perceptions of their child’s interests changed after they attended the HAS program. As shown in Table 16, according to the parents’ perceptions, their students’ interests in NASA and STEM increased significantly after attending the HAS program.

Table 16  
*Descriptive Statistics and Paired t-test Results for Parents’ Perception of Child’s Interests Prior to and After Attending the HAS Program ($N = 148$)*

<table>
<thead>
<tr>
<th>Interest</th>
<th>Before $M$</th>
<th>Before $SD$</th>
<th>After $M$</th>
<th>After $SD$</th>
<th>$t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>NASA in general</td>
<td>6.68</td>
<td>2.60</td>
<td>9.18</td>
<td>1.39</td>
<td>.1415</td>
</tr>
<tr>
<td>Future opportunities at NASA</td>
<td>6.00</td>
<td>2.85</td>
<td>9.54</td>
<td>5.88</td>
<td>-7.04</td>
</tr>
<tr>
<td>Future opportunities in engineering</td>
<td>7.16</td>
<td>2.77</td>
<td>8.96</td>
<td>1.75</td>
<td>-9.67</td>
</tr>
<tr>
<td>Understanding NASA’s mission</td>
<td>5.64</td>
<td>2.60</td>
<td>9.12</td>
<td>1.48</td>
<td>-17.06</td>
</tr>
<tr>
<td>Taking more STEM courses</td>
<td>8.20</td>
<td>2.13</td>
<td>9.26</td>
<td>1.41</td>
<td>-8.11</td>
</tr>
<tr>
<td>STEM</td>
<td>7.80</td>
<td>1.94</td>
<td>8.92</td>
<td>1.37</td>
<td>-9.35</td>
</tr>
<tr>
<td>Careers at NASA</td>
<td>5.91</td>
<td>2.91</td>
<td>8.87</td>
<td>1.66</td>
<td>-14.82</td>
</tr>
<tr>
<td>Careers in STEM</td>
<td>7.11</td>
<td>2.10</td>
<td>8.47</td>
<td>1.55</td>
<td>-10.90</td>
</tr>
</tbody>
</table>

* $p < .05$. ** $p < .01$. *** $p < .001$. 
There was a total of 148 HAS parents who completed the open-ended question on the benefits of the HAS program. When parents were asked about the benefits of the HAS program, the most mentioned theme was the college and career exploration (37.4%). The second most mentioned theme was interacting with like-minded students (21.4%). The third, fourth, and fifth most mentioned themes were: interacting with NASA mentors and employees (18.3%), teamwork skills (14.5%), and learning about NASA (13.7%).

RQ3 - What are the facilitator’s perceptions of the HAS program?

There was a total of 35 HAS program facilitators that completed the research survey. Eight of the respondents were Texas certified teachers (educators) who applied to be a HAS program facilitator during the on-site experience at JSC. Twenty-seven of the HAS program facilitators were mentors who were NASA employees at the time of their on-site experience. The data in Table 17 reveal that the eight educators (Texas teachers) believed the most important benefit of the HAS program was learning about NASA resources ($M = 9.88, SD = .35$). The least important benefit was learning how to run a simulation ($M = 8.71, SD = 1.77$).

Table 17
Descriptive Statistics for Facilitator (Educator) Benefits ($N = 8$)

<table>
<thead>
<tr>
<th>Facilitator (Educator) Benefits</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learned about NASA resources</td>
<td>9.88</td>
<td>.35</td>
</tr>
<tr>
<td>Learned how to run a simulation</td>
<td>8.71</td>
<td>1.70</td>
</tr>
<tr>
<td>Made good contacts with NASA personnel for my teaching</td>
<td>9.38</td>
<td>1.77</td>
</tr>
</tbody>
</table>

In Table 18, educators highly-valued the opportunity to better access NASA resources ($M = 9.50, SD = .76$). The least valued opportunities were that they became
more knowledgeable about STEM ($M = 8.38, SD = 1.77$) and the NASA materials used in this experience aligned well with their teaching topics ($M = 8.38, SD = 2.39$).

Table 18
*Descriptive Statistics for Educator Takeaways (N = 8)*

<table>
<thead>
<tr>
<th>Educator Takeaways</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am more knowledgeable about STEM.</td>
<td>8.38</td>
<td>1.77</td>
</tr>
<tr>
<td>I am more aware of NASA resources.</td>
<td>9.38</td>
<td>1.06</td>
</tr>
<tr>
<td>I am better able to access NASA resources.</td>
<td>9.50</td>
<td>.76</td>
</tr>
<tr>
<td>The NASA experience has inspired me to bring NASA content into the classroom.</td>
<td>9.13</td>
<td>1.46</td>
</tr>
<tr>
<td>I can immediately apply what I learned from this NASA experience to my teaching about STEM.</td>
<td>8.75</td>
<td>2.38</td>
</tr>
<tr>
<td>I will be more effective in teaching STEM concepts introduced in this NASA experience.</td>
<td>9.00</td>
<td>1.60</td>
</tr>
<tr>
<td>Based on this NASA experience, I will make changes to my teaching activities.</td>
<td>8.87</td>
<td>1.81</td>
</tr>
<tr>
<td>The NASA materials used in this experience align well with what I teach or expect to teach.</td>
<td>8.38</td>
<td>2.39</td>
</tr>
<tr>
<td>These resources will be effective in increasing my students’ interest in STEM topics.</td>
<td>9.00</td>
<td>1.60</td>
</tr>
<tr>
<td>This NASA experience provided ideas for encouraging student exploration, discussion, and participation.</td>
<td>9.38</td>
<td>1.19</td>
</tr>
</tbody>
</table>

There was a total of 35 HAS program facilitators that completed the open-ended question on the benefits of the HAS program. The HAS program facilitators believed the most important benefits to the students were: career & college exploration (61.8%), teamwork (55.9%), and learning about NASA (41.2%), and was interacting with NASA mentors and employees (38.2%). And, the least important themes (<10%) were creativity skills (8.8%), time management skills (5.9%), and increased confidence (3.1%).

**Conclusion and Recommendations**

**Summary of Findings**

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In reference to the three research questions that directed this study, the following findings emerged after the researchers analyzed the collection of datasets from the participants:

RQ 1. What are the HAS participants' attitudes towards STEM learning and 21st century skills?

The findings of this study related to the HAS program's effectiveness and success provided evidence that the majority of the program participants reported that the HAS program was a valuable, inspiring, and effective experience. The participants’ satisfaction rate was extremely high (9.55 out of 10). The majority of the HAS program participants indicated that they would recommend other students to apply for the HAS program. The participants were most positive about their capacity to understand and apply various skills, and STEM knowledge learned during the HAS program. The HAS program participants emphasized that they learned more about careers related to NASA and had a better understanding of NASA’s support for education after participating in the HAS program. Moreover, the HAS program participants perceived the HAS facilitators as extremely helpful, involved, and interested mentors. This finding supported the statements made by the 2015 NRC report on OST STEM programs; indicating that the overall success of the OST programs is specifically related to the development of relationships with caring adults that serve as mentors to the participants.

Furthermore, the research findings provided evidence that the activity which the participants found most beneficial was hearing from a panel of NASA employees and having mentors from NASA during the on-site sessions. The program participants also reported that by interacting with NASA role models, they learned more about NASA;
thus, broadening their interests in NASA and STEM. These findings offer valuable evidence for NASA's importance on developing a STEM workforce and a continuing involvement and support of OST STEM programs. These findings have a number of similarities with Fadigan and Hammrich’s (2014) results that found that OST STEM programs provide unique opportunities to develop STEM workforce by allowing participants to meet with STEM professionals and learn more about their own interests in STEM.

According to the results related to HAS program benefits, another activity the student participants found extremely beneficial was working with others students interested in science and engineering. These findings are similar with Archer et al. (2012) and further support the idea of peer interaction in the formation of beliefs and values that affect interest development.

The findings of this study revealed that the HAS program participated in more hands-on work, felt more listened to, increased their planning, and contributed to a group/team effort more within the context of the HAS program than in their school setting. These findings are consistent with previous research that found that OST programs provide more innovative and engaging program structure, and hands-on learning activities that are collaborative, informal and personal (Beckett, 2009; Huang & Dietel, 2011). Moreover, the HAS student participants were less stressed and showed more initiative during the HAS program than in their traditional school setting. This finding concurs with the Afterschool Alliance (2011) and further supports the idea that providing a less structured, inquiry-based learning environment is essential for successful OST STEM programs.
Lastly, the HAS program inspired the participants to learn more about STEM; and as a result were more interested in taking additional STEM courses and pursuing STEM careers after participating in the HAS program. These findings coincide with the studies of Copper & Heaverlo (2013) and Krishnamurthi, Ballard and Gill (2011) which found that OST STEM programs, do in fact, increase the participant’s interest in STEM and STEM learning activities. In addition, the findings provided evidence that the HAS program had a positive influence on the student participants' attitudes toward 21st century skills. The participants stated they acquired additional skills related to communication, collaboration, team working, problem-solving and critical thinking. These findings were comparable to an Afterschool Alliance (2011) report which found that students who attend OST STEM programs are better prepared in areas such as collaboration, critical thinking, and problem-solving.

RQ 2. What are the parent’s perceptions of the HAS program?

The findings of this research provided evidence that the parents of the participants believed the most significant benefits of the HAS program were the panel of NASA employees and the NASA mentors. In addition, the majority of the parents believed that the interaction with NASA employees increased their child’s interest in STEM careers. Furthermore, the parents believed that interacting with like-minded students who share the same academic ambitions as their children was one of the positives of the HAS program. As stated by Archer et al. (2012), the idea of peer interaction plays a critical role in the formation of beliefs and values that affect interest development.

Moreover, the parents believed their child’s attitudes towards STEM increased after they participated in the HAS program. The findings also revealed that 9 out of 10
parents believed that the HAS experience inspired their children to learn more about STEM and take additional STEM-related courses. Lastly, the findings indicated that the participants’ parents believed their children become better prepared in skilled areas such as collaboration, team working, problem-solving and critical thinking.

RQ 3. What are the facilitator’s perceptions of the HAS program?

The HAS program facilitators provided evidence that the opportunity to access NASA materials was a significant educator benefit. Also, the eight Texas teachers indicated that the HAS program provided additional STEM curriculum and academic initiatives they could apply in their classroom. In addition, the facilitators believed that student participation in HAS program required all students to engage in meaningful and consistent teamwork. The correlation between teamwork activities and OST STEM programs is significant because, as reported by Casner-Lotto et al. (2006), teamwork is one the skills most sought after by employers. Other student benefits mentioned by the facilitators were: (1) meeting other students participating in the HAS program, (2) working with NASA role models, and (3) hearing from a panel of NASA employees during the on-site experience.

Recommendations

Based on the findings and conclusion of this study, the researchers offer the following recommendations.

Recommendation 1. The U.S. has transformed from a manufacturing economy to an information-based economy; however, technological advancements of the 21st century are not well-represented in K-12 curriculum. And yet, NASA plays such an essential role in scientific discoveries, space exploration activities; and technological developments.
The findings of this research and other research conducted by prominent scholars revealed that OST STEM programs, with a theme of space exploration, have the capacity to increase interest in STEM and STEM careers. Therefore, the researchers recommend that NASA should broaden the scope regarding OST STEM learning opportunities for K-12 students; especially for students who are underrepresented in STEM fields.

Since the inception of the HAS program in 1999, the partnership between the state of Texas, NASA Johnson Space Center and other organizations has proved to be successful. The researchers recommend that states where other NASA centers are located should replicate the Texas HAS program structure in their own states. Also, Johnson Space Center should be willing to provide the K-12 education systems in neighboring states, without NASA centers, the expertise in creating and implementing similar OST STEM programs with the understanding that these states can utilize the Johnson Space Center facility to conduct their OST STEM programs.

**Recommendation 2.** During the review of the relevant literature review, the researchers found that the programs have clearly defined goals and outcomes have greater success than those whose goals and outcomes are poorly articulated. After analyzing the findings, the researchers believe that one of the primary strengths of the HAS program’s success is its logic model which identifies linkage among the program resources, activities, and short-term and long-term goals. The researchers recommend that OST STEM programs should clearly define program goals and outcomes at the beginning stages of the program and align program planning and activities with desired assessment outcomes by creating a logic model for the program.
**Recommendation 3.** After reviewing the relevant literature review and analyzing data, the researchers determined that program participants and their parents highly-valued the interaction with other like-minded participating students. The researchers recommend that OST STEM programs should establish an alumni system that promotes active and ongoing relationships between program graduates and the program facilitators, as well as encourages the graduates to pursue STEM careers. Depending on the age group of program alumni, this can be achieved through: (a) social media tools, (b) an alumni LinkedIn group, and (c) yearly or biennially alumni gatherings.

**Recommendation 4.** During the review of the relevant literature review and the data analysis, the researchers discovered that by connecting OST program activities to real-world situations will actually increase student interest and engagement. The findings revealed that the students, parents, and facilitators agreed that providing HAS program participants with hands-on learning activities related to real-world challenges was an essential part of the HAS program. The researchers recommend that OST STEM programs should adopt a more intuitive and engaging curriculum that focuses on additional hands-on learning experiences that are directly connected to real-world scenarios.

**Future Research**

This study not only adds to the current body of research regarding HAS programs, but also has led to new ideas, further questions and areas of opportunity for academic research. As the investment continues to grow for OST STEM programs, it is essential to evaluate the effectiveness of these programs on STEM. However, the outcomes related to STEM careers are difficult to assess because of the lack of a comprehensive evaluation
tool that is reliable, valid and designed explicitly for OST STEM programs. The researchers suggest creating a valid, reliable and practical instrument to assess the effectiveness of OST STEM programs on career choice. A possible extension of the current study would be to assess the HAS program’s long-term effects on STEM career choice, which can be achieved by a new longitudinal study.
References


Learning Attitudes about Science Survey. Denver: University of Colorado Department of Physics.


Engineering, and Mathematics. *Journal of Youth and Adolescence, 46*(8), 1805-1820.
TITLE:
Student Perspectives on Using an e-Textbook in Non-majors General Biology Online Course

Topic Area: Cross Disciplinary Areas of Education

Presentation Type: Paper Session

Synopsis:
This session will provide participants the platform to engage in discussion on the use of e-textbooks in an online non-science majors general biology course. We will engage in conversation on the impact of the student’s view on their learning process. Results from this qualitative study will be discussed to highlight the students’ perception of the impact of e-textbooks have on the overall learning experience.

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STUDENT PERSPECTIVES ON USING AN E-TEXTBOOK IN NON-MAJORS GENERAL BIOLOGY ONLINE COURSE

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Abstract:

The current student in higher education today has at least two of the following digital devices on them at all times – smartphone, tablet, laptop, or smartwatch. Their constant use of these tools has forced the textbook industry and learning platforms to review what is being offered to students and provide students with data and information they need in the form they will use. More institutions have been exploring and adopting low to no cost course content for student use. Open Education Resources make use of Creative Commons Licenses. The various Creative Commons Licenses allow for reuse, mix, collaboration, and most of all sharing. The incorporation of adaptive learning with an Open Education Resource provides the student with an individualized learning experience. The student is able to move through the content related activities at their own pace and be redirected when necessary without being left behind or feeling unprepared. This may seem as a given for an online student but the ease of use with the adaptivity creates a unique learning experience for the student. The objective of this research includes the following: 1) To understand the student perspective of using a e-textbook in a non-majors general biology online course and 2) To impact the courses being taught at an Historically Black College and University (HBCU). The book cost for this research ranged from $0 - $40 for the students. The research was conducted during two academic years/four semesters in an online non-majors biology course. This qualitative study analyzed open-ended questions from students enrolled in an online course. The results from this research continue to guide the course design for this online course as well as translate to other online and traditional majors and non-majors courses. More research is needed to examine the impact of the course resources student learning and student achievement.

Key Words: online learning, OER, e-textbooks, adaptive learning
Introduction
In the current state of higher education, students are constantly introduced to new teaching and learning methods to meet their learning needs. The current student in higher education today has at least two digital devices on them at all times – smartphone, tablet, laptop, or smartwatch. Their constant use of these tools has forced the textbook industry and learning platforms to review what is being offered to students and provide students with data and information they need in the form they will use. The ability for this generation to connect to a text or reading material at anytime and anywhere is critical to their success because today’s student is a multitasker. In this study, an e-book is defined as a textbook that is accessible through the learning management system and has adaptive and/or interactive components. This research was conducted at a Historically Black College and University (HBCU) in the Southern part of the United States. Many of these students are either first generation college students and/or students who receive Pell Grants or Federal Financial Aid. Another contributing factor many instructors are considering in determining if the integration of e-textbooks will be beneficial to the overall learning experience is the financial barrier traditional textbooks pose for many students. Prior to the adoption of the e-book in this Biology course for non-majors, the textbook for this course was over $150. For a non-major who had to prioritize how they allocate their funds non-major courses were not the highest priority. Being able to eliminate the financial barrier for students by reducing the financial barrier to $0-$40 was also a factor in this student’s success. In addition, not having to wait for students to receive books from third-parties weeks after the semester started ensured learning could start on day one.

Definition of Terms:

Adaptive Learning - is a form of learning allowing learner to move at their own pace and software adapts to their learning process.

CogBooks™ - micro-adaptive system for learning. This system may be integrated into Learning Management System; it is also based on OER materials.

e-textbook - textbook that is accessible through the learning management system and has adaptive and/or interactive components.

HBCU- Historically Black College and University, there are 105 in United States.

OER- Open Education Resource, “are teaching and learning materials that you may freely use and reuse at no cost, and without needing to ask permission. Unlike copyrighted resources, OER have been authored or created by an individual or organization that chooses to retain few, if any, ownership rights”. OER Commons

Literature Review:
In recent years, the number of students opting out of purchasing a textbook has reached at least 30% (de Noelles & Raible, 2017). Due to the cost of textbooks and other student priorities, many students often prioritize which book they will purchase and when in the semester they will
actually buy a book. The College Board estimates the cost of books and supplies for the 2017-2018 academic year at a four-year public institution is $1,250 (Board, 2018). About 75% of students at this institution receive Federal Pell Grants and are limited to financial assistance outside of the federal funding they receive. If students are expected to cover these expenses after tuition and fees have been paid, some of them will opt out of or at least delay the purchasing of the textbook (de Noelles & Raible, 2017; Watson, Domizi and Clouser, 2017). With the delay in purchase, this impacts student learning and success in the course. In order to provide students with the tools they need on the first day of class, the use of OER (Open Education Resources) and e-textbooks has been adopted by many courses, departments and schools.

The use of Open Education Resources has been on the rise in the last few years to combat rising textbook prices. OER Commons (2018) defines OER as” teaching and learning materials that you may freely use and reuse, without charge.” This suggests resources can be used, shared, downloaded, and/or remixed to provide course content materials for students. Higher education has recognized the importance of using these peer-reviewed low to no cost textbooks for students (Levitan, 2018; Wiley, Hilton, Ellington, Hall, 2012).

One of the many OER initiatives was that of Rice University in 2012 with OpenStax™; their goal was to increase student access to course materials (OpenStax,2018a). OpenStax™ has saved students over $155 million dollars over the last six years. The numbers of colleges and universities national and internationally adopting such OER developments as OpenStax™ are continuing to rise and save students money (Levitan, 2018). Although OER saves students money, these resources have also been found to increase retention, reduce the time to graduation and impact student learning (Colvard, Watson and Park, 2018).

CogBooks™, was developed using Concepts of Biology, an OpenStax™ text as its contextual framework and employs adaptive learning tools which allows the student to learn at their own pace. The student can move back and forth in their own time and space with confidence. It is considered a micro-adaptive system which adjusts the sequence of the activities based on the individual students’ actions in real time (Thompson, 2016). In adaptive learning systems, “the systems “learn” from student interactions and then adjust the path and pace of learning” (Educase/ELI, 2017). Adaptive learning and its ability to provide a personalized learning environment for students is a “game-changer” in their learning (Murray, M. C., & Pérez, J., 2015). This type data-driven learning process can prove beneficial for students in many different courses and provide faculty and administrators with analytics to enhance teaching and learning.

**Research Objective:**

The objective of this research includes the following:

- To understand the student perspective of using an e-textbook in a non-majors general biology online course
- To impact the courses being taught at an HBCU (Historically Black Colleges and Universities)
Research Method:
This qualitative research was leveraged using online general biology non-majors courses at an Historically Black College and University in the southern part of the United States. Approximately 90% of students receive Federal Pell Grants. Student feedback for two academic terms were used, Fall, 2016, Spring 2017, Fall 2017 and Spring 2018; a total of 234 students. In each semester, there was one section using CogBooks™ which is combined with OpenStax™ and one section using only OpenStax™. The use of open-ended interview questions and video submissions created a rich sample for data collection and analysis. Research questions were addressed by participants based on their experiences in the online environment and served as the basis for the study.

To structure the comments, students received the following prompt and were allowed to provide their responses via submitted text, video and/or audio:

This semester we are using CogBooks™ or Concepts of Biology, which is linked in Moodle. I want to know your thoughts. Please be honest; there is no penalty for telling me you do not like it :)  

Is it practical to have it inside of Moodle?  
- Was cost reasonable?  
- Did you like the videos?  
- Do you like digital books?  
- Recommendations:  
- Requirements:  
  - Must include Name, Classification and Title of Book  
  - Quote  
  - Spell Check!, Grammar Check!, If it is a testimonial video, it must be professional! There MUST not be random noise in the background. You MUST be appropriately dressed. You MUST speak clearly. No driving and recording.

Results:

The data collected was from two academic years/four semesters (Fall 2016, Spring 2017, Fall 2017 and Spring 2018). There were a total of 234 students from nine courses; this total is at the end of semester when students have withdrawn from the course. Each course averaged 26 students per semester. From each section about 50% of the students responded to the prompt.

The following section presents the emergent themes associated with the answers provided by students. This section is divided according to themes that emerged from the assignment of the participants. The themes that emerged from the study were (a) cost, and (b) perceptions. Student names have been changed to keep anonymity.

Theme 1: Cost
During the analysis of the data, it was clear that students are very concerned about the amount of money they have to spend on books. The ability of the book being little to no cost ($0-$40) provided the most excitement to students.

Mitchell, a student taking the course shared his views:

Most of the books in college are around $100-200 and if you take the normal 15 hours that’s 5 books, together that would be almost $1000 if you actually purchased all of them. What’s worse is buying books that you end up not needing.

Travis is another student that had the opportunity to participate in the course and he stated:

Considering the fact that a biology book could be as expensive as $80 or more I say that this is affordable and you get so much content for such a small price. I say that it's perfect for every college student.

After reviewing the other comments on this question it was clear from rising tuition and fees, the cost of books for a full time student can be anywhere from $500 or more. The use of this cost efficient book relieved financial stress from a majority of the students as they said they were able to “focus on other areas” and not have to miss assignments due to not having $100-$200 to purchase a book.

Theme 2: Perceptions

In 2018, the ability of students to function in a digital learning system is dependent on their previous experience with similar systems and technological capabilities. The majority of them agreed that having the book available on the course homepage was best for ease of access because they did not have to search for a secondary website, they could just login and click to access the book. It also offered them flexibility. They were able to walk around with the book in their pocket because they could access it on their phones at any point of the day.

Rory spoke about her experience:

The online book is a great source for students like myself. It is very convenient to access online and it allows you to print out whatever chapters needed at no cost as well. This was the best idea yet. Hopefully in the future many other courses will consider this type of textbook to help students save money. It makes students feel like the instructors/University is willing to do whatever it takes to help us achieve our goals.

Students like Margan enjoy the idea of easy access to the book:

Yes. I feel that it's more accessible to have it inside of moodle, instead of logging out of moodle to get to cog books. I like digital books I feel that it's very easy to download and return if someone is renting them, and it's also easier to carry around just your phone or tablet versus a backpack full of books.
Students also felt the extra activities associated with the book were valuable because they enhanced learning more than a physical book not associated with an online site. The ability of the lessons to be self-paced allowed students to learn as they needed and review materials they were unsure about as much as they needed.

Angelina is a student that used the online text to her advantage:

> I like how the online book asks do you completely understand before allowing you to move on to the next lesson. The videos provided on there is a plus as well. They are very informative. Also, after each lesson it requires you to take a quiz to make sure you fully understand. The book makes the online class more easy, entertaining, and interesting. This online interactive tool also allows you to work at your own pace. All teachers should most definitely offer these type of books for the use of their class. It will take a big load off of their students.

Gina also enjoyed the activities that were provided:

> The online book made learning fun for me because of the videos, quizzes and worksheets. That ensured I understood the material before moving on to the next section. Also, this made me move at my own pace without slowing down others.

There were less than 1% of students who provided negative comments to the prompt.

**Conclusion:**

The student perspective is a valuable resource in the decision-making process for advancing teaching and learning in online courses as well as the traditional face-to-face course. The student recognized and appreciated the low to no cost e-textbooks used in the course as we are sure students do around the world (Bliss, Hilton, Wiley, and Thanos, 2013). For a student to state they value the self-paced learning and review in the course is also something to take note of for course design. If the student does not feel their learning can be individualized there may be resistance to successfully complete the course. With all courses, we want students to be successful and in this research their voices clearly state they want low cost e-textbooks with adaptive learning. Future studies at this HBCU will continue to evaluate the use of OER and/or adaptive learning. From this two academic year/four semester study the instructors were able to see how the adoption of the e-textbooks helped enhance the student’s overall learning experience. More research needs to be done to determine if student conceptual understanding was enhanced due to the access to slides, lecture notes, and supplemental material (e.g. videos and activities) included in the e-book and learning management system. From the preliminary results of comparing test data from previous semester there was no decline in student learning but a more in depth study needs to be designed to better assess the impact of e-books on students conceptual understanding.

**References:**


OER Commons (2018). OER Commons & Open Education. Retrieved from [https://www.oercommons.org/about](https://www.oercommons.org/about)


TITLE: Examining Mindfulness and Body Image in the Context of Yoga

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ABSTRACT: Negative body image has been associated with low self-esteem, eating disorders, and mental illness. Many young girls are dissatisfied with their bodies, even at an early age, and this has been shown to continue and worsen over time. Researchers have studied the effect of physical activity on body image, but results are mixed, and few have examined the reasons why it might be effective. The purpose of this study was to examine the relationships of mindfulness and self-compassion to body appreciation and body surveillance in women during a 16-week yoga course. It was hypothesized that higher state mindfulness and self-compassion would predict decreases in body surveillance and increases in body appreciation over the 16 weeks. It was also hypothesized that there would be an increase in trait mindfulness, self-compassion, and body appreciation, and a decrease in body surveillance throughout the course. The study included 147 female participants (M\text{age} = 20.28). Self-report surveys were administered to participants during week one, and then again in week 16 to assess trait mindfulness, self-compassion, body appreciation, and body surveillance. Surveys assessing state mindfulness were administered every two weeks for a total of seven surveys. Average scores of state mindfulness were used in the main analyses. All correlations between variables were significant and in anticipated directions. State and trait mindfulness, self-compassion, and body appreciation all related positively to each other, and they all negatively related to body surveillance. In looking at whether mindfulness and self-compassion predicted body surveillance and body appreciation, we found that higher state mindfulness and self-compassion related to decreases in body surveillance and increases in body appreciation. Interestingly, trait mindfulness was not a significant predictor in either case. Understanding these relationships is essential so that women can begin to work on implementing strategies that will support more positive body image. Yoga can be an effective tool in aiding women in their journey on becoming more mindful and self-compassionate.
Student perceptions about participation in co-curricular engineering projects - an Institutional Study at Cal Poly San Luis Obispo.

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Abstract (300+ words)

Co-curricular team projects in engineering – like design projects, experimental assignments, or national project-based competitions or challenges – can be key experiences for students in forming personal and professional skills and traits. Little concrete data is available about why students choose to participate or not participate in such activities though, and how their participation and perceptions of the activities may be influenced by factors such as their gender identity, race/ethnicity, and other facets of themselves and their experiences. Without this data, it is difficult to conceive of strategies to improve participation in certain activities among groups of people who are otherwise under-represented compared even to their representation at the College level. The research was devised to gather insight into why students chose to participate or not participate, and what they felt the benefits and detrimental effects of participation were. The pilot study was conducted at the Cal Poly San Luis Obispo campus, which is part of the California State University system - it has a student cohort that is not particularly diverse compared to the rest of the system or highly representative of state demographics, and it has an institutional focus on applied, hands-on learning that means that a high number of students participate in co-curricular engineering projects. A 70 question survey tool, adapted from an existing tool, garnered responses from nearly 500 students, with demographic and identity questions preceding sections about factors that led to participation or non-participation, and then perceptions of positive and negative outcomes that can come from involvement in co-curricular engineering projects.
1. Introduction

Preparing students properly for the global workforce, and ensuring that engineering graduates have satisfactory skills that span both the technical and interpersonal, are national priorities (Clough, 2004). ABET requires institutions to provide opportunities for students to practice technical and professional skills, to develop creative thinking, problem-solving skills, teamwork, and general application of theory to practice – all notions that are developed or re-enforced in co-curricular engineering activities. Therefore, engaging students in applied project-based work that sits outside the classroom has been pursued by many institutions as a means of improving students’ professional attributes and supplementing learning and formation in a hands-on way. Understanding how students are learning in co-curricular projects - when there is often little-to-no formal or informal assessment of their attainment of concepts or practice or connections to the curriculum and beyond - is undoubtedly difficult but useful given the voluntary time, effort and resources that many students apply to engineering projects for which they most often obtain no academic credit. Properly understanding why they choose to participate in the first place is just as vital, but we know exceptionally little about this (Yu et al., 2015), which also severely limits our ability as educators to ensure that students who are under-represented in engineering are able to access and take benefit from such experiences.

The research described here was aimed at addressing the following questions, based on preliminary analysis of survey data that will later be used to glean a greater depth of insight into the role of gender, ethnicity, and other potentially influential factors that influence participation in projects (and student attitudes towards that participation or otherwise).

1) What are the perceived positive and negative outcomes of participation in co-curricular engineering activities that students at Cal Poly feel the most strongly about?
2) Are there significant differences in those perceptions and the emphasis placed on them by different demographic groups?

Co-curricular activities are increasingly recognized as “the place where it all comes together.” Participation in activities outside the curriculum has been shown in some circumstances to be a more accurate predictor of workplace competence than grades (Kuh, 1995). Carberry et al (2013) found that among 261 engineering students, 45% of their technical skills and 62% of their professional non-technical skills were self-attributed to an engineering service experience. For instance, in one significant study into where engineering students encounter ethical considerations (Burt et al., 2011), 30% of 4000 indicated regular participation in project-based “clubs”.

Note that in this research we refer to co-curricular activities as strictly those which align well with the major subject area (engineering) and typically provide students/members with a project-based experience (e.g. Formula racing, Concrete Canoe, Robotics Club, etc.). They are usually associated with no formal academic credit. We explicitly exclude professional/social development societies and organizations like Society of Women Engineers or Society of Hispanic Professional Engineers from this category as, while they may involve some project activity, that is not their main purpose or engagement for all their members. We define extracurricular as being largely unrelated to the major subject area, such as athletics, band, scuba diving club, and similar activities. These distinctions were spelled out to students in the
course of completing the survey described in section 2, to ensure that there would be little to no confusion as to the nature of activities in question for the present research.

Yu and Simmons (2015) looked at available research between 2000 and 2013 identified only four peer-reviewed investigations that dealt directly with factors related to student participation in any co-curricular activity (undergraduate research, service learning, and others), and only one dealt directly with reasons for student participation. Some reasons for the lack of data and study may be obvious: occasionally, faculty advisers are not deeply involved (emotionally or professionally) in the student organization, and students working on projects for competitions or other events are unlikely to find themselves being assessed and may therefore conduct relatively little self-reflection without explicit prompting - leaving an open-ended question as to how and by how much they have actually developed professionally and personally, let alone why they participated in the first place.

Simmons et al. (2015) attempted to better understand under-represented engineering students’ involvement in activities, and developed a Postsecondary Student Engagement Survey (PosSE, discussed in greater detail in section 2, since this methodology is being adapted in part for the present proposal). The holistic study references all “out of class” activities, including those not at all associated with engineering. The study was the first one of its kind but was limited to 10 students (as befits a trial of the methodology before the approach is finalized and rolled out on a larger scale). At that time the authors stated “currently there exists no valid and reliable survey that comprehensively measures… reasons for and for not participating in out-of-class activities.” In terms of why students choose to participate, anticipated positive benefits may be only one of many reasons to join or not, and the benefits may not be perceived to outweigh downsides. The study’s widescreen focus on all possible activities yields a wealth of new information, but very little of it discernibly to do with hands-on engineering project activities of the type that are common on many university campuses, and the study is premised on the foundation of engineers being reluctant to participate and a need to know why – this is not our experience at Cal Poly, where a vast number of project experiences are available to, and popular with, engineering students.

Simmons et al (2015) also asked of both literature and research subjects “what demographic and institutional characteristics are associated with engineering students who participate in out-of-class activities?” – we will further refine this area of inquiry to focus specifically on co-curricular engineering projects. Students with a strong stated intent to work in engineering upon graduation were more likely to involve themselves in purely-engineering activities. Holland et al (2011) undertook a qualitative study of 62 students comparing participation from a historically-Black college and a primarily white institution – they found that female students were more interested in activities with a strong professional orientation, with males more interested in less formal interactions with peers and alumni. The researchers uncovered intrinsic motivations such as powerful interest in their major, valued interactions with peers, and a break from coursework being desirable. Extrinsic motivations included improving their marketability to industry. Scheduling and lack of information were cited as frequent stumbling blocks to participation, with faculty encouragement and peer/role-model encouragement enhancing likelihood of involvement.
Estrada (2014) concluded that engagement in co-curricular activities helps to strengthen underrepresented minority (UMR) students' continued interest in a STEM career. Normally these students have lower rates of participation in co-curricular activities due to lack of social cohesion. In addition to creating an engaging environment for students, universities need to consider the psychological factors that motivate students to spend their extra time participating in co-curricular activities. Estrada concluded that the relationship between self-efficacy, identity, and resilience plays the largest role in motivating a student to invest time in a co-curricular program. While these traits are mainly dependent on the individual, they can be developed through a positive, supportive academic setting. With increased traits like self-efficacy, the apparent barriers that prevent students from engaging decrease. Students will also begin to develop a more clear personal identity that could help improve their long term interest in the STEM field. Insight into what motivates students to continuously engage in these beneficial programs can help universities to create a more supportive environment that will encourage UMRs to participate.

For the present research we have attempted to focus our efforts on better understanding student perceptions around engaging in co-curricular activities (expected positive or negative outcomes), comparing answers from those who either did or did not participate at a single institution. Viewing the responses through an identity-based framework dealing with gender and race/ethnicity would begin to highlight differences in attitudes and experiences from groups, though we stress that this is a first pass through a large amount of data which will require closer analysis.

Cal Poly San Luis Obispo is a primarily-undergraduate institution, part of the multi-campus Cal State system and, being a polytechnic, noted for its focus on engineering and science subjects in particular. The campus has the least diverse student cohort in the Cal State system, with over 50% of students reporting as white in the College of Engineering. Female enrollment is at around 25% though this varies widely across departments. Cal Poly has an explicit mission of “Learn By Doing” which has resulted in the creation of between 35 and 40 funded hands-on co-curricular project experiences available in Engineering alone, not counting other related experiences such as research, internships, etc. As a result, student participation in co-curricular activities is assumed to be high relative to other campuses that do not offer nearly as many potential activities. It is in this context that we decided to better understand the student decision-making process surrounding their engagement or lack of participation in co-curricular engineering projects.

2. Methodology

2.1 Design of Research and Data Gathering
All data was gathered from an online survey (the full questions appear in Appendix B, with the ones focused on for this paper highlighted in Appendix A). This was supplemented with more detailed information obtained from several semi-structured interviews with respondents who participated in the aforementioned survey. The online survey was adapted from the constructs presented in Developing the Postsecondary Student Engagement survey (PosSE) to Measure Undergraduate Engineering Students Out of Class Involvement (Simmons et al. 2015). PosSE consists of eleven constructs developed using Q-methodology; PosSE analyzes the satisfaction, sense of belonging, level out of class involvement, and other relative concepts. Since the PosSE survey tool was thoroughly developed through workshopping the
questions and potential answers with a variety of students to ensure a very comprehensive range was covered, the present tool was not extensively modified. However, because PosSE also accounts for all activities outside this project’s definition of co-curricular activities, we modified some items in the following PosSE constructs to fit the scope of our project: Factors that Promote Participation, Factors that Prevent Participation, Expected Positive Outcomes, and Expected Negative Outcomes.

In order to distinguish between students who have and have not participated in co-curricular engineering activities, the online survey was designed with three sections. The first section contained an informed consent form, and the second section contained fourteen demographic questions on gender, race/ethnicity, pell grant status, academic standing, etc. Students were able to self-report their race/ethnicity by typing, rather than choosing from a prescribed list. Unlike the previous two sections, which were open for all survey respondents to answer, the third section split survey respondents based on whether or not they participated in a co-curricular engineering activity in the last twelve months. Using the logic function of the online surveying tool, those who indicated involvement in a co-curricular were automatically directed to rank fifteen factors that they may have felt directly promoted their participation in a co-curricular activity on a five point Likert scale. Similarly, those who indicated no participation ranked fifteen factors that may have limited their participation in a co-curricular activity on the same scale. All respondents were then directed to rank eleven perceived positive outcomes and eleven negative outcomes of participating in co-curricular activities, regardless of whether they participated or not. Respondents were also given the option to enter a random-draw raffle for a chance to win one of 4 fifty dollar gift cards, as incentive to drive survey completion.

A pilot survey was conducted with 6 students to ensure the online survey functioned correctly, and to garner feedback about its usability and understandability. Only minor changes were required after this to roll out to the wider engineering population. For the main survey, a link was emailed to the entire College of Engineering student cohort at Cal Poly as a census. In addition, specific promotion was asked of several of Cal Poly’s minority-serving clubs/organizations to its engineers (National Society of Black Engineers, Queer Transgender People of Color, etc).

2.2 Observational Unit
The approach outlined above constitutes a self-reported observational study. The population of interest is the engineering students at Cal Poly in June 2018. While primarily intended for engineers and disseminated to engineering groups, there were no specific measures in place to prevent non-engineers from filling out the survey. Since this was a distributed as a census, data from the pilot and main survey were included in the frame analyzed. Incomplete responses were later deleted from the data set to make analysis more streamlined and reliable.

2.3 Response and Explanatory Variables
The response variable of interest for the project is “Have you participated in a co-curricular activity in the past 12 months?”. As expressed in the research question, we wished to determine what differences in perceptions of positive and negative benefits may exist between students who choose to join or not join a co-curricular engineering activity.
This was measured against our explanatory variables from the “Expected Outcome” section of the survey (positive or negative results that could stem from participation) all students responded to; questions 47-68 from the survey in Appendix B. Additionally, these variables were analyzed across the demographics of gender (cis-man and cis-woman) and race (Asian, Latinx, multiracial, white) for comparison.

2.4 Analysis procedure
All statistical analysis was completed using JMP Pro 14 software. To gain insight on the distribution of our survey participants with regards to our response variable and explanatory variables, we made use of the *distribute* function. The explanatory variables followed a similar procedure, recording the response rate of strongly agree, agree, neutral, disagree, strongly disagree, and making note of the distribution. In addition, each explanatory response category was assigned a value based on the Likert Scale (1-Strongly Disagree, 2- Disagree, 3 - Neutral, 4 - Disagree, 5 - Strongly Disagree) and the values averaged for each question. To understand the association between the response variable and the explanatory variables, the distribution function was once again used. One item from the survey was selected at a time as the variable of interest and compared with the response variable. We recorded the response rate of strongly agree, agree, neutral, disagree, strongly disagree, and made note of the distribution for each response by their respective answer to yes or no to co-curricular participation. This procedure was repeated for each demographic category mentioned above. To test for statistical significance of our explanatory variables with our response variables, a Chi-Square Test was conducted to retrieve a p-value.

3. RESULTS

3.1 Descriptive Statistics

Sample Demographics
In total, 550 survey responses were collected using the online surveying tool. All analysis, results, and conclusions stated in this paper were drawn from the final cleaned dataset which totaled 476 respondents. Depicted in Table 1 is the demographic breakdown of both the survey respondents and the Cal Poly College of Engineering (CENG) based on institutional statistics correct as of 2016/17. Cis men constituted more than half (n=259) of all total survey respondents in the gender category, but were underrepresented in this survey in comparison to their overall makeup (74.4%) of the CENG. Cis women only makeup 25.6% of the CENG but responded to the survey at a rate of 43.3% (n=206). Genderqueer, non-binary, transgender, and unsure/questioning students, respectively constituted less than one percent of survey respondents. Because there is no published data on the demographics of students with the aforementioned gender identities, this project is unable to determine whether the data gathered in the survey is representative of the CENG, but we would consider the numbers too small to make any valid analysis at this stage.

White students make up the largest racial group in both the survey (n=288) and the CENG (n=3,320); however, white students were overrepresented in this survey by almost ten percent. Asian students constitute the second largest racial group in both the survey and the CENG, and were along the lines of their demographic makeup. Latinx students were only 6.3% of survey respondents, but are 14.1% of the CENG. In itself, these numbers could be connected to anecdotal evidence that Latinx students may be under-represented in co-curricular projects on campus, even compared to their under-representation in the
college cohort. However, multiracial respondents were 13.5% of respondents, almost double their CENG constitution. There were only two black survey respondents, yet their survey constitution (0.4%) was similar to their CENG composition (0.7%).

Table 1. Demographics of respondents vs. Cal Poly College of Engineering

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total Survey Respondents</th>
<th>Total Students in College of Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N=476)</td>
<td>(N=6,421)</td>
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<td>Gender</td>
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<td>Latinx</td>
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<td>503</td>
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<td>Native Hawaiian/</td>
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<td>3,320</td>
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<td>Unknown</td>
<td>14</td>
<td>298</td>
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</table>

Co-curricular engineering project participation

Of the 476 student respondents in the sample collected, 54.83% students indicated they participated in a co-curricular engineering project activity in the past year. A breakdown of co-curricular participation by demographics with more than 5 respondents can be seen in Table 2. Separated by gender, cis men had a participation rate of 56.9% and cis women 51.9%, indicating relatively similar participation rates, with cis men above average participation and cis women below. When separated by race and ethnicity, participation of students identified as white was 57.6%, Asian 47.4%, multi-racial 54.6%, and Latinx 43.3%. Therefore Asian and Latinx students were significantly below the average participation rate of students as compared to white students, and multi-racial students are at about the average.

Table 2. Summary of response variables by gender and race/ethnicity
Perceived Outcomes that Promote or Prevent Co-Curricular Participation

The average responses to the perceived expected outcomes from joining a co-curricular can be seen in the Likert scale average in Figure 1 and Figure 2; the items are ordered from strongest agreement to strongest disagreement, and green indicates a potential positive benefit while yellow indicates a perceived potential negative outcome. The value of their averages are also listed according to their demographic identity in Table 4 of Appendix A. The expected positive outcomes that appear to be the most important toward promoting general participation are Career and professional development, Intellectual development, and Connection with your discipline. All three of these factors were above the Likert average for women and multi-racial students. All other demographics rated below the average besides white students who matched the average of Connection with your discipline. Worth noting is that women rated all factors that promote participation higher than average.

![Figure 1. Likert scale averages of expected positive outcomes for the standard (mean) respondent](image)

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Total of Demographic who Participated in a Co-curricular Activity</th>
<th>Percentage</th>
<th>Total of Demographic who didn't participate in a Co-curricular Activity</th>
<th>Percentage</th>
<th>Total Demographic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cis women</td>
<td>107</td>
<td>51.9</td>
<td>99</td>
<td>48.1</td>
<td>206</td>
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<tr>
<td>Cis man</td>
<td>140</td>
<td>56.9</td>
<td>106</td>
<td>43.1</td>
<td>246</td>
</tr>
<tr>
<td>*Other</td>
<td>14</td>
<td>58.3</td>
<td>10</td>
<td>41.7</td>
<td>24</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>37</td>
<td>47.4</td>
<td>41</td>
<td>52.6</td>
<td>78</td>
</tr>
<tr>
<td>Latinx</td>
<td>13</td>
<td>43.3</td>
<td>17</td>
<td>56.7</td>
<td>30</td>
</tr>
<tr>
<td>Multi-Racial</td>
<td>35</td>
<td>54.7</td>
<td>29</td>
<td>45.3</td>
<td>64</td>
</tr>
<tr>
<td>White</td>
<td>166</td>
<td>57.6</td>
<td>122</td>
<td>42.4</td>
<td>288</td>
</tr>
<tr>
<td>*Other</td>
<td>10</td>
<td>58.2</td>
<td>7</td>
<td>41.2</td>
<td>17</td>
</tr>
</tbody>
</table>
The most significant expected outcomes that negatively impacted potential participation were *Consumed my time therefore my schedule was less flexible*, *Decreased time spent working for wages*, and *Personal health declined*. Asian students rated *Career and professional development declined* as a reason for not participating above the Likert average and multi-racial rated it below the average. *Personal development negatively impacted* was rated significantly higher than average for Latinx students and below average for multi-racial. All demographics ranked *Social development negatively impacted* at about its mean.

**Perceived Expected Outcomes by Participation in Co-Curricular**

A first look at potential association between a student’s perception of the expected outcomes and their participation in co-curricular activities can be seen in Appendix B Tables 6 to 13. Table 13 below shows this association for a negative outcome: *Academic timeline extended*. In particular, note that the grouping that had not participated in a co-curricular activity had a significantly higher percentage of students who “Agree” that academic timeline extension is a disincentive, as compared to students who have participated. Figure 3 provides a visualization of this interaction. On the left we see the overall distribution of responses, which is then broken up by those who participated and those who did not. The association is worth noting for these factors, *Intellectual development*, *Personal development*, *Academic timeline extended*, *Career and/or professional development declined*, *Decreased my GPA in college*, *Increased expense*, and *Decreased time spent working for wages*. 
Figure 3. Standard (mean) Respondent Academic Timeline Extended Response Distribution
Overall Comparison to Standard (mean) Respondent Distribution Contingent on Participation in Co-Curricular activities

This same visualization is undertaken by demographics in Figures 4 to 9. The distributions by demographic on the left side of each figure follows a similar distribution to the standard respondent. On the right side of each figure this is once again separated into students who did and did not participate in a co-curricular. Notably the distributions for cis males, cis females, white, Asian and multiracial students are similar to the standard respondent, all had a more pronounced “Agree” among students who did not participate compared with students who did. A significant exception is from those identifying as Latinx, in this case those who participated and those who did not had a large amount of students with “Agree”. For Latinx students, the factor may not distinguish between those who did and did not participate, but is worth noting for the difference between Latinx and other demographics.
3.2 Inferential Statistics

The Chi-square test was used to determine which factors maybe the most statistically significant. With many variables, the potential for false positives was avoided by using a prediction model to find those most relevant to the sample. Additionally, certain factors did not meet the validity conditions for the chi-square test, usually with insufficient responses in a particular category. The factors passing the initial Chi-square test with a significance level of .05 were *Intellectual development, Personal development, Academic timeline extended, Career and/or professional development declined, Decreased my GPA in college, Increased expense,* and *Decreased time spent working for wages.* Gender and race were not statistically significant on their own. The results with the full set of p-values for each explanatory variable are provided in Table 5 in the Appendices.

The model we used includes the following factors: *Intellectual development, Academic timeline, Career and/or professional development declined,* and adjusted for with *decreased time spent working for wages.* With a p-value of .0001, this model is found to have a statistically significant association with a student’s choice to join or not join co-curricular projects. The R-square value, which measures the amount of variability the model explains, is 11.5%.

Figure 4. Cis Men’s Academic Timeline Extended Response Distribution Overall Compared to Cis Men’s Response Distribution Contingent on Participation in Co-Curricular activities
Figure 5. Cis Women’s Academic Timeline Extended Response Distribution Overall Compared to Cis Women’s Response Distribution Contingent on Participation in Co-Curricular activities

Figure 6. White Students’ Academic Timeline Extended Response Distribution Overall Compared to White Students’ Response Distribution Contingent on Participation in Co-Curricular activities
Figure 7. Asian Students’ Academic Timeline Extended Response Distribution Overall Compared to Asian Students’ Response Distribution Contingent on Participation in Co-Curricular activities

Figure 8. Latinx Students’ Academic Timeline Extended Response Distribution Overall Comparison to Latinx Students’ Response Distribution Contingent on Participation in Co-Curricular activities
4. Discussion and Preliminary Conclusions

With little information on the decision for students to join or not join co-curricular activities, this study is intended to be exploratory and based on student perceptions of positive and negative outcomes, ignoring for now more specific reasons for why they actually did or did not participate (which will form the basis of continued work). In this regard, a wide net was cast with the intention of paring down to information worth further investigation. This is especially important in the context of finding sources that have the greatest impact on the decision to participate in co-curriculars.

From our sample, we had significantly higher participation rates among some groups of under-represented students as compared with their demographic make-up in the college. For instance, cis women make up 25.6% of the Cal Poly College of Engineering but were 43.3% of the respondents. Any future study may wish to account for this in their sampling techniques to have an improved representative sample. Even with this in consideration, white and male students had higher participation rates then their underrepresented counterparts.

Student perception of expected outcomes provides a raw interpretation of what students as a whole consider important in their choice to join or not join co-curriculars, even if they were not able to for other reasons. Career and/or professional development ranks high in this regard, both as an incentive for joining and a disincentive if their worry is its decline. There is no significant difference in this regard among those who do and don’t participate, when it comes to this factor’s importance. This is also true of social development and academic engagement for incentives to join and consumed my time as a
disincentive. While there may not be a distinction in terms of those who do and don’t participate on these factors, it is worth further investigation to understand why students overall feel strongly about these items.

An interesting observation on the Likert Scale averages by demographic is how these demographics differ in their ranking of perceived outcomes. In Appendix A Table 4, as noted earlier, women seemed more enthusiastic about the perceived benefits of co-curriculars even as they had lower participation rates (though we note that at Cal Poly, female students are very likely to be associated with the Society of Women Engineers, which we deemed not to have enough engineering project activity to classify as a co-curricular by our definition, but may consume significant time and effort from the female students involved). However they also seemed to feel more strongly that there may be potentially significant negative outcomes. The largest gaps between men and women came under *Consumed my time* and *Decreased time spent working for wages*. Latinx students were almost always below the average of all students on perceived positive outcomes and above average on perceived negative outcomes, indicating that as a group, Latinx students may not think as highly of potential positive outcomes and placed more emphasis on the perceived negative outcomes. In light of Latinx student’s low participation, it’s worth further examination why this may be the case and if a change in perception among Latinx students that more closely reflects the standard students may help improve participation – this would involve a more detailed look at why those perceptions exist and whether they are accurate and valid or not for this demographic (e.g. whether a structural barrier needs removed, or whether more information and exposure would change a perception).

Also worth noting are that certain factors stand out as especially important to certain demographics. For instance, civic development ranked especially high among Asian students compared with the standard student. This maybe an avenue towards increasing participation if this aspect of co-curriculars were better promoted.

The model we used to associate student choice to join or not included factors *Intellectual development*, *Academic timeline*, *Career and/or professional development declined*, and adjusted for with *decreased time spent working for wages*. The adjustment accounts for overlap with other variables that might be statistically significant. In this case *Intellectual development*, *Academic timeline*, and *Career and/or professional development declined* are statistically significant in their own right. This indicates these three perceived outcomes play a significant role in differentiating the attitudes of students who decide to join compared with those who do not, however this does not exclude other sources of variation or even the other perceived factors. Indeed, the R-square value indicates only 11.5% of variation is accounted for between these two groups. It makes these factors worth a deeper look, but further investigation is needed to find other sources to explain the variation between students who join and do not join co-curriculars.

Certain factors may not have met criteria for the Chi-square test or otherwise may not be statistically significant, but are worth considering in observing the association between participation in co-curriculars and our other factors. The following items stand out: *Intellectual development*, *Personal development*, *Academic timeline extended*, *Career and/or professional development declined*, *Decreased my GPA in college*, *Increased expense*, and *Decreased time spent working for wages*. In Appendix B Tables 6 to 13 we note the differences in responses between students who joined and did not join co-curricular activities,
for instance a benefit of *Personal Development* had those who did not participate agree at 57%, and those who did participate strongly agree at 52%. For this reason an important consideration is that simply agreeing or disagreeing with a particular perception may not on its own affect participation, but how strongly a student agrees or disagrees with the statement which will color their attitudes to decision-making.

5. Future Work
The work presented here is our first look at a rich and significant data set that also includes interview material not discussed in this paper. At present, the survey described in this paper is being rolled out at several other universities in California that feature engineering programs but which have significantly different institutional profiles (public vs. private, large vs. small, research-intensive vs. primarily undergraduate) and/or gender or ethnic demographics in their engineering student cohort. This trove of new information will allow for stronger conclusions based on the identity factors we have focused on here, by reducing the dependence on data from a less diverse university that is unusually focused on undergraduate project experiences. It will also allow for more productive exploration of factors relating to international students or students for whom English is not a first language, which is rare at Cal Poly but prevalent at other universities. We anticipate using the present data to further investigate student decision-making through the lens of the “theory of planned behavior” (Ajzen, 1991), and to cross-correlate the survey data we have not explored here (statements about why did you choose to participate or factors which limited your participation) against the perceived positive and negative outcomes of participation to look for scenarios in which students do not participate but have highly favorable perceptions of benefits if they *do* participate, so that more specific barriers to participation can be identified for student groups.

Acknowledgements
This material is based upon work supported by the National Science Foundation under Grant No. 1738154, titled “Research Initiation in Engineering Formation: Why do some students participate in co-curricular activities?” We gratefully acknowledge the input of Monica Singer and Nicki Holm in helping with the data gathering process and general advice for the project, and Emily Doughty in assisting with background literature.

References


Appendix A

Table 4. Likert scale averages of student’s perceived positive and negative outcomes

<table>
<thead>
<tr>
<th>Category</th>
<th>Standard</th>
<th>Cis Man</th>
<th>Cis Woman</th>
<th>White</th>
<th>LatinX</th>
<th>Asian</th>
<th>Multiracial</th>
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<tbody>
<tr>
<td>Intellectual development</td>
<td>4.42</td>
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<td>4.37</td>
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<td>Personal development</td>
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<td>4.34</td>
<td>4.27</td>
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<td>4.34</td>
<td>4.03</td>
<td>4.32</td>
<td>4.42</td>
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<td>4.18</td>
<td>4.35</td>
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<td>4.17</td>
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<td>4.25</td>
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<td>4.37</td>
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<td>Promote socialization of people of different backgrounds</td>
<td>3.50</td>
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<td>3.27</td>
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<td>3.56</td>
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<td>Develop leadership skills</td>
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<td>4.02</td>
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<td>4.13</td>
<td>3.80</td>
<td>4.04</td>
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<td>Connection with your discipline</td>
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<td>4.43</td>
<td>4.35</td>
<td>4.37</td>
<td>4.26</td>
<td>4.41</td>
</tr>
<tr>
<td>Opportunity to be independent and explore new areas</td>
<td>4.02</td>
<td>3.97</td>
<td>4.06</td>
<td>3.99</td>
<td>3.70</td>
<td>4.17</td>
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<td>Connecting with people who share your identity</td>
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<td>3.34</td>
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<td>3.41</td>
<td>3.00</td>
<td>3.57</td>
<td>3.09</td>
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<td>2.75</td>
<td>2.75</td>
<td>2.73</td>
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<td>Career and/or professional development declined</td>
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<td>2.10</td>
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<td>2.07</td>
<td>2.22</td>
<td>1.97</td>
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<td>Consumed my time</td>
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<td>4.10</td>
<td>4.09</td>
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<tr>
<td>Social development negatively impacted</td>
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<td>2.68</td>
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<td>3.20</td>
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<td>3.14</td>
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<td>Increased expense</td>
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<td>3.09</td>
<td>2.94</td>
<td>3.07</td>
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<td>3.28</td>
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<td>Personal academic standard lowered</td>
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<td>3.50</td>
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<tr>
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<td>2.91</td>
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<td>3.04</td>
<td>2.97</td>
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Black indicates a value within .01 of the standard student average
Blue indicates a value above the standard student average
Red indicates a value below the standard student average
Table 5. P-values of student’s perceived positive and negative outcomes

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<tr>
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### Table 6. Intellectual Development Response Distribution by Participation in Co-curricular

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<td>Strongly Disagree</td>
<td>0.00%</td>
<td>0.00%</td>
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<td>Disagree</td>
<td>0.47%</td>
<td>1.55%</td>
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<td>Neutral</td>
<td>5.16%</td>
<td>4.65%</td>
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<td>Agree</td>
<td>58.22%</td>
<td>34.50%</td>
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<tr>
<td>Strongly Agree</td>
<td>36.15%</td>
<td>59.30%</td>
</tr>
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### Table 7. Academic Timeline Extended Response Distribution by Participation in Co-Curricular

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<th>Promotion Factor: Personal Development</th>
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<td>Strongly Disagree</td>
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<td>0.00%</td>
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<tr>
<td>Disagree</td>
<td>3.29%</td>
<td>0.39%</td>
</tr>
<tr>
<td>Neutral</td>
<td>9.86%</td>
<td>10.47%</td>
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<td>Agree</td>
<td>57.28%</td>
<td>37.21%</td>
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<tr>
<td>Strongly Agree</td>
<td>29.11%</td>
<td>51.94%</td>
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### Table 8. Connection with your Discipline Response Distribution by Participation in Co-curricular

<table>
<thead>
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<th>Promotion Factor: Connection with your Discipline</th>
<th>Has Participated in a Co-curricular in the Past 12 Months</th>
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<tr>
<td>Strongly Disagree</td>
<td>0.00%</td>
</tr>
<tr>
<td>Disagree</td>
<td>1.87%</td>
</tr>
<tr>
<td>Neutral</td>
<td>7.48%</td>
</tr>
<tr>
<td>Agree</td>
<td>54.67%</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>35.90%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.30%</td>
<td>0.78%</td>
</tr>
<tr>
<td>7.75%</td>
<td>7.75%</td>
</tr>
<tr>
<td>37.96%</td>
<td>53.10%</td>
</tr>
</tbody>
</table>

### Table 9. Career and/or Professional Development Response Distribution by Participation in Co-curricular

<table>
<thead>
<tr>
<th>Prevention Factor: Career and/or Professional Development</th>
<th>Has Participated in a Co-curricular in the Past 12 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>15.09%</td>
</tr>
<tr>
<td>Disagree</td>
<td>64.15%</td>
</tr>
<tr>
<td>Neutral</td>
<td>15.57%</td>
</tr>
<tr>
<td>Agree</td>
<td>4.25%</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>0.94%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>29.02%</td>
<td>47.84%</td>
</tr>
<tr>
<td>16.08%</td>
<td>5.10%</td>
</tr>
<tr>
<td>1.96%</td>
<td>1.96%</td>
</tr>
</tbody>
</table>
Table 10. Decreased my GPA in College Response Distribution by Participation in Co-curricular

<table>
<thead>
<tr>
<th>Prevention Factor: Decreased my GPA in College</th>
<th>Has Participated in a Co-curricular in the Past 12 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>1.90%</td>
</tr>
<tr>
<td>Disagree</td>
<td>14.22%</td>
</tr>
<tr>
<td>Neutral</td>
<td>40.28%</td>
</tr>
<tr>
<td>Agree</td>
<td>32.70%</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>10.90%</td>
</tr>
</tbody>
</table>

Table 11. Increased Expense Response Distribution by Participation in Co-curricular

<table>
<thead>
<tr>
<th>Prevention Factor: Increased Expense</th>
<th>Has Participated in a Co-curricular in the Past 12 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>2.82%</td>
</tr>
<tr>
<td>Disagree</td>
<td>19.72%</td>
</tr>
<tr>
<td>Neutral</td>
<td>35.68%</td>
</tr>
<tr>
<td>Agree</td>
<td>37.09%</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>4.69%</td>
</tr>
</tbody>
</table>
Table 12. Decreased Time Spent Working for Wages Distribution by Participation in Co-curricular

<table>
<thead>
<tr>
<th>Prevention Factor: Decreased Time Spent Working for Wages</th>
<th>Has Participated in a Co-curricular in the Past 12 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>0.47%</td>
</tr>
<tr>
<td>Disagree</td>
<td>15.49%</td>
</tr>
<tr>
<td>Neutral</td>
<td>29.58%</td>
</tr>
<tr>
<td>Agree</td>
<td>38.50%</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>15.96%</td>
</tr>
</tbody>
</table>

Table 13. Academic Timeline Extended Distribution by Participation in Co-curricular

<table>
<thead>
<tr>
<th>Prevention Factor: Academic Timeline Extended</th>
<th>Has Participated in a Co-curricular in the Past 12 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>2.82%</td>
</tr>
<tr>
<td>Disagree</td>
<td>17.84%</td>
</tr>
<tr>
<td>Neutral</td>
<td>22.54%</td>
</tr>
<tr>
<td>Agree</td>
<td>43.66%</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>13.15%</td>
</tr>
</tbody>
</table>
Appendix B

Full Survey Tool

Q1. Please verify that you are 18 years old or older and volunteer to participate
Q2. What is your gender Identity? Answer Choices: Cis-Woman Cis-Man Non-Binary Transgender Woman Transgender Man Genderqueer Unsure/Questioning Other (please specify)
Q3. What is your sex? Answer Choices: Female Intersex Male
Q4. How would describe your race(s) and/or ethnicity? Answered Skipped
Q5. What is your academic standing? Answer Choices: Freshman Sophomore Junior Senior Graduate
Q6. How many years have you attended Cal Poly? Answer Choices: 1 2 3 4 5+
Q7. Are you a first generation college student (neither of your parents completed a bachelor degree or higher) Answer Choices: Yes No
Q8. Are you an International student? Answer Choices: Yes No
Q9. What is your citizenship status? Answer Choices: US Citizen Permanent Resident Undocumented Immigrant Prefer Not to Answer
Q10. Are you a care provider (parent/ legal guardian or caregiver of a chronically ill, disabled, or aged person)? Answer Choices: Yes No
Q11. How many hours do you work (paid)? Answer Choices: 0 1-5 5-10 10-15 15-20 20+
Q12. Do you receive the Pell Grant? Answer Choices: Yes No
Q13. Do you receive Federal Work-Study support? Answer Choices: Yes No
Q14. Have you participated in a co-curricular activity in the past 12 months? Answer Choices: Yes No
Q15. During a typical recent academic session, how many hours per week would you estimate (on average) you spent working on a co-curricular project? Answer Choices: 0-5 5-10 10-20 More than 20

------

If students indicated they participated in a co-curricular activity in the last 12 months, they were asked about the factors which led to their participation, ranked on a Likert scale of 5 choices from “strongly disagree” to “strongly agree”.

Q16. Because I agree with the message and goals of the club/organization and feel passionate about the objectives or main ideas of the project.
Q17. Because I could afford the financial cost/expense.
Q18. Because I had the time.
Q19. Because I read/heard about the activities.
Q20. Because of my parent or guardian’s influence.
Q21. To be on par with other students in terms of involvement in activities.
Q22. To follow in the footsteps of older or former students who are now successful.
Q23. To break down barriers for and open new doors and to change perceptions of my race/ethnicity, religion, gender, or sexual orientation.
Q24. To create positive impact on campus / community.
Q25. To act on the encouragement from a faculty or advisor.
Q26. To fulfill my personal interest.
Q27. To gain skills and contacts that will make me more competitive in the job market.
Q28. To interact with students that look like me (e.g., age, race, gender, etc).
Q29. To seek activities beyond coursework.
Q30. To try something new.

------

If students indicated they did NOT participate in a co-curricular activity in the last 12 months, they were asked about the factors which limited their participation, ranked on a Likert scale of 5 choices from “strongly disagree” to “strongly agree”.

Q31. Cost/Expenses of joining were too high
Q32. Negative impressions of the club or the projects
Q33. Discouraged by faculty
Q34. Doesn’t contribute to what I want to learn
Q35. Family influence, or personal matters
Q36. Gender issues (actual or expected negative experiences related to gender)
Q37. Wasn't interested in group/teamwork
Q38. Identity (e.g., I did not personally identify and/or relate to members of the group)
Q39. Uncomfortable with social aspect of the team
Q40. Couldn't find an activity that suited my interest
Q41. Lack of time
Q42. Lack of knowledge about the opportunities (e.g., didn't have much information, wasn't sure what was involved or didn't know what projects were available)
Q43. Lengthy, difficult membership process
Q44. Limit to number of participants; a competitive process to join
Q45. Race/ethnicity issues (e.g., not feeling welcomed because of race/ethnicity; seemed like non inclusive environment)
Q46. Social inertia (e.g., I joined another activity on or off campus and it became too hard to leave after joining)

---
ALL respondents, whether they participated or not, were then asked about their perceptions about the expected positive and negative outcomes from participation in a co-curricular project activity, again ranked on a 5 point Likert scale.

**Expected positive outcomes:**
Q47. Intellectual development (e.g. analytical skills, critical thinking skills, might indirectly boost academic performance)
Q48. Personal development (e.g., self-confidence, identity development)
Q49. Social development (e.g. learning how to collaborate or work in varied teams)
Q50. Academic engagement (e.g., active and collaborative learning in a relevant subject area, interaction with peers and faculty)
Q51. Career and professional development (e.g. would help me network with industry, or help me plan to attend graduate school, or connect to and enter the engineering job market, or work on valuable professional skills)
Q52. Promote socialization/understanding of people of different backgrounds/identities
Q53. Civic development (e.g., civic activism, help people with difficulty, community service, and voluntarism)
Q54. Develop leadership skills
Q55. Connection with your discipline (stronger feeling that you are an engineer, or working on meaningful problems connected to your major)
Q56. Opportunity to be independent and explore new areas
Q57. Connecting with people who share your identity

**Expected negative outcomes:**
Q58. Academic engagement decreased (e.g., the degree of attention, curiosity, interest, optimism, and passion that I showed lowered)
Q59. Academic timeline extended (e.g., extended time to graduate)
Q60. Career and/or professional development declined
Q61. Consumed my time therefore my schedule was less flexible and free time was reduced significantly
Q62. Social development negatively impacted (e.g., interpersonal relationships declined)
Q63. Decreased my GPA in college (not applicable to first year students)
Q64. Increased expense (e.g., cost of involvement)
Q65. Decreased time spent working for wages
Q66. Personal academic standard lowered (feels like reduced quality of work in classes or other areas, whether or not grades actually affected)
Q67. Personal development negatively impacted (non-engineering traits and interests and thoughts)
Q68. Personal health declined (e.g., physical health, mental health)
Title: Best Foot Forward: Holistic Intervention for First-Year Podiatric Medicine Students

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Dagmar Cofer

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Abstract

Title: Best Foot Forward (BFF): Holistic Intervention for First-Year Podiatric Medicine Students

Problem: Given the high stakes involved in attending a graduate podiatric medicine program, there is a need to provide holistic IQ and EQ support for students to aid them through their rigorous health professions program.

Literature Review: The success of graduate health professions students can be attributed to a combination of academic and emotional factors. There is a growing body of literature supporting the holistic review of student applicants into graduate health professions. Emotional Intelligence (EQ), the “softer sciences” provides important coping strategies necessary to assist students toward academic success. Strategies for adult learning and emotional coping, along with anecdotal evidence have guided the content of the BFF intervention.
**Purpose:** Over the last few years, the College of Podiatric Medicine at Western University of Health Sciences (WesternU) experienced increasing student attrition and decreasing on-time graduation rates. BFF has intentionally created content to support at-risk students to strengthen their academic, emotional, and mental skills readiness to increase their success.

**Methodology:** The BFF intervention was an innovation of WesternU’s Learning Enhancement and Academic Development (LEAD). The intervention aimed to raise student exam scores and narrow the achievement gap between high performing and low performing students. The intervention focused on the development of IQ and EQ skills. Each BFF intervention consisted of five modules over a five-week period. Each hour-long module incorporated IQ and EQ competencies. The initial Fall intervention was offered to the entire 2021 podiatric medicine cohort. The students were then categorized by group: Non-mandatory, Optional, or Mandatory. The second and third interventions were delivered to a targeted at-risk group of students (Mandatory) within the 2021 cohort in the Spring semester after the first course.

**Results:** Given the data of nine exams after the first Spring 2018 course, the improvement demonstrated by “Mandatory (attended all)” student group is statistically significant. The results have identified a notably increased exam average by this population. Additionally, the standard deviation has decreased. Both findings indicate the achievement gap between high performing and low performing students has narrowed.

**Conclusion:** The Best Foot Forward (BFF) intervention program sought to better equip students with the academic and emotional coping skills necessary to be successful within their podiatric medicine program. Within each intervention’s modules, one EQ and one IQ competency were discussed, goals formulated, and strategies provided and practiced. Student demonstrated positive results following their participation in the intervention.
ABSTRACT

**Background:** Service dogs provide specific tasks to their handlers, which increases their independence and enhances quality of life. However, service dogs are often misunderstood. The confusion leads to barriers and misunderstanding. Currently, service dog education is not included in national curriculum standards for students in allied health degree programs. The paucity of service dog education among healthcare students and professionals leads to a gap in services, training, and advocacy for individuals with disabilities who benefit from service dog partnerships.

**Purpose/hypothesis:** The purpose of this study was to quantify the impact of interactive service dog education on allied health students’ understanding and perceptions of the use, benefits, ownership, and rights of service dog users. We hypothesized that interactive service dog education would significantly increase participants’ actual and perceived knowledge about service dog partnerships.

**Methods:** We developed pre/post-tests designed to measure actual and perceived knowledge about the benefits, use, definitions, and laws about service dog partnerships. Sixty-two participants were recruited from the CAH student association from both the Tulsa and Oklahoma City OUHSC campuses. Participants completed a pre-training assessment. The students then participated in a one hour lecture about service dogs which included an interactive demonstration of a dog performing service dog skills. Students completed a post-training assessment. A total of 50 participants had matched pre-/post-test scores. Five questions on the pre-/post-assessments were measured on a nominal scale (e.g. correct-incorrect). The McNemar nonparametric test was chosen for testing differences between related samples on a nominal scale. Responses on two pre-/post-training questions were assessed on a scale from 1 (no knowledge/not important) to 10 (very knowledgeable, very important). A paired samples t-test was used to test for a statistical difference between responses on these two pre-/post-training questions.
**Results:** Test results indicate there were significant changes in participants’ understanding of what differentiates an assistance dog from a therapy dog ($\chi^2 = 9.09, p = .001$). Participants also improved their scores in recognizing the types of service dogs ($\chi^2 = 7.58, p = .004$), and understanding who would benefit from a service dog ($\chi^2 = 22.04, p = .0001$). Overall, participants reported a significant increase in their perceived knowledge of service dogs. On a scale from one to ten, participants rated their pre-training knowledge of service dogs at 4.72, but the rating increased to 7.18 ($t_{49} = 8.02, p < .001$) following the training. Likewise, the perceived importance of knowing about service dogs for future healthcare providers significantly increased from 6.86 to 8.72 ($t_{49} = 7.67, p < .001$).

**Conclusion:** The one hour interactive service dog education proves to be effective in increasing allied health students’ knowledge and understanding about the use, benefits, ownership, and rights of service dogs users. Additionally, the course impacted students’ perceptions about the importance of the knowledge for healthcare professionals. The Professor Paws Project is a model for providing service dog education for healthcare students and professionals to increase the level of care and advocacy provided for clients.
PAWSITIVE OUTCOMES THROUGH INTERACTIVE SERVICE DOG EDUCATION: 
THE PROFESSOR PAWS PROJECT

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ABSTRACT

Background: Service dogs increase independence and enhance the quality of life for their partners. However, service dogs are often misunderstood. The confusion leads to barriers and misunderstanding among health care professionals and service dog users.

Purpose: The purpose of the Professor Paws Project is to provide interactive service dog education for future health care professionals at the University of Oklahoma Health Sciences Center and in the community. Studies quantify the impact of interactive service dog education with students and potential service dog users. This presentation will provide an overview of the Professor Paws Project, its purpose, and results of research to date, with a focus on research completed with College of Allied Health students.

Methods: We developed pre/post-tests designed to measure actual and perceived knowledge about the benefits, use, definitions, and laws about service dog partnerships. Sixty-two participants were recruited from the CAH student association from both the Tulsa and Oklahoma City OUHSC campuses. Participants completed a pre-training assessment. The students then participated in a one hour lecture about service dogs which included an interactive demonstration of a dog performing service dog skills. Students completed a post-training assessment. A total of 50 participants had matched pre-/post-test scores. Five questions on the pre-/post-assessments were measured on a nominal scale (e.g. correct-incorrect). The McNemar nonparametric test was chosen for testing differences between related samples on a nominal scale. Responses on two pre-/post-training questions were assessed on a scale from 1(no knowledge/not important) to 10 (very knowledgeable, very important). A paired samples t-test was used to test for a statistical difference between responses on these two pre-/post-training questions.

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**Conclusion:** The one hour interactive service dog education proves to be effective in increasing knowledge and understanding about the use, benefits, ownership, and rights of service dogs users. Additionally, the course impacts students’ perceptions about the importance of the knowledge for healthcare professionals. The Professor Paws Project is an innovative model for providing service dog education for future healthcare professionals and the community.
ABSTRACT

This paper outlines three categories of research-supported interventions aimed at supporting students in managing stress as they transition from high school into the postsecondary system. The categories all revolve around connection – first to resources, then to the self and finally to the future. Implications for educators and counsellors are discussed.

HIGH SCHOOL TO HIGHER ED – SUPPORTING STUDENTS TO MANAGE STRESS

Stress among students is plentiful. For example, 32% of undergraduate students from 117 institutions of higher education reported that stress was the most common health factor impacting academic performance (Byrd & McKinney, 2012). The American Psychological Association published a “Stress in America” survey (APA, 2011) and found that most Americans suffer from moderate to high levels of stress. Almost half of those who responded reported that their stress levels have increased over the past five years. Chronic stress damages health, impedes progress and has been shown to have negative impact on academic achievement. Research with postsecondary students has shown that psychological distress contributes to all kinds of negative outcomes including reduced academic performance, school dropout, risk of psychiatric disorders, substance use, decreased physical health and self-care (e.g., lack of exercise and poor diet), job difficulties, relationship breakups, and even suicide (V’azquez, Otero, & D’iaz, 2012). This paper outlines three categories of research-supported interventions aimed at supporting students in managing stress as they transition from high school into
the postsecondary system. The categories all revolve around connection – first to resources, then to the self and finally to the future. Implications for educators and counsellors are discussed.

**BACKGROUND**

Striving for higher education is inherently stressful. Our education system aims to foster active learning among students – to stretch minds, to entertain a variety of perspectives, absorb facts and figures, use information in innovative and creative ways and to contribute to our knowledge of ourselves and the world around us. Students are required to learn and to demonstrate their learning. Stretching our mental capacity, combined with a pressure to perform, naturally creates stress, but stress also comes from internal sources – a desire to try our best, to challenge ourselves, to please our teacher, to succeed at a goal. With external and internal pressures driving us towards change and challenge, we are bound to experience psychological stress and at times, physical strain. We don’t want to necessarily remove all of this pressure from the learning process, but we do want to prepare our learners to manage these demands so that the stress and strain do not result in distress and despair.

As a registered psychologist working in a university student counselling centre for the past 20 years, I’ve had the opportunity to talk with thousands of students about their stresses, strains, triumphs, and tragedies. Knowing these students personally has fueled my interest in supporting student success, and I have devoted all of my research endeavors towards enhancing student supports. The body of research I’m drawing from here includes three longitudinal studies of first year student cohorts (Miller, 2013; Miller, Smith, Best & Hellsten-Bzovey, 2013; Miller, Rude, Simpson, & Whitehead, 2018; Miller, Smith, & Simpson, 2014), an international study of students’ knowledge of career computing disciplines (Connolly, Miller, & Uzoka, 2017), youth citizenship (Connolly, & Miller, 2017; Miller, Connolly, & Racy, 2015), the lasting impact of campus leadership roles (Boczek, Miller, Reynolds, Keller, & O’Reilly, 2017), and most recently conducting individual interviews with Indigenous female alumni about their experiences of postsecondary studies and of transitioning into the workforce (Heron, Pidgeon, Ksionzena, & Miller, 2019). Experience providing counselling to enhance resiliency among leaders (Miller, Dean, Nickle & Seltner, 2017), understand resiliency among disaster survivors (Miller, 2016) and bring positive psychology into postsecondary counselling practices (Flessati, Miller, & Ciccocioppo, 2010) are also included in this paper. A synthesis of this work supports transition issues for students across three broad categories – Connect with Resources, Connect with Self and Connect with Future. Elements of each recommendation are presented here with the hope of fostering further conversations with our youth about success in higher education settings.
**CONNECTING WITH RESOURCES**

**Help Seeking Behaviours.** Many students will indicate that they are aware of services on campus that are available to support their academic skills and overall well-being, yet many also indicate that they are unlikely to use these services (e.g., Einsenberg, Golberstein, & Gollust, 2007; Heron, Pidgeon, Ksionzena, & Miller, 2019). The National Comorbidity Survey Replication (NCS-R) revealed that less than half (41%) of those who experienced a mental disorder accessed services, with a median delay of 11 years between the onset of a mental health disorder and first access to services (Kessler, et al., 2004; Kessler, et al., 2005). This is particularly concerning since the age of onset of many chronic mental health disorders coincides with the age at which many young adults pursue higher education (Kessler et al., 2005). Research amongst a college-aged population suggests that both the complexity and number of students with mental health issues are increasing (Blanco, Okuda, & Wright, 2008; Canadian Mental Health Association, n.d.; National Alliance on Mental Illness, 2012). Approximately one third of college students in North America have elevated psychological distress or meet diagnostic criteria for a mental disorder (Adlaf, Gliksman, Demers & Newton-Taylor, 2001; Svanum & Zody, 2001).

Thankfully, learning to access resources is a skill that can be developed at any age. Encouraging our youth to ask for help, raise their hand, initiate phone calls and put inquiries in writing are tangible and teachable skills. On the institutional side we can broadly advertise supports and services, schedule time in student schedules to access counsellors or advisors, and we can reduce barriers including wait times, location, and costs.

**Healthy Living.** Too often students wait until they are in crisis to start living well. Living well gives us resources in the bank to draw from during times of intense work – and without these savings, we are at risk of falling apart during times of extreme stress. It’s common knowledge that nutrition, exercise, and sleep set the foundation of a healthy lifestyle, and transition to university challenges healthy habits.

The transition from high school to university can leave students vulnerable to changes in their physical health beyond the proverbial “Freshman-15” weight gain. Bray and Born (2004) looked at the physical activity levels of Canadian students and found that 61% of their sample met minimum physical activity standards in grade 12, but that number dropped to 44% after the first year of university. Downs and Ashton (2011) found that higher levels of physical activity was associated with “more positive affect, higher self-esteem, and less stress” (p. 241). Perception of stress is also positively impacted by regular
physical activity (VanKim & Nelson, 2013). In an analysis of the National College Health Assessment (NCHA) survey data, students at our university who reported “excellence” in their overall health (n=123, 9%) had significantly higher scores in fourteen other health behaviours, compared to those who reported “very good” overall health (n= 550, 39.9%; Flessati & Miller, 2014). Three of these factors connected with exercise.

Further, those students who reported excellence in health also reported exceeding recommended daily doses of fruits and vegetables (Flessati & Miller, 2014). To support access to fresh produce advisors may wish to talk with students about how to access local markets, make use of home delivery programs, farm-direct purchases and food programs that provide discounted goods.

**CONNECTION WITH SELF**

**Building Resiliency Skills.** The post-secondary age is generally referred to as the time of “emerging adulthood” (Arnett, 2000), reflecting a state of being in-between adolescence and adulthood characterized by self-exploration and further development of resiliency. Resilience has been defined as the ability to bounce back during times of distress, and the ability to persist through difficult situations. Resiliency is linked with problem solving skills, the ability to regulate one’s emotions and with an attitude of realistic optimism. It is linked with flourishing and psychological well being (Keyes, 2007; Zepke, 2015). Psychological resiliency is linked with more positive coping through disasters, but also is linked with effective and sustainable leadership (Miller, Dean, Nickel & Seltner, 2017; Nelson, & Padilla-Walker, 2013). Resiliency is also linked with connection to the whole self, including one’s beliefs, values, and culture. Cultural identity is central to the wellbeing and success of many of our students. For example, having culturally-relevant academic programs and Indigenous mentors (e.g., peers, Elders, faculty, staff) all are linked with success among Indigenous learners. In our recent conversations with female Indigenous alumni we found that overall resiliency was linked with turning to their Indigenous teachings and cultural practices (Heron, Pidgeon, Ksionzena, & Miller, 2019). Our participants told us that they strived to stay connected with their culture as a source of healing, strength and resiliency. Many of these women attributed their overall success in completing their post-secondary education to being strongly connected to their culture, ancestors and community.

**Grit and Persistence.** Most students talk about hitting a “wall” as they approach the end of term – losing steam and experiencing burnout as final exams loom. It’s hard to maintain steam through this time and many students experience stress as a type of “burnout” here. Burnout is characterized by
feelings of mental and emotional exhaustion, inefficiencies (might be spending time studying but find information is not retained), and lack of motivation. I just want this to be over, and “I can't wait for this to be done” are often heard in hallways, counsellor offices and at the dinner table. Students who are distressed about deadlines may push themselves to pull all-nighters, forgoing sleep and meals in an effort to get things done. Caldwell and colleagues (2010) found that rates of sleep difficulties among college students ranged from 31.6% to 64%. A study by Lund, Reider, Whiting, and Prichard (2010) found that 60% of their college student sample was assessed as being poor-quality sleepers, noting both insufficient sleep and irregular patterns of sleep. Most of us know that this is a recipe for further burnout, but most of us also likely remember the pressure of school and how everything felt so urgent and overwhelming. The idea of giving up sleep to gain hours actually is backwards thinking. Research has been pretty clear at showing (and many students who do this will agree) that sleeping well gives you more focus, makes you more efficient as a learning-machine, and allows you to work smarter rather than harder. A clear hour of studying is worth more than three hours of burnt-out review.

Students can benefit from being forewarned of these crunch times – especially students in first year who don’t yet have the experience of the end of term rush. Education can also include information on the science of sleep, the importance of nutrition to keep the brain functioning well and strategies for efficient studying (to ward off the tendency to cram or rely on rote memory). Most universities have study skill supports, and many A+ students are known to have made use of these services to aid in their study habits – to study smarter not harder.

**Work Ethic.** Many high school students will report distress about not being “smart enough” to get into college or university, while many studies suggest that core intelligence is only part of the equation. Work ethic, time spent on task, and “hard” work have been heralded as more important that how “smart” you are. A significant positive relationship has been found between the final grade obtained from a first year economics course and time spent on studying (Jung, Leong, & Miller, 2015). We found a significant positive relationship between grade received in the economics course and time spent studying for both male and female students alike. Similarly, Strauss and Volkwein (2002) report that time spent studying per week is positively related to a student’s GPA.

**Creating Sustainability or Balance.** I’m not sure that balance is the right word to use here, although often it’s the one chosen. Balancing implies equal weight to each thing being considered, when often we have priorities or urgent concerns. My counselling practice often includes some kind of conversation about “balancing” life outside of school with all of the academic demands being faced, and
balancing the demands of being a student with the other elements of our personal and cultural identity. We aim for some kind of sustainability in how we deploy our attention, time and resources between school, employment, relationships, volunteerism, care giving, etc. Here we refer to time spent on activities outside of academia, including employment, volunteerism, relationships, family commitments, care giving of children or parents, time spent managing activities of daily living (food preparation, finance-related activities, sleep) and communications – including social media activities, email and face-to-face interactions.

**CONNECTING WITH THE FUTURE**

**Normalize Career Uncertainty.** Research reveals that most students are stressed about their career choice. Evidence includes general reporting of career uncertainty, difficulty choosing a major, switching programs after first year, and dropping out. In the three longitudinal studies that I’ve lead which track cohorts of students from their first year through to the time of graduation, we have found that career uncertainty is a predictor of academic success. Those students who were in a degree program who had high career uncertainty were most likely to leave their studies without graduating.

Unfortunately, from the student’s individual perspective, this experience seems isolated, unique and distressing. Educators and support staff can encourage students to talk about their uncertainty as a way of normalizing that condition and as a means of accessing resources. Accurate information is also deemed essential, and advisors are encouraged to seek out resources that could assist them to assist others. Checking assumptions is also recommended. In one study we conducted of students studying in the computing disciplines found that many students did not have a clear understanding of the tasks associated with their program (Connolly, et al, 2016).

**Building Community Belonging.** The transition from high school into a university or college setting often is accompanied by a loss of (or distancing from) high school friends, and a sense of feeling like an outsider in the new environment. Social support is strongly linked with enhanced well-being generally, (Keyes, 2007; Tao, et al, 2000) and with academic success specifically (Pittman & Richmond, 2008; Wilcox, Winn, & Fyvie-Gauld, 2006). Supporting a student to integrate into the social world of the university is just as important as academic integration (Heron, Pidgeon, Ksionzena, & Miller, 2019; Pittman & Richmond, 2008; Wilcox, Winn, & Fyvie-Gauld, 2006; Zepke, 2015). Once the business of creating new friends, managing old-friend transitions, and joining with a cohort has been established, stress is often reduced. Students link these community experiences with overall health. In our analysis
of the national NCHA data discussed above (Flessati & Miller, 2014), we found that students who categorized their health as “excellent” also reported significantly higher levels of happiness in the last month than those who categorized their overall health as “very good” (F=28.010, p<0.00). Happiness could of course be the results of excellence in health (correlation does not imply causation), but interestingly those in the self-claimed “excellence” group also said they were significantly more interested in life (F = 30.145, p < 0.00), felt they had something important to contribute to society (F=24.684, p<0.00), and felt they belonged to a community (F=19.551, p<0.00). When social supports are in place, students are much more likely to manage the stresses of university life well (Pancer, Pratt, Hunsberger, & Alisat, 2004).

We can support student transition before classes begin by developing a familiarity of the buildings and the campus, but also by intentionally investigating student clubs, societies, orientation activities and the schedule of social events (Pittman & Richmond, 2008). Linking with spaces and people who will support the emotional and spiritual development of the student are important (Tinto, 2015), and cultural connection is essential for many (Heron, Pidgeon, Ksionzena, & Miller, 2019). Particularly crucial are the first six weeks of the postsecondary adaptation experience. During this time students work through excitement, loneliness, fear, hope, joy, loss, freedom and confusion. As the new normal sets in, students launch into a development phase of self-discovery, referred to as the stage of emergent adulthood (Arnett, 2007). We can support by providing organized opportunities to volunteer, develop leadership skills and participate in the campus community in a meaningful way.

**Developing Confidence.** The best way to develop confidence is of course to have a variety of positive experiences. Schools can support this by providing opportunities for students to try new skills, learn new roles and develop as leaders in their communities. Safe places to fail are important as individuals learn how to innovate, cope with setbacks, live through embarrassment, and get comfortable with being uncomfortable. We are more willing to take risks when we feel we are accepted, understood and supported. Perfectionism can be a significant barrier to building confidence. For those who feel perfection is required, interventions that encourage good-enough thinking, creation of messy drafts, and the development of prototypes are highly encouraged. For those who feel reluctant to engage in public speaking yet want to – we encourage skill-building programs, frequent low-risk small speaking challenges, and opportunities for practice with and without an audience (live or recorded). Encouragement, light-heartedness, focusing on what is being shared rather than on who is sharing, rehearsals and practice with encouragement make these skills easier to acquire. Students find
satisfaction as they develop these kinds of skills which has been linked with improved mental health and higher self-esteem (Galambos, Barker, & Krahn, 2006), and mastering academic and social skills within the university context has been linked with student retention and success (Verger, et al., 2009).

**CONCLUSION**

This paper reviewed three types of transition issues common among students transitioning from high school into the postsecondary context – Connection to Resources, Connection to Self, and Connection to the Future. Most college and university campuses contain a plethora of student support services offering interventions along academic, personal, recreation, medical and social continuums, yet many students do not access these supports when needed. Personal development focused on fostering resiliency, grit, work ethic and sustainable distribution of resources and attention across facets of life have shown to serve students well as they transition into the postsecondary environment. Students tend to thrive when they can take their whole self to school, including their culture, interests, identities, and imperfections. Lastly, connecting with the future highlighted the importance of normalizing career uncertainty and fostering belongingness within the university or college context. Our goal is to support learners to access resources early, to engage with their communities in a meaningful way; to take advantage of the opportunity to know themselves and to normalize the process of managing stress.

**REFERENCES**


Canadian Mental Health Association, n.d. (http://www.cmha.ca/media/fast-facts-about-mental-illness/).


Miller, J. (2013). Ask and you shall want to ask more! Predicting persistence using a first year student survey. Presented at the Canadian Society for the Study of Higher Education (CSSHE) Annual Conference at the Congress of the Humanities and Social Sciences, University of Victoria, BC.


Miller, J., Smith, B. & Simpson, S. (2014). *Getting to know our students through a first year student survey: What we’re learning about student retention, research methodology and survey design to support undergraduate student success and persistence.* Presentation made at CACUSS, Halifax, NS.


Measuring What Readers See in News Page Design

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Abstract

This study used eye-tracking software to determine and pinpoint where viewers’ eyes went on a news page designed for the web. The researchers used this approach as a way to move beyond “clicks” on a webpage and determine what elements of news page web design and layout actually draw attention, as measured by where eyes moved on a news page, and how long those eyes lingered. In addition, digital primary source images of past newspaper layouts, before the popularity of the Internet, were used as well. This pilot study is intended to provide guidance for web designers presenting journalism on the web in a fashion that will appeal to online viewers. The study, which the researchers wish to expand to a larger population, is an update on the seminal eye-tracking studies conducted on newspaper print pages in 1991. However, in this case, all of the participants are students beginning to study Journalism and the layout in delivering the news in print and web site delivery. Furthermore, the researcher here is presented with visual evidence in gaze plots and specific data is presented without objective physiological measures or inferential statistics utilized. After agreeing to participate, the student subjects engaged with various news media options presented to them, at their own pace. The eye tracking technology captured the eye movements and calculated the gaze path in every unique situation. Although the content changed for each participant, the gaze paths followed similar patterns, advertising was largely ignored, and certain visual elements created some consistencies found in the results.
For decades, news page designers made assumptions about how readers’ eyes traveled over a page. These assumptions became the industry standard in the look of newspapers. These assumptions relied on a hierarchy of type sizes as headlines to tell readers what was the most important story, usually at the top of the news page, down to less important stories at the bottom of the page.

Young page designers were introduced to the look of news pages as they cut waxed galley sheets of type and placed them in order on non-reproduction blue layout sheets that would then be sent to plate making and provide the starting point for the final printed project. These young designers would work under veterans who would describe the virtues of the layout system they were being taught. Some would be told that a reader’s eyes would travel over the page in a “Z” pattern. Others would be taught that eyes moved from the top of the page to the bottom. Some would be told that the eye’s formed a figure “6” shape from the upper right corner of the page and then inward. A few would be taught to create a center of visual interest – some collection of photojournalism, graphics and typography – that would pull the eye into the page and then allow readers to radiate from those points, which is why the date, a quick weather report and the price of the paper were generally strategically placed based on these theories.

While each school of thought had its adherents, the devotion to these design decisions was more a matter of individual taste and belief rather than measurable science. These acts of faith came under scrutiny thanks to the first eye-tracking study of newspaper page design (Garcia, Stark, & Miller, 1991). The study by the Poynter Institute for Media Studies created a revolutionary change in the underlying precepts of page design by using actual data gathered from where readers’ eyes went on a page to help determine how to best layout a news page.
While the study created change in the newspaper industry and the training of page designers, it was not without its drawbacks. The foremost was the requirement that participants wear headgear with video cameras mounted to it to measure where each participant’s eyes went on the page. This bulky and obtrusive approach was better than the previous belief in what made for good page design, but it still created a significant observer effect. We don’t normally wear bulky, multiple camera headgear when we read.

Technology, which has taken news from print and broadcast formats into a digital format that can include images, video, text, and graphics, has also created advancements in eye-tracking devices. This study relied on those advances to ensure an unobtrusive method for measuring where eyes go on a news page designed for the web as well as digital images of pre-Internet newspaper designs. In recognition of the amount of news content being generated in an online format, the researchers used eye-tracking software to research where the readers’ eyes go when reviewing a news web site or primary source digital image of a newspaper layout. The intent of their research was to determine if certain news elements or elements of design in a news web page might be more attractive to viewers’ eyes and thusly spur online news page design that is more readily consumed.

Eye Tracking & News

Before and after the 1991 Poynter Institute study, there were books and guidelines on the tenets of news page design. While these were modified following the 1991 study and the results of the study became widely disseminated, the move from newspaper print publishing to online publishing of news has generated a new set of considerations with the potential for a new set of guidelines for news page design for the web. There have been a number of reference books and chapters on how this form of presentation changes design, and one of the original co-authors of
the Poynter Institute eye-tracking study authored an early text on online news design (Garcia, 1997). More recently, researchers have used eye-tracking software to identify web usability problems (Ehmke & Wilson, 2007), to find entry points on newspaper spreads (Holsanova, Rahm, & Holmqvist, 2006), and to measure how pictures influence the online viewing experience (Beymer, Orton, & Russell, 2007).

As eye-tracking software developed, and the web presence of news continued to grow, researchers started to turn their attention to the web viewer’s experience. This research interest has produced studies on the initial interaction with web sites (Russell, 2005), how viewers’ eye patterns show a differentiation of the type of web page viewed (Granka, Joachims, & Gay, 2004; Lorigo et al., 2008), and tracking how digital natives experience web pages relative to digital immigrants (Djamasbi, Siegel, & Tullis, 2010; Djamasbi, Siegel, Skorinko, & Tullis, 2011). Research also revealed how viewers have different behaviors depending on the web page viewed, specifically the inclination toward reading text and assigning pictures to a secondary status when visiting news websites (Goldberg & Wichansky, 2002). While some general information could be gleaned from these studies, a definitive guide for designing news web pages based on viewer eye-tracking remained in its infancy.

Continued studies have led to some generalized guidance on web page design for news presentation. Research on navigation for slide shows, effectiveness of breaking news formats, and design options for supplemental links (Chu, Paul, & Ruel, 2009) provided a measure of the impact of various digital formats. Researchers in Italy used eye-tracking software to measure the usability of websites operated by two Italian newspapers (Zambarbieri, Carniglia, & Robino, 2008) and found that viewers tended to start at the top of the webpage and fixated on the left-hand side of the page. This fixation, however, may have had more to do with page design that
put more elements on that side of the webpage and left textboxes down the right-hand side (Zambarbieri et al., 2008). The area of how the web design of news keeps eyeballs on a page and tracking remains one that merits further study.

Methods: Viewing News

Participants in this pilot study were volunteers from the student body of Metropolitan State University of Denver. The 22 participants were both males and females, ages 19 – 25, enrolled as freshman or sophomores in a basic journalism course. In accordance with human subjects protocol, the participants were neither rewarded for participating nor punished for choosing not to participate. The researchers gathered only demographic information from the participants and no unique identifiers were collected or maintained for this study.

After agreeing to participate, the subject met with one of the principal researchers in a small computer lab (eight terminals) on campus. Participants in this research were asked to review a series of news related web sites, some from print other from broadcast journalism, as well as a few different primary source images of past newspaper layouts from different eras. The order of the series was the same for each participant and all were asked to “view that as you would normally and when you’re finished with the source, move on to the next one.” The purpose for this approach was that it mimics how many people review the news from multiple sources over the Internet – one at a time to find what is interesting or relevant to the individual. The media sites and newspapers used and the order presented to the participants were as follows: the web sites for The Denver Post, The New York Times, and The Washington Post were used for “printed” news websites. For video broadcast news, Denver’s local 9news.com, CNN.com, and Fox News.com were presented to the participants. Mixed media sites, those which offer text, audio and visual news reports, such as The Examiner and Huffington Post followed the video
broadcast news sites. Finally, primary source images of newspaper layouts concluded the series from The Denver Post in 1965, the New York Times in 1940, the Washington Times in 1914 and USA Today in colorful 1982. Every source of news, with the exception of the primary source images, were dynamic sources that changed the content for each participant based on the emerging news at the time each individual participation of the study.

Technology used in this study centered around Tobii’s Studio (version 3.2.1) Software with an eye tracking USB hardware bar that calibrates and tracks the eye movement from a PC computer monitor. Thus, the computer used was a Dell Optiplex 990 running on Windows 7 with a 13-inch flat screen monitor. All web sites were presented through Internet Explorer version 11. Each participant spent between 2 to 5 minutes calibrating the system to his or her eyes before starting. Hats needed to be removed and bi-focal glasses were not allowed for testing as both threw off the calibration of tracking the eye gaze.

It cannot be mentioned enough that more research is needed for tracking the eye movements of those reading and viewing news media online. Whether these studies focus on individual tracking for preferences, devices (desktop and mobile) or layout and design there will always be a need for continued eye tracking studies to keep up with ever changing technologies and human behavior. Though this study was limited, in scope of participants, we took a middle of the road approach between traditional user experience (UX) Testing requirements, which state that only 4 to 5 people are needed to find 80% of UX issues (Krug, 2014), and one of a more traditional approach to research with a strong pool of participants. To reiterate for clarity, for this study, we measured the eye tracking for 22 Journalism students enrolled in an entry-level course. We also used no “control group” in our study as each participant was asked to do the same tasks. However, the content was similar for those who tested on the same day or time of day, but the
content was different as often as news updates and changes. So, more research is needed to either provide the exact same content for every publication, as this study had when looking at the primary source print versions of newspapers in the past.

Results

The results of this study do provide some insight as to what, precisely needs to be studied as some patterns emerged from the eye tracking data. The gaze plot images and video provided the best visual results to examine as each participant had their gaze captured to reflect not only the path their eyes took, but how long the gaze lasted (size of the ellipse) and whether information was committed to cognition (“cogs” on the ellipse which indicate blinking or pupil dilation). Although the length and cognitive aspects are important, and could use further research as well, it was the similar paths of the eye gaze from each participant that stands out. Not only regarding what they were specifically focused on, but also what was ignored.

Therefore, four major results emerged as the data was analyzed: 1) Similar eye gazing patterns emerged for both print and broadcast media web sites. 2) Advertisements were largely ignored no matter the delivery or placement on the screen. 3) Navigation was used when prominent. 4) Headlines and images matter, but consistency between them matters even more.

Similar eye gazing patterns emerged for both print and broadcast media web sites.

The web sites for print media presented similar eye gazing patterns as did the broadcast media sites. In both of these cases, thumbnail images and headlines stood out as well as “Latest News” lists and newer navigation features. In the print media layout design a Funnel or Tornado Effect gaze pattern emerged. Print media news sites all had similar eye gaze paths that are illustrated in Figures 1 and 2.
Figure 1: Typical Eye Gaze Paths for Print Media Web Sites – The Denver Post, The New York Times and The Washington Post

Figure 2: Typical Eye Gaze Paths for Broadcast Media Sites – 9 News (Denver), CNN and Fox News

For print media, our participants were, again, focused on the images and headlines while creating patterns that were consistent with prior eye tracking research for newspapers. Not necessarily the “Z” or “figure 6” pattern, but rather a funnel or Tornado Effect, as we now refer to it, as evidenced below in Figure 3. This pattern emerged early and was a consistent gaze
pattern for all of the participants. Many started with the images and gazed back and forth to verify the consistency between the headline and the image or images on the page. When images were sparse, as it was on the 1940 NYT front page, the participants spent more time on the headlines and bold text. This is in contrast to the 1982 front page of a USA Today, where color dominated the participant’s attention through print and images. However, the pattern of the gaze was almost identical in all of these cases and leads these researchers to wonder if the Millennial demographic of the participants had been impacted by the layout and design of news media on the Internet before viewing the older newspaper layout design? The Tornado Effect creates a heavy focus and concentration at the top of the page and the amount of focus decreases as the reader continues, or in the case of online design – scrolls, down the page. The focus appears to be on images, headlines, descriptive text (captions) with a slight zig-zag pattern, close to the “Z” pattern, but rather winds down like a funnel, or tornado. Further research is needed in this regard as well.

Figure 3: The Tornado Effect on Print Newspapers from 1940 (NYT), 1965 (DP) and 1982 (USA Today).
Advertisements were largely ignored no matter the delivery or placement.

Marketers are always attempting to reach an audience and eye tracking is widely used in advertising research. Such research is often used to sell advertisement space in both the real world and the virtual one that ends up on our computer screens. There is no shortage of such research. For example, overpowering ads that take over the screen and have movement can be a distraction when trying to read an article (Charlton, 2013). Which is why it was somewhat of a surprise to see our participants ignore the advertisements, presented to them randomly, throughout the study and even before they became a distraction. Out of the 22 participants in this study, only two participants glanced at an advertisement and neither time was the glance more than a brief second. For the most part, advertisements weren’t even given even a glance, let alone a single click. Remember, our participants were instructed to view these websites and newspaper images the same way they would normally do so every day and for many participants the approach we used was similar to how they read the news online – by going to different sources when the day starts. In fact, the Pew Research Center found that 7 in 10 Americans (71%) start their day by getting the news, but traditional methods of consuming the news have fallen such as the newspaper (to 34%) or television (to 20%) news options (Rosenstiel, 2008).

For one participant, the entire CNN web site changed in color and the frequency of the advertisement (3 big banners and a typical ad spot), as seen in Figure 4, in order to grab to audience’s attention. However, this advertising attempt was widely ignored by our participant – only a single glance and nothing more. Similarly, we present an example for The Denver Post where our participants all ignore not only a dental advertisement, but all the other advertisements on the page as well. Now, it can be noted that our demographics may not be in the market for
dental implants, but to completely ignore and not even glance, also seen in Figure 4, seems a bit unprecedented.

![Image](image.png)

Figure 4: In both broadcast and print news media web sites, our participants largely ignored advertisements regardless of placement, repetitiveness or applicability.

**Navigation was used when prominent.**

When Steve Krug wrote the well-received UX Testing book, Don’t Make Me Think, Revisited, the title is a reference to one of the most important aspects of web site development. Navigation. Although the unconventional use of massive scrolling is used on most news media web sites (a no-no in most web developer’s minds), each site offered both traditional and prominent forms of navigation. Traditional navigation in this study can be defined as the horizontal navigation that runs along the top of a page or the vertical navigation that is usually found on the left side of a web page. Prominent navigation can be presented as scrolling image windows or unique lists of “Latest News” or “Read More” that are located in non-typical places on the screen (to the right of a headline story, for example), as evidenced in Figure 5. The Washington Post, for example, has a bold stripe of navigation horizontally at the top of the page, a black navigation bar with white text. That is a navigation design that has been around as long as the Internet itself. One student had a minor glance at that navigation and it was never used. Denver’s 9 News web site offered “Quick Links” in navigation friendly territory on the left side
of the screen. Again, only view or used by two participants. The rest of our participants took a path similar to the paths represented in Figure 5.

![Gaze paths](image)

**Figure 5:** Gaze paths show that traditional navigation was largely ignore in favor of more **prominent** navigation.

The outcomes of the navigation use in this study certainly indicate that more research is needed, but it might signal a shift in how navigation is presented for news consumption.

Whereas, by appearance and watching the video progression of the eye gaze from each participant, it is possible that the participants were approaching the use of these web sites on a desktop computer the same way they approach them on a mobile phone? After all, recent mobile research indicates that scrolling on a mobile phone is a continuation, for some “liberating,” while clicking is a decision (Gordon, R. and Dody, E. 2014).

**Headlines and Images matter, but consistency between them matters even more!**

Many prior studies regarding newspaper and web site page layout discuss how important headlines and images are on the page. Headlines are emphasized by bold text, larger fonts and are worded to grab our attention fast. As Nielsen and Krug profess – we scan pages, first, to locate the information we’re looking for or is most desirable to us (Krug, 2014). An image speaks a thousand words and studies indicate that we are becoming more dependent and prefer visual media (Schade, Cheng, & Shergar, 2016). This study can safely provide more data to
support these design factors. However, for news media, the eye gaze path indicates that consistency rules as the more consistent the headline matched an image and/or the text accompanying the headline, the more likely the audience will read or view the article. This could also be said for the primary source print examples that followed the “Tornado Effect.”

The more ellipses and viewing back and forth from the headline to the accompanying content translated to reading and engagement with the content. In cases where the headline was confusing or didn’t match well with the image and/or accompanying text, the participants were quick to move on. For example, Fox News had an image for each major headline and our participants were careful to view each one, compare the headline to the image, and most of the students selected a story to read or view from this page, as seen in one example in Figure 6. The New York Times and the other sites had similar results. The most effective stories were the ones where there was consistency. The main headlining story in The New York Times, regarding Syria, was viewed, but not as much as the other content on the page, as seen in Figure 6. Upon further investigation, the story is about Syria being in ruins today, but the data in the image is from four years ago. Perhaps this student wasn’t interested in the topic, but it was the headline and very important news. Yet, the participant spent time on other places of the page – where the headlines and text were consistent.
Conclusion

Perhaps due to the small sample size, it was difficult to draw definitive guidelines for news design on web pages. We did, however, observe the following similarities and differences that support past research as well as common usability guidelines for news web design that provide our students with specific examples of what is working or not in how the news is presented on web sites delivering the news. Additionally, the study illustrated how the participants viewed these web sites similar to how we hypothesize they would view the same content on a mobile device through scrolling. Thus, research tracking the eye gaze from participants consuming news media on mobile devices and measuring their gaze as well as scrolling tendencies is a logical next step for research and is discussed further below.

Where Their Eyes Went

The Eye Gaze plots provide us with specifics of not only the pattern and cadence of the viewing and reading of the news, but also how much time was committed to an area or story. We will get to the length of time spent and the most popular elements viewed by participants of the
study. First, we’ll focus on where the participant’s eyes went, whether or not there was
distraction and patterns of viewing and reading.

One thing that Usability Testing has proven when it comes to web sites - people are
habitual (Krug, 2014). The students in this study were not new to seeking news on Internet sites.
It is, after all, the subject they’re studying and have a vested interest in. So, the natural approach
for many of the participants was to seek the most interesting stories in the most familiar way.
However, in one case, the Washington Post, the non-descript and plain navigation wasn’t used
by any of the participants. However, in most cases if something works well – people will tend to
stick to using that. Even if there’s a better way to do something out there – it’s unlikely that
they’ll go looking for it. For example, if more prominent navigation was available the
participants spent a good deal of time there and used it as a way to locate something interesting.

As the results indicated, the participants did not acknowledge or pay much attention to
any advertisements. It is important to emphasize that students were not instructed to ignore
advertisements, but rather to view the news media sites as presented and how each participant
would normally use them to seek out news.

What does this mean? Well, a lot to advertisers depend on views and “clicks.” Perhaps
the audience is becoming adept to advertisement placement and instinctively knows where
advertisements are typically placed on a screen and where not to look so that the experience is
not interrupted? If this is the case, it is possible that typical web site advertising is creating “dead
zones” of areas the audience will begin to ignore and pay no attention to as the assumption of
what is likely to be there – an advertisement then interrupts the experience. Are marketers and
advertisements “teaching” the audience where and what to ignore? Will personalized advertising,
with higher levels of relevance, drawn the audience back to advertisements? Only time and more research will tell.

**How Long their Eyes Stayed There**

The length of a gaze is something that is sped up quite a bit by reading or “scanning” pages. So, when a gaze ellipse is much larger than others and has “cogs” on the outside gives us an indication of two things: first, not surprisingly, images played a big part in how long a participant stayed in a spot. Second, the “cogs” on an ellipse indicated that the participants either blinked or the pupils dilated. Both are considered evidence that the participants attempted to cognitively remember what was looked at. This made certain areas of the gaze path easier to determine interest as well as time spent at particular locations on the page.

**Which Elements did they Stayed on the Longest**

While images and visual content played a huge part, as expected, it was great to see how much headlines and descriptive text mattered in terms of consistency. The more consistent and accurate these elements worked together, more engagement was illustrated by the participant’s gaze paths.

**Why is this so?**

Looking at past research in journalism that defined eye tracking of news consumption was a great place for the researchers to start. The Tornado Effect that emerged in this study seems to be a combination of several previous findings of the “Z” or “figure 6 (8)” patterns these important studies in the field discovered. It also illustrated how attention spans are now dependent on how the formats and design change on the screen for media presented on a scrollable and dynamic web page versus a static front page of a newspaper. This presents another area for future research.
Responsive Design, the method of making a web site viewable on any device, will change the way content is displayed and also provides more prominent navigation. However, these responsive changes to the presentation of a site is due to the screen size and thus, screen real estate, that content must fit into for presentation. The assumption here is that many of the participants normally view the news media from these sites on their mobile devices rather than the web sites themselves. It is fair to conclude that the participants might have carried over their viewing habits from the mobile screen to the desktop screen. Of course, this assumption or theory can only be proven with more specific research on this topic.

Limitations

One significant limitation of this pilot study was the sample size. Our University lacks the funding commitment for a large-scale usability test involving hundreds of participants. This study was conducted using the lone computer in our department equipped with the necessary software. The researchers hope to use the results of the test pilot study to justify additional research and to conduct additional usability tests on news media web pages on the desktop and mobile devices.

The limited sample size also limits the applicability of our conclusions. As such, this small sample should be taken as merely a first step. Only additional research with a larger population would lead to the sort of seminal design guidelines that the online news industry still needs. The researchers do believe, however, that based on the test study it is possible to produce a set of webpage design guidelines that will ensure that news presented will also be news that is used by an audience. Furthermore, expanding the research to quantitatively measure eye movements for precision and displaying content in experimental designs are logical next steps for this research in the near future.
Additional limitations include the method of consuming the news on a desktop computer. Responsive design changes the way we consume news on a mobile device rather than a desktop computer. Although there are some heuristic and UX similarities with the amount of scrolling and headlines, the overall layout and design can be minimized to almost non-existent when consuming the news over a cell phone, for example. However, the length of time one stays on a story and how the combination of text and images are relatively the same when reading on a desktop versus a mobile device. This can be verified by the clusters of gaze plots that formed around the images and text on a page. The larger the ellipse, the longer the individual’s eyes stayed at a specific location and the higher concentration of ellipses in an area indicates more interest in what is being viewed. If one has the same reaction to reading the same story on a mobile device, it is safe to assume that a resulting gaze plot would look very similar on devices or platforms where news is consumed.

One expected outcome is that this has become one heck of a teaching tool providing excellent teaching moments. Students had the chance to see the results of what they were reading, what caught their attention and really what works as well as what doesn’t work in news media. Since this study, our department has flipped this concept around and used the eye tracking software on an instructor or third party reading the student written news stories submitted for a mid-level News Reporting class. The students now have the opportunity to see how the reader reacts and views their stories when posted to the Internet. Thus, they learn what works and what doesn’t in their next assignments from a few examples.
References


1. Universities and Healthy Oceans: Building Capacity on the Ground for Implementation of SDG14 through Synergies and Partnerships

2. Higher Education

3. Paper Session

4. This study demonstrates the vital role of higher education institutions towards the sustainable development of the coasts and seas through its core activities in education, research, governance and external leadership. It highlights how this approach can be used as a strategy in building on-the-ground capacity of countries implementing and scaling up integrated coastal management (ICM) programmes to train and build a critical mass of ICM leaders and practitioners in the East Asian region who can contribute to effective and efficient implementation of SDG 14 and other related ocean and coastal goals. Through collaborating and networking with leading higher education institutions from various countries in the region designated as ICM Learning Centers (ICM LCs), the PEMSEA Network of Learning Centers (PNLC) working towards the sustainable development of our ocean and coasts, has a key role to play to support on-the-ground efforts for sustainable use of the ocean resources.

5. Author

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Summary Abstract:

Higher education institutions play a vital role for the sustainable development of the coasts and seas through its core activities in education, research, governance and external leadership (SDSN, 2017:10). Building on-the-ground capacity in implementing and scaling up integrated coastal management (ICM) programmes involve training and maintaining a critical mass of ICM leaders and practitioners in the East Asian region who can contribute to effective and efficient implementation of SDG 14 and other related ocean and coastal goals.

The Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) is a regional coordinating mechanism involving 11 Country and 21 Non-Country Partners, which was established in 2006 through the Haikou Partnership Agreement. PEMSEA’s objective is the sustainable development and management of the region’s coasts and oceans through the implementation of the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA). SDS-SEA and integrated coastal management (ICM) provide a framework in support of implementing Sustainable Development Goal (SDG) 14 through a voluntary commitment of PEMSEA country partners to scale up ICM covering at least 25% of the region’s coastline and contiguous watershed areas, supporting national priorities and commitments under UN SDGs, UNFCCC, Aichi Biodiversity Targets, UNISDR Post-2015 Framework for Disaster Risk reduction, and other relevant environmental and sustainable development targets subscribed to by PEMSEA Partner Countries.

With over than 20 years of ICM experience in the region, PEMSEA forges collaborative arrangements to enhance and make best use of the region’s intellectual capital for integrated management and sustainable uses of coastal and marine environment through stakeholder participation, networking, and scientific, technical and information support. Capacity development is a continuing process. It begins with education and training, it is nurtured and expanded through application, hands-on experience, information sharing, knowledge development and transfer and, basically learning from each other. Each activity of the project entails some form of capacity development, mobilizing existing intellectual capital at the community level, scientific institutions, government agencies, the private sector, and/or the international community, for the benefit of the work programme and over the longer term, for sustainable social, economic and environmental development. To ensure success and sustainability, capacity building and knowledge transfer are built into PEMSEA activities from project conceptualization to actual implementation and monitoring, as well as in scaling up efforts.

In line with providing technical assistance to national and local governments, universities and research institutes are mobilized to increase technical support available on the ground, provide scientific inputs from experts advice in focus issues in various phases of ICM cycle, and building capacity and skills to replicate and scale up the ICM practice in the region by serving as knowledge repository of ICM lessons and best practices as ICM Learning Centers. These ICM Learning Centers provide technical assistance in the on-the-ground transfer of ICM practice, skills, knowledge, tools and methodologies.

A critical mass of ICM leaders and practitioners who do not only contribute to effective and efficient implementation of ICM programs but also in the scaling up of ICM practice is vital to ensure the sustainable development of the coasts and seas. The PEMSEA Network of Learning Centers (PNLNC) is a network of leading universities and research institutes well-recognized who collaborate and share
knowledge and experience in ICM. The PNLC, as a network of ICM LCs working towards the sustainable development of our ocean and coasts, has a key role to play to support these efforts through working with leading higher education institutions from various countries in the region.

The study highlights the roles of universities in strategic and programmatic capacity development approaches to build and maintain a critical mass of ICM leaders and practitioners in the East Asian region who can contribute to effective and efficient implementation of ICM programs through scaling up ICM practice for the sustainable development of the coasts and seas. These strategies include the integration of capacity development programs through the various phases of ICM cycle and using ICM demonstration sites to replicate and scale up the ICM practice. On-the-ground capacity is built through innovative training workshops, tools, networks and linkages, to build capacity of people – professionals, academics, ICM practitioners, project managers, etc. - through learning-by-doing programmes providing hands-on training to enhance knowledge and technical skills in using ICM as a tool to effectively manage their coastal and marine resources and environment.

Through synergies and partnerships built among Communities of Practice (CoP) such as the PEMSEA Network of Learning Centers (PNLC), the intellectual capital on ICM principles and practical skills in implementation is strengthened and awareness raised among local stakeholders, especially the local government, which significantly contributes to national, regional and global sustainable development objectives. In lessening the disparities in capacity among countries, PEMSEA provides effective platforms that encourage knowledge sharing such as the Seas of East Asia Knowledge Bank (SEAKB). ICM training and specialized training workshops at the regional, national and local levels, enhances the skills of local actors in various tools for specific issues including pollution reduction, marine spatial planning, risk and vulnerability assessment, ecosystem services valuation, coastal strategy, State of the Coasts reporting among a few. In collaboration with local governments, consultation workshops are also conducted to engage stakeholders and promote ownership and buy-in that facilitates learning and sharing of knowledge, resources and expertise among countries.

In building on-the-ground capacity of countries in the region to implement ICM programmes, higher education institutions indubitably play an important role in imparting the sustainability education paradigm upon society and in integrating the notion into educational programmes and systems. Further to this, building academic alliances for promoting sustainability in postgraduate education and research and to share resources and knowledge certainly enhances regional and global sustainable development efforts.
1. Transdisciplinary approaches towards sustainable development: The transformative role of education, research and capacity building

2. Cross-Disciplinary Approaches in Education

3. Paper Session

4. Effective formulation and implementation of solutions that address challenges brought about by rapid global changes lie within a rigorous transdisciplinary focus that is locally grounded and involves all the stakeholders concerned. An insightful transformation is happening in higher education institutions as they play a role for the development of new approaches to address complex global threats and challenges. In response to finding effective formulation and implementation of solutions towards sustainable development, transforming universities to serve tripartite roles in educating future leaders, fostering research and acting as extension of community works is deemed as a crucial step. Transdisciplinary education requires sustainability to be embedded not only in the academic curricula but through programs that will enable students to develop skills in complexity, collaboration and interdisciplinarity.

This study analyzes various initiatives of various higher education networks addressing focal issues of climate change, disaster risk reduction and biodiversity conservation and demonstrates how efforts by universities collaborating with various stakeholders across sectors serve important functions as platforms to promote transdisciplinary approaches in education, research and capacity building. The nature and methodologies of these engagement efforts and how they support co-creation, co-production and collaboration of knowledge is an important process that will be looked at.

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Summary Abstract

An insightful transformation is happening in higher education institutions’ role for the development of new approaches to address complex global threats and challenges. In response to finding effective formulation and implementation of solutions towards sustainable development, transforming universities to serve tripartite roles in educating future leaders, fostering research and acting as extension of community works is deemed as a crucial step. Transdisciplinary education requires sustainability to be embedded not only in the academic curricula but through programs that will enable students to develop skills in complexity, collaboration and interdisciplinarity.

Trandisciplinarity can be simply explained when various knowledge and disciplines merge and research are connected to relevant issues in the society. In finding ways to move forward to sustainable fashion, complex problems should be dealt with a greater and holistic level of understanding. Griggs et al. (2013) in his unified framework mentions how physical planetary boundaries/ limits can be put together with the development goals, from the Millennium Development Goals, to now the Sustainable Development Goals (SDGs). This shows that we are not just thinking about physical earth system, but consider the tripartite model of development.

From the educational standpoint, building communities of practice and networks play an important role in helping to address these kinds of issues by incorporating various bodies of knowledge, including traditional knowledge or knowledge of practitioners, which helps in orienting existing or new information to societal realities. The analysis presented in this paper lays out the arguments on how transdisciplinary approaches contribute to the transformative role of education in overcoming fragmented approaches in learning through developing a multi-sectoral and engaging various stakeholders of academia, especially with the communities. It looks at how universities can begin addressing these complex challenges through problem-based research that can be realistically implemented by active participation and engagement with the local community, as the immediate circle of influence that can be affected by initiatives of the universities. The nature and methodologies of these engagement efforts and how they support co-creation, co-production and collaboration of knowledge is an important process that should be looked at.

This study analyzes various initiatives of various higher education networks addressing focal issues of climate change, disaster risk reduction and biodiversity conservation and demonstrates how efforts by universities collaborating with various stakeholders across sectors serve important functions as platforms to promote transdisciplinary approaches in education, research and capacity building. A few key learning from these networks include encouraging active participation and active engagement of stakeholders, co-collection and co-analysis of data on societal needs and demands, development of new technologies and systems through social experimentation at universities as living laboratories, assessment of impacts with transparency, objectivity, neutrality, legitimation of innovation in society, provision of effective feedback to decision makers, incorporation into institutional design, and contribution to agenda setting at regional, national, and global levels.

Effective formulation and implementation of solutions that address challenges brought about by rapid global changes lie within a rigorous transdisciplinary focus that is locally grounded and involves all the stakeholders concerned. While we have achieved meaningful partnerships and collective engagement in the past as we shifted from monodisciplinary (isolated) approaches to multidisciplinary (additive) and then to interdisciplinary (interactive) approaches, the highly uncertain, highly complex and fast-evolving
problems we are currently dealing with require a more holistic transdisciplinary approach that brings all stakeholders together, including the academe, local government units, NGOs and communities, to enable rapid transfer of knowledge, experiences and quick feedback. During the past few decades, we have seen great advances in Information and Communications Technology. Yet, real progress is still to be seen in our ability to solve pressing societal problems. At this present conjuncture, the challenge is how to design and implement research projects that can not only advance knowledge but translate knowledge to sustainable solutions effectively through transdisciplinary approaches.
1. **Title**

*Fennec: Enhancing English Listening Skills with Video-Watching Experiences*

2. **Topic**

Language Education

3. **Presentation Format**

Paper Session

4. **Description of presentation (not exceed 75 words in total)**

This research aims at answering two specific questions: (1) how to utilize online videos as a useful resource for English learner to improve their listening skills, and (2) how to provide an enjoyable learning environment to the learners where they can actively engage in the lesson rather than just listening. The *Fennec* is a new web application that utilizes transcription technology to help learner actively engage with online videos to improve their listening skill. The system also automatically generates assessment questions for the selected video.

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**Fennec: Enhancing English Listening Skills with Video-Watching Experiences**

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**Abstract**

In traditional English education, instructors mainly focus on teaching reading and writing rather than listening and speaking skills. Specifically, there is no standard way to improve listening skills and learners can easily lose their passion in learning. In this research, we try to answer two fundamental questions: (1) how to enhance English listening skill by using available online videos, and (2) how to provide an engaging learning environment for English learners. Fennec is a web application that utilizes automatic transcription technology to help non-native English speaker actively engage with various online videos to improve their listening skills. The application is a user-centric design and has gone through traditional Human-Computer Interaction (HCI) practices to improve its usability. The current result shows that Fennec not only provides lecture on demand like services with existing online videos, but it also offers automatically generated assessment questions for the users.

**Keywords**—YouTube videos, transcription, English, listening skills.

**I. INTRODUCTION**

Listening is a natural way to learn a new language. Previous study has shown that when a person is engaged in communication, approximately 9% is devoted to writing, 16% to reading, 30% to speaking, and 45% to listening [1]. However, traditional English teaching for foreigners normally starts from reading and writing rather than listening and speaking. Specifically, listening is one of the most difficult skills for English learners to improve. In order to improve listening skills, different methodologies have been proposed, such as class activities, online group studies and exercises, etc. Unfortunately, not all people in different countries or environments can freely enjoy such educational resources.

Based on the learners’ various demands, many different types of learning tools have been introduced, such as YouTube videos, podcasts, books and mobile applications [1-3]. By using appropriate learning tools, English learners can improve their language skills effectively. Different from speaking and writing skills, however, improving listening skills can be very frustrating and learners can easily lose their passion and engagement in the lesson. Our research aims at answering two specific questions: (1) how to utilize learning tools, such as YouTube videos, as a useful resource for English learner to improve their listening skills, and (2) how to provide learners a different environment where they can actively engage into the lesson rather than just listening.

In this paper, we propose the *Fennec*, a web application that utilizes a transcription technology, to help non-native English speakers actively engage with various online YouTube videos to improve their listening skills. The *Fennec* is capable of automatically generating different assessment questions for the selected YouTube video. The rest of this paper is organized as the following. Section II provides related work that shows various learning tools for learners. Section III presents the details about our web application design and implementation. Finally, we conclude our work in Section IV.
II. Related Work

Different approaches have been used to improve English language. For example, Artyushina et.al [1] introduced podcast as a learning tool at the undergraduate level. The survey of their study has shown that podcasting is a creative and entertaining technology for individuals in e-Education. Podcasting has also demonstrated its great educational purpose as it widens the students’ lexical and grammatical context.

Reading comics books for language learning is another approach. Kocacs and Miller [2] developed the Foreign Manga Reader - a system that helps readers comprehend foreign-language written materials and learn the grammar and vocabularies. By providing the sentence-structure visualization for a dialog, learners can understand the grammar, pronunciations, phrases and individual words. (Figure 1)

![Figure 1. Foreign Manga Reader: Grammar visualization for a dialog [2]](image)

Not only for language learners, how-to videos on the web are one of the most popular and powerful tools. Since millions of learners today use how-to videos to learn new skills in a variety of domains, Kim et. al. [3] created ToolScape application to provide how-to videos with step-by-step annotations. The application offers an interactive video player to display step descriptions and intermediate result thumbnails in the video timeline. It enhances learning experience via existing how-to videos.

III. FENNEC

*Fennec* is a web application that utilizes a transcription technology to improve English listening skills through watching online videos. We choose YouTube as an example to demonstrate the idea, but in fact the idea of the system can be generalized to all kinds of online videos. *Fennec* automatically generates different assessment questions for the selected YouTube video.

3.1 Design

To generate assessment questions automatically for the selected video, the system needs to apply a speech recognition technology to the selected video. There are different available services for speech recognition, such as Google Speech API [4] and Web Speech API [5], and *Fennec* uses Web Speech API to simplify the process. (Figure 2)

![Figure 2. System Architecture of Fennec](image)
In terms of the UI design, the Fennec cares about the user experience and follows traditional Human-Computer Interaction (HCI) practices to improve its usability. The system is user-centric, and we start from creating a low-fidelity paper prototype to get inputs from the users. The main system is simplified to have only three main pages. (Figure 3)

![Figure 3](image)

Figure 3. The proposed idea of the system

The main page only has a search bar for retrieving videos with a specific search term. (Figure 3 - (a)) After taking a search term input, the system will be redirected to a second page that has a list of recommended videos. This design references YouTube layout to lower the learnability to the learners. (Figure 3 - (b)) When the user clicks on a specific video, the selected video will be shown on the third page, along with a list of videos on the right-hand side. As Figure 3 – (c) indicates, a multi-tab design is included next to the main video. While the Question tab is used to show assessment questions, which is automatically generated by the Fennec, the Result tab can provide the transcribed content.

### 3.2 Implementation

The Fennec uses existing web services, including YouTube APIs and Web Speech APIs, to demonstrate the idea. To make the system comply with the state-of-the-art Web technologies, we use React, a JavaScript library for building user interfaces [6], to design the system. Basically, the system uses `fetchVideo()` function with predefined parameters to send a request to YouTube server for retrieving designed information. (Figure 4) In addition, to make an asynchronous HTTP request from the browser, we use `axios`, a promise-based HTTP client for the browser and Node.js. [7]

```javascript
export function fetchVideo(term){
  const params = {
    part: 'snippet',
    key: API_KEY,
    q: term,
    type: 'video'
  };
  const request = axios.get(ROOT_URL, {params, params});
  return {
    type: "fetchVideo",
    payload: request
  };
}
```

![Figure 4](image)

Figure 4. Handle HTTP GET request to YouTube
Some main functionalities of Web Speech API are injected to `this.props` for passing down to some child components. `Props` is a single object in a component that is passed as a JSX attribute. Unfortunately, Speech Recognition does not work well as a component, so it is set as a container. Hence, other components can be rendered within the Third Page Component.

Figure 5. Speech Recognition feature

```jsx
class Dictaphone extends Component {
  render(){
    const { transcript, resetTranscript, browserSupportsSpeechRecognition, finalTranscript, stopListening, recognition } = this.props;
    if (!browserSupportsSpeechRecognition) {
      return null;
    }
    return (
      <div className="input-group">
        <input type="text" className="form-control" ref="search"/>
        <button className="btn btn-default" type="button" onClick={this.onSearchTerm}>
          this.props.onSearchTerm(this.refs.search.value)
        </button>
      </div>
    );
    return {
      autoStart: true
    }
  }
  export default SpeechRecognition_props(Dictaphone)
```

Figure 6. Code snippets of some main components in the Fennec. (a) search bar: get the user’s input query for retrieving videos, (b) list video items: load information for each video in the list, (c) video detail: load a specific videoID with its title and description, (d) video list: return a list of 5 videos.

```jsx
class SearchBar extends React.Component {
  render(){
    return (
      <div className="input-group">
        <input type="text" className="form-control" ref="search"/>
        <button className="btn btn-default" type="button" onClick={this.onSearchTerm}>
          this.props.onSearchTerm(this.refs.search.value)
        </button>
      </div>
    );
  }
  export default SearchBar;
}
```

```jsx
const VideoList = (props) => {
  const videoItems = props.videos.map((video) => {
    return <VideoListItem onVideoSelect={props.onVideoSelect} key={video.etag} video={video} />
  });
  return {
    <ul className="list-group">
      {videoItems}
    </ul>
  };
  export default VideoList;
```

```jsx
const VideoList = (props) => {
  const videoItems = props.videos.map((video) => {
    return <VideoListItem onVideoSelect={props.onVideoSelect} key={video.etag} video={video} />
  });
  return {
    <ul className="list-group">
      {videoItems}
    </ul>
  };
  export default VideoList;
```
These main components will be rendered into three containers: Main Page, Second Page, and Third Page respectively. `mapStateToProps()` function is the most important function defined for containers. It stores data into components. As Figure 7 indicates, it returns two application states, i.e. listed videos and the selected video.

```javascript
function mapStateToProps(state, selectedVideo) {
  return { videos: state.videos, selectedVideo: state.selectedVideo };
}
```

Figure 7. mapStateToProps() function

Another essential function is `mapDispatchToProps()`, which provides action creators as a props to the components. In this case, `fetchVideo()` function is called as an action creator that is required to be bind with a dispatch call to merge into components.

```javascript
function mapDispatchToProps(dispatch) {
  return { bindActionCreators: (fetchVideo, dispatch) => fetchVideo(dispatch) };
}

export default connect(mapStateToProps, mapDispatchToProps)(FinalPage);
```

Figure 8. mapDispatchToProps() functions

For the Main Page, Router is initialized for the other two containers. Basically, Router initializes a routing path that associates to specific containers. This part is only required to define once in the first container, then it can be used throughout the whole application.

```javascript
return (
  <Router history={history}>
    <Switch>
      <Route exact path="/" exact strict component={MainPage} />
      <Route path="/result" exact component={SecondPage} />
      <Route path="/result/resultVideo" exact component={SpeechRecognition} />
    </Switch>
  </Router>
)
```

Figure 9. Routing between containers

### 3.3 Results

The *Fennec*, a Web application for enhancing English listening skills with video-watching experiences, is illustrated as Figure 10. The application is user-centric and easy-to-use. It simply contains three main pages, as explain in section 3.1. The key features of the system include:

1. Query a key word and retrieve a list of related videos
2. Provide a learning mode to watch the selected video
3. Transcribe the watching video with Speech Recognition technique
4. Generate assessment questions automatically

The *Fennec* project has an impact for the users whose first language is not English. From technical perspective, handling data flow and managing states of the whole application are trivial. Compared with traditional HTML and JavaScript approaches, it took several steps to bind transitions between pages using React [6]. There are some improvements that can be made for the system. For example, when clicking on a certain video on page two (Figure 10 - (b)), the transitioning does not function smoothly because it keeps loading the layout before getting back data. Moreover, although generating assessment questions from a transcribed text is a success, the ideal operation of the drag and drop is not finished at this moment. Due to the inconsistent states of React state, the search results often return back unrelated videos.
Learning English should be an interesting experience, but traditional English education mainly focuses on teaching reading and writing rather than listening and speaking skills. As indicated in [1], when a person is engaged in communication, 45% are devoted to listening. There is a gap between time used in training listening skills and the importance of this skill. Unfortunately, there are not available tools designed to improve English listening comprehension. In this research, we try to answer two fundamental questions: (1) how to enhance English listening skills by using available online videos, and (2) how to provide an engaging learning environment for English learners.

We propose Fennec, a new web application designed for enhancing listening skills for English learners. The application is simple and user-centric. It not only went through traditional HCI practices for usability enhancement, but it also investigated possible techniques to automatically generate assessment questions for listening comprehension. The current result indicates that Fennec can provide lecture on demand like services with online videos. In addition, the assessment questions can be automatically created for any selected video. The future work of this research includes improving UI design for interactions, extending the system to support speaking enhancement and adding support for mobile devices.

REFERENCES


[7] axios - Promise based HTTP client for the browser and node.js: https://github.com/axios/axios
Abstract: This presentation includes the course design and students’ perceptions of using Artificial Intelligence (AI). The main objectives in this course were to gain the basic knowledge of usage of AI by learning how to build the corpus data, and to gain critical thinking skills. To evaluate the effectiveness of this course, critical thinking scales were used. It was master’s level course at Polytechnic University of Japan (PTU). AI was first introduced to the course. The students actually built the training data for the AI system that help search appropriate vocational training.

Background

Artificial Intelligence (AI) may be one of the most powerful tools that may have great impact on our lives near future. The college students should be ready for the use of
such one of the latest technologies. It is important for them to know how to use it. At the same time, the students need to think about how it could be used in their field.

Traditionally, people who involved in the field of STEM (Science, Technology, Engineering, and Mathematics) are required to have higher skills in their specialized field. However, those people who work in the STEM field are asked for other generic skills such as creativity, problem-solving, critical thinking, and communication skills to explain a new product (OECD, 2016).

This study indicates how the course was designed for the graduate students to gain the basic knowledge of using AI system, and examined whether or not they improved their critical thinking skills after the group work building the corpus data of AI.

**Literature Review**

The importance of critical thinking skills was often discussed. There are several definitions of critical thinking. Kusumi (2005) described that critical thinking was related to criteria or reasonability of one’s thought. Instead of criticizing others’ ideas, you should consciously reflect your own thinking process. In addition, critical thinking is considered as inductive inference, which is an important role to collect information, infer, evaluate, and conclude.

Kusumi and Matsuda (2007) showed that there are four factors in critical thinking attitudes. They were “inquiry mind”, “objectivity”, “emphasis on evidence”, and “awareness to logical thinking”. The four factors were briefly explained as follows. “Inquiry mind” is to have intention of seeking various information and knowledge. “Objectivity” is to try to see things objectively avoiding subjectivity. “Emphasis on evidence” is to make a judgment based on evidence. “Awareness to logical thinking” is awareness about your own logical thinking ability.

Kusumi and Matsuda (2007) also stated that "inquiry mind" and "objectivity" were a factor affecting "subjective information gathering". "Subjective information gathering" was referred to what Goto (2005) indicated. He explained that “subjective information gathering” was not only to accept information easily, but also to try to get information using various sources if they think it didn’t make sense. In addition, Kusumi and Matsuda (2007) stated that college students with higher "inquiry mind,"
"objectivity," and "emphasis on evidence" in critical thinking attitudes, understood the bias of the media more, and had subjective information gathering more.

Fujiki and Okibayashi (2010) showed that "inquiry mind" was the source of critical thinking attitudes. It was thought that “inquiry mind” motivates critical thinking attitudes and forms "emphasis on evidence" as mental attitude as well as forms "objectivity" as normative consciousness. Moreover, "awareness to logical thinking" was generated as self-evaluation by monitoring this "emphasis on evidence" as a mental attitude. Furthermore, based on "emphasis on evidence" as a mental attitude, "objectivity" was considered to occur as normative consciousness about your thought. These four factors were used to evaluate critical thinking in several studies.

**Research Methods**

**Settings**

The students participating in the study were in the master’s level program at Polytechnic University of Japan (PTU). PTU has an important mission of educating vocational training instructors in Japan. PTU offers not only undergraduate program, but also Master’s degree program, along with the official certificates of a vocational training instructor. To become a licensed vocational training instructor, it is important for the students to know about the latest technology as well as generic skills such as critical thinking. The name of course was Dynamic Capability of Product Organization. The purpose of introducing AI into the graduate level course was to allow students to explore one of the latest high technologies to see what it is like and how it works. Moreover, the group activity using AI was expected to improve the students’ critical thinking skills.

AI was first introduced to this course in 2018. The course consisted of nine lessons. One lesson was 200-minute-long. But the students used AI for three lessons. Twenty two students enrolling the master’s level of course.

When they developed the corpus database, at first they decided a persona that uses the system. Thus, they needed to think through the user’s insights who did not know much about professional occupations and types of training. The students shared the ideas and built the corpus data as a group. The group members consisted of 4 or 5 students who had different professional fields such as mechanical engineering, electrical engineering, electronics and information engineering, architectural engineering.
In the first lesson, the students gained basic knowledge and specification of AI, and the students learned algorithm for machine learning and deep learning, and how to develop the corpus data base. Then, in the second lesson, the students were asked to build the corpus data to train the AI system which helped find appropriate vocational training for the specific user that the students assumed. In the third lesson, the students tuned database for the AI system and made a presentation to show how the system they developed worked well or not.

The artificial intelligent that the students used was IBM Watson. Initially, the instructor of the course made the basic database so that the students can develop it easily in the limited class time.

**Purpose of This Study**

The students in the graduate level program should obtain higher knowledge and skills in their field. But, it is also important to explore one of the latest technologies such as AI. In addition, as OECD suggested, they need to have generic skills to obtain critical thinking skill. Building the corpus database to have desirable results for a particular person that the students decided as a persona seem to promote to reflect one’s own thought as Kusumi suggested (2005). For, since building the data instantly show the results while building it, they were able to rebuild it again until they were able to receive desirable results while reflecting their thoughts.

Thus, the purpose of this study is to see a group activity using AI improve the students’ critical thinking skills.
This is a pilot version in order to include this type of activity with a bigger size of class in the near future. Thus, this study is important to investigate how this course design using AI works well.

**Research Question**

The research question was whether or not a group activity using AI system improved the students’ critical thinking skills or not. Were four factors of critical thinking generated as the Kusumi and Matsuda(2007) indicated?

**Data Collection**

In order to examine the students’ critical thinking skill, critical thinking attitude scale (Hirayama, & Kusunomi, 2004) was used for the measurement of critical thinking. The scale consisted of 18 items in total of four factors: "awareness to logical thinking", "inquiry mind" "objectivity" "emphasis on evidence", and the answer consisted of "strongly agree (5 points)" to " strongly disagree (1 point) " in 5 likert scales.

Based on previous studies of critical thinking attitude scale items, critical thinking attitudes were classified as subscale scores of items. They were "awareness to logical thinking" of 13 items, "inquiry mind" of 10 items , "objectivity" of 7 items, "emphasis on evidence" of 3 items, and subscale scores were calculated, respectively. The data were collected before and after the group activity using AI.

**Results**

Except for persons with missing data of critical thinking subscales before and after class, 21 data were used.

In order to compare critical thinking skills before and after the class, t-test was conducted for each subscale score of the critical thinking attitude scale. Critical thinking attitudes before and after the class shows the average score and standard deviation of the subscale and the result of t-test in the Table 1.

As a result of the t-test, there was no significant difference in each subscale score of the critical thinking attitude scale before and after the class. The reliability coefficient of the preliminary data is (α = .701), and when the reliability coefficient (α value) of each subscale is calculated, the awareness to logical thinking (α = .899), the inquiry mind (α = .666), objectivity (α = .749), emphasis on evidence (α = .60). The reliability
The reliability coefficient (α value) of each subscale of the posterior data reveals that the awareness to logical thinking (α = .806), the inquiry mind (α = .848), objectivity (α = .814), emphasis on evidence (α = .645).

Table 1. Critical thinking Subscales

<table>
<thead>
<tr>
<th></th>
<th>Pre (N=20)</th>
<th>Post (N=21)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>Awareness to logical thinking</td>
<td>2.69</td>
<td>0.87</td>
</tr>
<tr>
<td>Inquiry mind</td>
<td>3.89</td>
<td>0.61</td>
</tr>
<tr>
<td>Objectivity</td>
<td>3.45</td>
<td>0.72</td>
</tr>
<tr>
<td>Emphasis on evidence</td>
<td>3.53</td>
<td>0.73</td>
</tr>
</tbody>
</table>

Correlation Analysis of Critical Thinking Subscales

Correlation analysis was conducted between each subscale of the critical thinking attitude scale in order to investigate the relationship between elements of critical thinking before and after the class. The results of correlation coefficients of each subscale before the class, are shown in Table 2, and the results after the class are shown in Table 3.

In advance, there was a significant positive correlation at 5% level between "emphasis on evidence" and "awareness to logical thinking", and at 1% level between "inquiry mind" and "objectivity".

There was also a significant positive correlation at 5% between "inquiry mind" and "objectivity", and between "objectivity" and "emphasis on evidence" after the class. In addition, there was a significant positive correlation at 1% level between "emphasis on evidence" and "consciousness to logical thinking."
Table 2  Pre Correlation

<table>
<thead>
<tr>
<th></th>
<th>Awareness to logical thinking</th>
<th>Inquiry mind</th>
<th>Objectivity</th>
<th>Emphasis on evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness to logical thinking</td>
<td>1</td>
<td>.078</td>
<td>.319</td>
<td>.472*</td>
</tr>
<tr>
<td>inquiry mind</td>
<td></td>
<td>1</td>
<td>.712**</td>
<td>.436</td>
</tr>
<tr>
<td>objectivity</td>
<td></td>
<td></td>
<td>.309</td>
<td>1</td>
</tr>
<tr>
<td>Emphasis on evidence</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3  Post Correlation

<table>
<thead>
<tr>
<th></th>
<th>Awareness to logical thinking</th>
<th>Inquiry mind</th>
<th>Objectivity</th>
<th>Emphasis on evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness to logical thinking</td>
<td>1</td>
<td>.122</td>
<td>.348</td>
<td>.618**</td>
</tr>
<tr>
<td>Inquiry mind</td>
<td></td>
<td>1</td>
<td>.541*</td>
<td>.215</td>
</tr>
<tr>
<td>Objectivity</td>
<td></td>
<td></td>
<td>.497*</td>
<td>1</td>
</tr>
<tr>
<td>Emphasis on evidence</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

* The correlation coefficient is significant (5% level) (two-tailed).
** The correlation coefficient is significant (1% level) (two-tailed).

Discussions

In this study, the correlation analysis was conducted between each subscale of the critical thinking attitude scales in order to investigate the relationship between elements of critical thinking before and after the class.

As a result, there was a significant positive correlation between "objectivity" and "inquiry mind", as well as between “awareness to logical thinking " and "emphasis on evidence "both before and after the class.

In addition, there was a significant positive correlation between “emphasis on evidence” and “objectivity” after class.
In short, the results of this study supported what Fujiki and Okibayashi (2010) indicated. Yet, four factors of critical thinking attitude seem not to generate the same levels at the same time. This study showed that the order of generating the factors was “inquiry mind”, “emphasis of evidence”, “awareness to logical thinking” and then “objectivity.”

AI gave the students the prompt feedback of their thoughts when they tried to have the others’ perspectives, such as persona in this study. The activity may have helped to generate awareness to logical thinking ways from a sight of objectivity.

This study was a pilot version to see how the students explore AI system and whether or not this type of group activity could generate critical thinking skills.

This is a very limited pilot study, the results cannot be generalized. Yet, the results suggest that this type of group activity may help generate critical thinking skills. Although it is necessary to conduct further investigation, this study can be useful for the researchers to develop the similar course with bigger class size.

References


Development of new teaching materials for satellite imagery analysis

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Abstract

We aimed to develop a new method of teaching satellite imagery analysis in visible light, with the goal of enhancing educational materials and scientific literacy. Since environmental contamination manifests hue changes in satellite images, we developed a method for controlling hue and contrast emphasis in satellite images. We posited that this method would be a useful tool in professional education programs of applied information and communications technology (ICT).

We selected satellite photographs taken by Himawari 8, a Japanese weather satellite. The blue in the pictures was extremely strong and the visibility poor, so we reduced the color (Fig. 1). Using this method as part of an information science program, we demonstrated the process to 35 students in social science who plan, after graduation, to find employment at IT companies. We found that because we did not use a scaffolding approach, not all students were enlightened by the lecture; those students who lacked a clear understanding of the problems were less able to cope with the method, did not predict the next stage, and did not commence operations. Furthermore, some of the students lacked basic knowledge about the computer we used and thus could not operate the program. We advised them to ask us anything they did not understand while they were working on their individual computers, but many did not know how to express the problems they were having. For them, our teaching method was complicated. We determined that students need better prompting, and this led us to make a checklist for the operation.

However, the students who grasped the method had a sense of achievement. They found polluted seawater, a yellow-sand event, a typhoon, and a cloud configuration. In one exercise, we asked 5 students to analyze and compare a satellite image picture and a weather chart for the same location and time of day. They chose the images themselves, which strengthened their motivation. Their feedback helped us improve our instruction model through problem-solving, and we anticipate that our hue/contrast-enhancement technique will be a new development in teaching applied ICT.

Fig.1 the picture after image processing
Investigation on Effectiveness of Mobile Application for Summary Speaking Task for Producing Sentence Structures

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Abstract

Fluency is an important factor in speaking performance in language learning. Learners can improve oral fluency by repeating output tasks. Although a summary speaking task, which is an effective output task, enables learners to concentrate on grammatical encoding and improves their oral fluency, it is difficult for them to use this method for self-study. Thus, in our previous studies, we developed a mobile application for a summary speaking task for self-study (MAST), which offers not only a summary speaking task but also scaffolding practice for helping learners perform summary speaking by themselves.

Although we found that MAST could decrease learners’ frequency of repair when speaking English, it is unclear what kind of sentences learners could encode grammatically and speak more fluently. Therefore, the current study aims to investigate the kind of sentence structures that learners can speak without repair.

A brief description of the learning process with MAST is as follows. First, a learner listens to an English text (3 to 4 minutes) and then speaks its summary for one minute. While listening to the text, the learner can write down some words from the spoken text to refer to them later while summarizing. Second, MAST offers a “Short question and answer practice.” In this step, the learner must answer five or six short questions that MAST vocalizes. Each question is related to the summary points of the English text so that the learner can recognize the points gradually and practice using necessary words. Third, the learner listens to the text and speaks the summary again. An important feature of MAST is that it could help learners conceptualize what they have to say and retrieve necessary words so that they could concentrate on grammatical encoding when speaking the summary.

To evaluate the effectiveness of MAST, we conducted an experiment and analyzed participants’ oral fluency. The experimental procedure was as follows. We randomly split the participants into two groups and asked them to use either of the following learning applications for six continuous days: (1) MAST (an experimental group), or (2) learning application for reading aloud the same English text as MAST but not for grammatical encoding (a control group). In addition, the participants took speaking tests before the six learning days (pre-test), within three
days after the last learning day (post-test), and one week after the post-test (delayed test). We analyzed the participants’ speaking performance on the tests in terms of sentence structures that do not include repair.

Although the analysis results have a limitation for generalizability, the results imply that the use of MAST can enable learners who speak only words or phrases to speak English sentences of longer structure with fewer frequency of repair, such as SVOA and SVCA.
Development of Training Application for Wind Instruments
and a Leaflet as a Learning Tool

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Abstract

When performing basic training of wind instruments with a small number of people, the player needs to evaluate their own sounds. It is possible for players who are proficient to some extent to carry out the evaluation. However, it is difficult for beginners to properly evaluate. In this research, we focused on the beginner players and developed a wind instrument playing support system.

This system covers long tone exercise which is one of basic exercises of wind instruments. Specifically, if player continues to blow each note of the scale in sequence for about 10 seconds, the system will feed back about the accuracy and stability of the pitch. What this system can do is as follows: immediate detection of the pitch of the inputted sound, visualization of the detected pitch and feedback to the performer, accumulation of inputted sound or feedback contents, and presenting them even after playing.

To make better use of this application, it is desirable to practice with an accomplished teacher or player. However, as mentioned earlier, it would be difficult if there are no experts, such as when practicing with a small number of people. Therefore, we developed a leaflet as a learning tool that even beginner player can effectively utilize this application.

The purpose of this leaflet is to make the player compare the performance sound pattern fed back from the application with the ideal pattern or problem pattern. For that reason, not only ideal patterns of pitch and sound but also patterns including problems such as unstable intervals and sounds that are cut in the middle are presented. This allows the performer to easily evaluate his or her own sound. Besides, the leaflet includes the tips for performing wind instruments, such as form, breath control, and sound form, and the operation procedure of the application.

In this presentation, we describe the developed application and leaflet. Then, we would like to introduce cases using the applications and the leaflet, and examine the effects of them.
Aphasia Camp offers Allied Health Students an unique Experiential Learning opportunity

**Topic area:** Cross-disciplinary areas of Education  
**Presentation format:** Paper session  
**Description:**
This presentation provides an overview of aphasia camp and the development of the student role. A summary of students’ perspective provides evidence for the importance of experiential learning experiences in putting knowledge and skills into practice. Three different student data sets indicate learning in the areas of personal and professional growth, empathy, communication, interprofessional team work, resilience, connection, and the clients’ story. Facilitators reflection on how to set up a successful camp will be shared.

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Aphasia Camp offers Allied Health Students an unique Experiential Learning opportunity

Overview:
Aphasia camp offers those with aphasia and their companions an opportunity to explore recreational and therapeutic activities, enhance communication skills, and connect with peers within a camp environment (Kim, Ruelling, Garcia & Kajner, 2016). Interdisciplinary student teams independently plan, organize and execute activities during camp allowing students the unique opportunity to implement their classroom learnings into practice. Students, campers and facilitators alike express how positive and empowering this experience is.

Objective:
The purpose of this presentation is to provide a general overview of aphasia camp and explain the student role and their participation during camp. Two different data sets will be shared. One data set is from participating students. The student data is a description of their perspectives on their learning outcomes. The second data set is from the facilitators of camp who explore how to they set up a positive learning experience.

Method:
Three years of student perspectives on their learnings was collected through reflection papers and by conducting student focus groups. A separate focus group was conducted with the facilitators to explore the basis for success of the camp. All focus groups were transcribed and data was extracted using thematic analysis (Braun & Clarke, 2006). Member checking was conducted with both the students and faculty members.

Results:
Camp provides students with a unique opportunity to explore their (inter)professional competencies and leads to professional and personal growth. Students empathize how teamwork, communication, connection with others, empathy, resilience and campers’ stories provide rich opportunities to explore their own learning (Werther and Vergis, 2018). Facilitators highlight components of the experiential learning theory in their set up of camp. Providing a safe learning opportunity balancing structure with flexibility for students to develop their own activities. Trust in each other and students are essential components in its success.

Conclusion:
Aphasia camp provides a unique opportunity for students to implement their learnings outside of the classroom setting. The basis for success of camp can be found in experiential learning theory (Kolbe, 1984) and those participating in it.


Teacher Training to Support GeoSTEM Education for Language Learners

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Abstract

The GeoSTEM Project set sail to support ELs in Arizona by developing a systemic plan to design PD, strategies and materials to further educate, support and empower teachers, administrators, staff and parents of ELs. This project provided an all-inclusive learning experience for ELs to develop academic vocabulary in which teachers, parents and the school community were all provided with tools to navigate supporting ELs. To do this Arizona State University and the Arizona Geographic Alliance supported in part through a partnership with National Geographic developed strong partnerships with local schools that have large EL populations, have programs to develop language for ELs, and have established parent-school goals to to support academic rigor and language acquisition opportunities for their children. While this linguistic diversity provides rich opportunities for language learning, it also presents a need for highly qualified teachers and programs that ensure that all students are provided with an equitable education.

Introduction

As a nation it is crucial that a high quality public education is provided for English learners (ELs) in schools. Arizona consistently ranks among the top 15 states with the highest percentage of English learners (Soto, Hooker, & Batalova, 2015). Consistent with national student achievement data, English learners in Arizona are performing significantly lower than their non-EL counterparts. In order to meet the needs of ELs in Arizona, GeoSTEM Project will build ELs academic language and ensure English learners and Dual Language Learners (DLs) are ready to meet rigorous academic content and language goals. Grounded in Stanford’s 6 Principles for EL Instruction (Stanford, 2013), this grant focuses on providing ELs and DLs with opportunities to engage in practices which are designed to simultaneously build conceptual understandings and language competence. In our preparing to launch the work, we developed a needs assessment to determine how the grant could best support preservice teachers seeking a Bilingual/English as a Second Language Endorsement, inservice teachers working with ELs and DLs, school administrators in schools serving significant numbers of ELs and DLs, and parents
of ELs in DLs in Phoenix-area schools. Using the survey, focus group, and interview data, we identified the needs of the communities we seek to support and developed a plan to implement professional development for teachers that will bolster them as they reimagine the opportunities that Arizona’s public schools can provide for supporting our students who are learning language and academic content in tandem.

The GeoSTEM Project partnered with schools that were focused on language development, high academic content instruction, and technology integration to best prepare their students for college and the workforce. The three project goals were to:

1. Develop strategies, technology tools and instructional materials for teachers that drive improvement of academic vocabulary for ELs in the classroom

2. Professionally develop teachers’ use and implementation of technologies, strategies, and instructional materials that drive improvement of academic vocabulary of ELs in the classroom

3. Create and implement parent/family events that build knowledge and familiarity with technologies and instructional strategies that will enable them to help develop academic vocabulary of ELs at home

To accomplish these goals, this project:

· Developed, piloted and published 10 evidence-based ELTech Strategies and 10 STEMSS lessons that integrate the ELTech Strategies

· Developed, conducted and published face-to-face PD and eLearning modules to build 10 EL in-service teachers’ knowledge, experience and ongoing support in STEMSS content and ELTech strategies

· Conducted and presented at conferences to disseminate STEMSS lessons and ELTech Strategies to provide leadership opportunities for trained EL teachers and to extend the reach to ELs across the state and country

· Created a strong partnership between ASU and the local schools by collaborating to support ELs

· Created and implemented annual school events to develop families’ and community members’ knowledge of using strategies and technologies to increase children’s academic vocabulary

METHODS:

As part of this project, a needs-assessment survey was sent to the junior and senior cohorts of preservice teachers seeking a Bilingual/English as a Second Language endorsement at the Mary
Lou Fulton Teachers College and alumni of the program. It was also sent to teachers in our three LEAs who work primarily with English learners (ELs) or Dual Language (DLs) Learners and their school administrators. In addition, we conducted three focus groups with preservice teachers and three focus groups with inservice teachers pulled from the survey participants. We also conducted interviews with 5 key administrators in schools serving significant numbers of ELs and DLs. Furthermore, 5 parents of ELs and 5 parents of DLs from our LEA schools were interviewed. All focus group and individual interviews used a semi-structure interview protocol and were audio-taped, transcribed, and analyzed using qualitative methods.

Qualitative data sources were analyzed using constant comparison and analytic induction methods to identify and extract common themes across participants and data sources during the year (LeCompte & Preissle, 1993). Several techniques were used to support the trustworthiness of the data, including data triangulation, peer review, member checking, and a search for negative cases. Descriptive statistics were used to analyze all of the survey data (means, standard deviation frequencies).

RESULTS:

The theme that most commonly emerged from the qualitative data was the need for curriculum and instructional materials that teachers can implement with English learners and dual language learners in Arizona’s classrooms that are aligned with the content standards that teacher are expected to cover through their instruction. More specifically, preservice teachers, inservice teachers, and school administrators would like materials that differentiate for different English proficiency levels. The second most common theme was a desire for a community in which resources could be shared across schools and where challenges to working within Arizona’s restrictive language policies could be discussed and addressed as a community. Other themes that emerged included the need of professional development on how technology can be leveraged to support ELs and DLs, and how to engage meaningfully with ELs and DLs families. Other minor themes will also be shared in our presentation. The parent interviews revealed that they would like to better understand how decisions are made regarding the programs available to their parents. When asked specifically about how we can support them in developing their children’s academic vocabulary in English, they requested bilingual resources. Examining the quantitative data, preservice and inservice teachers’ as well as school administrators’ greatest need is time to plan collaboratively. Further results will be discussed in the presentation in regard to data collected in addressing the other grant goals.

CONCLUSION:
Based on the results from our needs assessment and on our initial grant proposal, we developed a professional development plan. We look forward to audience feedback on our plan for supporting teachers in Arizona’s public schools who work to meet the academic and linguistic needs of our language learners.
Abstract

Teacher assessment literacy is critical in improving assessment instruments and teacher judgments on the standards of student achievements on those instruments. The discussion in this paper focuses on the value of a new system of ‘Endorsement’ of assessment instruments before use with students and ‘Confirmation’ of teacher judgments in marking student responses to those. This involves the 20,000 teachers of Grades 11 and 12 in Queensland, Australia.

In particular, this paper examines the significant increase in teacher professionalism that results from enhanced assessment literacy, and the far more detailed feedback (feed-forward) to students about how to not only improve the quality of future works, but actually monitor the standards of those works during their production. It lets students into the ‘secret’ of marking (Sadler, 2002, 2007) using explicitly stated criteria that align directly with the subject syllabus objectives (conceptualised from Marzano & Kendall, 2007) - typically 6 – and the standards descriptors for each mark level in those. This also provides students with the opportunity to meet achievable challenges set for them (Willis, ca 2018).

So, what is ‘Endorsement’ and ‘Confirmation’, and how why are they practiced? The quality and comparability of assessment tasks and marking in a school-based assessment system where teachers both set and mark assessment instruments is critical. We have to trust teachers to do that well (Stobart, 2015), and in Queensland, the inter-marker reliability on a five-point scale is around 0.9 (external exams are typically about 0.65 – personal communication, P. Newton of Cambridge Assessment, 2008). Instead of statistical moderation of school-based assessment results using the externally set and marked assessment instrument in each subject - a practice in many jurisdictions - Queensland ‘front-ends’ quality instruments and teacher marking using rigorous processes.

In each General subject (there are 69 General subjects such as ‘Aerospace’ Systems’ and ‘English’ and 25 Applied subjects such as ‘Building & Construction Skills’ and ‘Business Studies’ - see QCAA, 2018a), there are three internal summative assessment instruments
(worth 25 marks each) and one external (worth 25 marks). Teachers mark the internal assessments using the instrument-specific marking guide (ISMG) for each provided in the relevant subject syllabus.

Before use in the classroom for summative assessment (contributing to exit mark) with Grade 12, QCAA Assessors (teachers employed part-time by the QCAA), assessment instruments from each school in each subject undergo a process of Endorsement. This is to ensure that “all assessments provide sufficient opportunities for students to demonstrate syllabus requirements and to build teachers’ capacity to develop high-quality assessments” (QCAA, 2018b). The three Grade 12 internal summative assessment instruments are endorsed about four months in advance of students undertaking them so that there is time for any required edits or amendments of the assessment instrument by the school and the QCAA Assessors to check that the quality is satisfactory in accord with the Principles of Assessment (QCAA, 2017) and specific subject syllabus requirements.

Once students complete the internal assessments, teachers mark the student responses using the ISMG provided by the QCAA in the relevant subject syllabus. The comparability of student achievements is then achieved through a Confirmation process. There are just on five hundred schools teaching approximately 110,000 students in Grades 11 and 12 across the State. To achieve comparability of results between schools State-wide (and, to some extent within schools too), moderation involves the checking of the marks awarded out of 25 for each instrument. Indeed, they are checked down to the level of each objective so that data is obtained, and rectifications made should a teacher/school be too soft or too hard in marking. That is, on each objective assessed in an instrument as well as overall out of 25 for that instrument. In this process QCAA Assessors check the school’s marking for both accuracy and consistency by selecting stratified samples of student responses. So, for example, if half of the students studying English got say between 20 and 22 out of 25 for an instrument, then half of the sample would be from that mark range. The QCAA Assessors match the evidence in each student’s response selected to the instrument’s ISMG in the syllabus.

So, while schools are responsible for internal moderation processes, it becomes very obvious with the Confirmation process if there is potentially an issue within the school (such as marking inconsistencies between teachers), for the Head of department or Principal to address through, for example, further marker training and professional development in assessment.

In discussing Confirmation, the QCAA (2018c) emphasises that:

The Confirmation process is informed by the attribute of reliability. Schools will be confident that the Confirmation process ensures:
- student work is judged using the ISMG
- judgments are valid and reliable
- students’ final subject results are credible
- judgments are comparable across schools and the state.

Using the ISMG, teachers will mark student assessment and internally moderate judgments within or across syllabus cohorts, to ensure consistency of results. This will continue building teachers’ skills and abilities in making judgments about student responses.

Overall, teacher professionalism and capabilities are further enhanced through the rigorous processes of Confirmation and Endorsement. In addition, the detailed nature of the ISMGs results in feedback to students, in the context of the specific requirements of the assessment instrument, that is both very detailed and comprehensive. Indeed, with Endorsement and Confirmation as teachers build their assessment literacies and capabilities,
students similarly have the opportunity to meet achievable challenges and monitor the quality of their responses to assessment instruments during their production.
Title of Submission ID Number 665:
‘The Social Brain’ - an online professional development module in educational neuroscience

Names of the authors:
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Full Paper follows:
Abstract

Learning about our ‘Powerhouse’ - the brain and brain-friendly ways of teaching and learning is critical for teachers and their students. We know much nowadays from leading Educational Neuroscientists such as Professor Louis Cozolino (clinical psychologist and neuroscientist) and Dr. Judy Willis (a Neurologist specialist medical doctor and a practicing teacher).

At CQUUniversity Australia we developed a Graduate Certificate in Brain Based Education (GC BBE) that consists of four units: Learning & Memory, Neurobiology, Theory of BBE, and Applied BBE. These are traditional university studies and delivered online using Moodle.

We were asked to do professional development (PD) with a large number of teachers in other parts of Australia at low cost. We had already found, as expected, that the price-point of Graduate Certificates - especially in the context where there is no real incentive for teachers in Australia teachers to complete a graduate qualification – meant few teachers or psychologists or others were interested in doing a Grad. Cert.

So, the solution was to offer PD online for a low price, and face-to-face for three of the four units of the GC BBE with the final Applied unit requiring a project. With the PD, teachers and others can do the two equivalent online modules at any time at low cost. Should they choose to do assessments to contribute towards the certification from the University such as the GC BBE then that is available. It consists of multiple-choice items relating mainly to knowledge within the modules as well as a portfolio including a reflective journal of learning and changes made to practices. This is then marked and if satisfactory, a student can receive up to 75% of the GC BBE as Recognition of Prior Learning (RPL). They then need only do the final Applied unit that relates to their educational setting such as a school or clinical practice.

To meet this need for teachers and others, we have developed Educational Neuroscience online modules that are low cost, as well as face-to-face PD for teachers on ‘Neuroeducation’.

In this paper we examine aspects of our first online module, ‘The Social Brain’. To survive we need social connection and, of course, we live, work, study and play together socially. Our brain is a social organ that connects and interacts with other brains. With neuroscientific insights in education developed in the last twenty years and particular the last five, as teachers we can inform our pedagogy and the learning experiences that we create so that our practices and student experiences are more brain-friendly and can contribute to optimal, thriving learning as well as our own well-being.

This paper explores ‘The Social Brain’ module that looks at how findings from Educational Neuroscience can be used by teachers in their practices, and the importance of neuroeducation for both achievement and well-being for our students.

Description of presentation: It is critical for teachers and students to know much more about their ‘Powerhouse’ – the brain. We have developed Educational Neuroscience online modules that are low cost as well as face-to-face PD for teachers on ‘Neuroeducation’. In this paper we examine aspects of the first online module, ‘The Social Brain’ by viewing and discussing some of its multimedia resources used for PD. Also, how teachers wishing a higher qualification can achieve this by taking a route using RPL involving self-paced learning at times and places and with low costs that suit the students.
Introduction

In this paper we present and discuss an online course for professional development in educational neuroscience at Central Queensland University, Australia. The overall project is ongoing as we gear towards a full Masters degree and in which we have not yet arrived at the evaluation stage. Hence, this paper concentrates on describing the process through which we have developed the course, including the conceptualisation, design and development of the online module. The paper also discusses the principles guiding this process, with a brief reference to the broader context, including the impact of the information age and network society on the needs of learners engaged in professional development and their expectations on what ‘flexible learning’ ought to be. In a loose sense, our discussion and reflections here might together be treated as a case study approach because it focuses on a single example of course development. Although we do not claim that this is a comprehensive or complete case study in a methodological sense, we see value in our approach because it has produced a number of insights and lessons for us, and which we think worthwhile sharing with others.

Background

It is useful to summarise and present the context and determinants that have led to the idea for, and then the design of, our online professional development module.

In 2017 the School of Education and the Arts at CQUniversity begun teaching the Graduate Certificate in Brain Based Education (GCBBE), delivered entirely online and intended mainly for educators. This course came about because of much interest in applied neuroscience by teachers and the contributions this relatively new discipline can make towards informing educational understandings and practices. Indeed, there appears to be widespread consensus among educators worldwide that the teaching profession ought to make use of the insights and knowledge provided by neuroscience. Tokuhama-Espinosa (2011, p.14) refers to the intersection of neuroscience and education as Mind Brain Education (MBE) which, put simply refers to “…studying how humans learn best in order to develop more effective teaching methods”.

Although much initial interest in the course was expressed by teachers across the state of Queensland and Australia, actual enrolment numbers in it have been small to date. This threatens the course’s viability, especially since CQUniversity is implementing a policy of ‘culling’ low-enrolment courses. Feedback from students (prospective and enrolled) indicate that at least three factors might influence decisions to enrol in the course, or to discontinue it. These include,

1. **Time.** Teachers have heavy workloads and are time-poor. This has been noted in the research literature for some time now (e.g., Easthope & Easthope, 2010; Bridges & Searles, 2011; Buchanan et al., 2013; Gallant & Riley, 2017).

2. **Cost.** Completing the four units in the course, together with associated expenses such as texts, costs around $A10,000 (approx. $US7120) (Although the ‘starting salary’ for new teachers is the fourth highest within 28 countries, “the top of the [salary] scale is only 1.4 times the starting salary” (McGaw 2016). So costs to students are high – financial and time.

3. **Mode of study and assessment.** Although the GCBBE course is offered online, thus allowing students some flexibility in how and when they study, the University’s rigid academic calendar means that students need to complete study units and submit assessment tasks by given dates, which generally are not negotiable (there is some flexibility in extreme cases, but the student’s circumstances must be evidenced to be
quite grave). We have found that our students’ priorities at work as school teachers prevented some from participating in asynchronous and synchronous discussions and online lectures and tutorials. Also, work deadlines (such as due dates for marking their pupils’ work) often coincided with due dates for university assignments. Indeed, busy school times of teaching, marking, report writing and so on line up pretty much exactly with the times the University wants most work from them in responding formally to assessment requirements. It adds further and substantial pressure to an already ‘pressure cooker’ environment.

However, at the same time we also received inquiries from state and private schools seeking short courses and workshops in educational neuroscience. This prompted us to question whether it was our approach and method that ought to be reconsidered, which then led to a decision to develop more flexible means for delivering professional development in educational neuroscience for school teachers. One where it was self-paced and assessments could be undertaken until mastery of at least 80% was shown in a course.

**Contextual reasons for prioritizing flexibility**

We began by seeking to differentiate our PD courses from those delivered through the usual modes for university courses, thinking that they ought to instead focus on leading responsive and targeted learning, rather than embedding it within inflexible timeframes and study environments. In thinking this, we were aware that the now ubiquitous digital information age can produce a dissonance between possibly lingering ‘industrial’ characteristics of higher education (notably, in the control and regulation of how knowledge is imparted and distributed), and the needs of learners for access on demand to specific knowledge. As gatekeepers to credentialed professional training and education, some universities might still employ principles for delivering education and training that stand in contrast with the requirements and expectations of learners in the information society.

Indeed, there is a rich body of literature pointing out that, over the past half century or more, most societies emerged from industrial/Fordist economies into what Daniel Bell (1976) described as the post-industrial *information age*. Frank Webster (2006 [1995]) coined the term *information society* to a ‘new society’, while Manuel Castells (1996) produced the label *network society* to specify that in the information society there is a relatively new-found capacity for individuals and communities to freely and rapidly distribute, exchange and access information. This is significant to note when discussing continuing professional development because, now that there is a vast abundance of freely available information (an increasing proportion of which is neither objective nor valid), formal systems of education are increasingly expected to focus more on vetting the specific knowledge required by those aiming to undertake formal qualifications or professional development. However, gleaning from our experience with the GCBBE, many learners prefer not to have to enrol in highly regulated, time-limiting, often work-disrupting, and financially costly formal courses to achieve these goals.

We are also aware of the increased proportion of so-called millennial (sometimes referred to as ‘digital’), learners who have just begun to fill the ranks of the school teaching profession, some of whom might be seeking to undertake PD in educational neuroscience. Veen (2003) referred to the millennials as ‘Homo Zappiens’ because they have grown up immersed in digital information that is easily and immediately accessible through the personal computer and mobile devices such as phones and tablets (their learning tends to be non-linear, and driven by ‘multitasking’ [more correctly: rapidly switching attention], by speedily ‘zapping’ from one digital platform to another). This has not gone unnoticed in the
literature, which warns that millennials tend to learn and engage differently with knowledge when compared to previous generations (see, for example, Mulford et al., 2011).

In recent years, our University has developed a separate platform (The Centre for Professional Development) (CPD) which delivers short professional development courses on its own online Learning Management System using Moodle. The CPD and its LMS operates independently of the University’s delivery system for credentialed/formal courses. At the same time, our School has determined to invest in the development of short courses for delivery through the CPD, hoping to increase its value and impact as well as enlarge its revenue base. We were also aware of the PD needs of school teachers, mandated at 20 hours each year in the state of Queensland. These three circumstances together presented a timely confluence of opportunities for us to develop a series of short courses and workshops in educational neuroscience for educators with an aim of facilitating as much flexibility as possible for those who enrol in them.

Having briefly discussed the information age and the network society as significant context, we ought to now explain what we mean by ‘flexibility’ in education. A quick glance at the literature focusing on Australian education systems indicates that the term flexible education is a contested one. Palmer (2011) pointed out that, “The call for ‘flexibility’ has emerged as a response to a range of needs from a range of stakeholders, at different times and in many contexts.” Even earlier, Bigum and Rowan (2004, p. 213) noted that, “When it is used to describe teaching or learning in Higher Education settings, it typically means either other than, or in addition to, lectures, workshops or tutorials to teach a course.” In yet another representation of it, the term indicates to some researchers that “From a student’s perspective, flexible learning options can create time, place, and pace dependence as they become increasingly tethered to equipment, places, and schedules” (Willems, 2005, p. 430). The latter might describe how our own GCBBE course could impact on students.

By contrast, there are scholars who understand flexible education to refer to “adaptability to learners’ needs and circumstances” (Bowles, 2004, p. 16). More specifically, flexible learning is,… a state of being in which learning and teaching is increasingly freed from the limitations of the time, place and pace of study. But this kind of flexibility does not end there. For learners, flexibility in learning may include choices in relation to entry and exit points, selection of learning activities, assessment tasks and educational resources in return for different kinds of credit and costs (Naidu 2017, p.269, original italics).

It is this definition which comes closest to our own understanding of flexible learning, and which we strive to implement in our new PD courses. We determined that the PD courses in educational neuroscience will be characterised by the following:

- Learners can enrol in any of the PD courses in the educational neuroscience stream, at any time, in any order (with the exception of capstone courses discussed below), and can complete them in their own time.
- Each course is designed so that it can fulfil continuing professional development obligations of school teachers. The cost for each course (around $A400.00 per PD course) is quite affordable when compared to university units.
- On the successful completion of a PD course in educational neuroscience, students will receive a completion certificate which can be used as part credit towards a formal degree in Educational Neuroscience at Central Queensland University. In Australia, the process of crediting prior learning towards a formal university or vocational qualification is defined as Recognition of Prior
Learning (RPL). The specifics of how RPL applications are made and outcomes determined (granted, partially granted, not granted), vary from institution to institution,

- Upon completion of the majority of short PD courses that are currently in development, students will become eligible to enrol in longer ‘capstone courses’ which, upon successful completion, and depending on the level of complexity at which students take these courses, is planned to lead to the conferral of one or more higher qualifications. The capstone courses will be focused on portfolios which students will develop on topics of interest for their individual practice as educators, and which will provide the basis and structure for a detailed and assessable student report which will be expected to draw on the entirety of their previous learning in the PD stream. These proposed courses will be designed to align to the Australian Qualifications Framework standards.

The Social Brain – main principles guiding the development of this course

In developing the first course, *The Social Brain*, we were guided by the principles of flexibility outlined above, and also by three main design principles which we determined to employ at the outset. That is, we wanted to, firstly, ensure that our courses will remain independent of the online Learning Management System (LMS) on which they are to be hosted (in our case, *Moodle*), while remaining easily editable and transferable. From our extensive experience spanning decades as online educators, we understood that an LMS is first and foremost a *Content Management System*, and less so a content creation system. Creating content in an LMS often leads to issues – which might include: unreliability, unsatisfactory and poor formatting of text, images and links, and online resources can be changed or even lost when the LMS is upgraded to new versions. In addition, most of the work creating learning content and resources requires to be carried out online.

Secondly, we wanted to produce high quality, accessible and engaging learning resources, but at the same time we needed to use a content creation methodology which is easy to learn and share among those involved in the development of our courses. This was to assist in collaborating towards developing online resources, and to make editing non-problematic. We settled on using Microsoft PowerPoint as the basic development software together with the instructional design software suite *iSpring* (ispringsolutions.com). The software can be installed as an ‘add-on’ in PowerPoint so one can easily shift between PowerPoint and iSpring to work on generating an e-learning package. This package can then be exported as a website, a SCORM or Tin Can package which can be inserted into most popular LMSs, or as a stand-alone video presentation. In addition to retaining most PowerPoint functions (for example, text animations), the iSpring software includes a fairly sophisticated quiz-creation function, has the capacity for recording and editing video presentations and audio-narrations, and creates its own user interface. The ‘learning curve’ for this software is not very steep, which is a major reason for choosing it for our purpose. Other, more complex and sophisticated e-learning software is available, led by Adobe’s *Captivate* and Articulate’s *Storyline*; however, these require specialist knowledge and training and are more expensive. One other major advantage of using the chosen software is that work is also saved as PowerPoint files, so if there was to be a failure with the e-learning software, content will be preserved.
Lastly, guided by our understanding of the information society where information has become abundant and ubiquitous (as briefly discussed above), we determined that we would only develop learning material ourselves when we could not locate appropriate resources in the public domain. We see our roles to be, foremost, as subject matter experts. In this capacity, we will use our knowledge of neuroscience and as educators to select appropriate material for our PD courses guided by two conditions. Firstly, material must be accurate, reflect current knowledge, and be relevant to educators in their practice. This requires care and meticulous revision of sources, as there is much inaccurate information being circulated on the internet. Secondly, the material we choose must be available in the public domain and freely accessible online. We think this is important, to ensure that learners taking our courses will have unproblematic access to learning resources. For example, video clips hosted on YouTube or Vimeo tend to stream much faster and reliably than videos hosted on the University’s website (CQU uses Echo360 as its video streaming platform, which has been slow at times).

**The Social Brain – course outline and content**

Our first course in educational neuroscience is delivered online through the CQU's Centre for Professional Development. It is intended to provide a broad introduction to the main areas of knowledge in educational neuroscience as they might serve to inform teaching practice. There are three learning outcomes set for this course:

1. Develop the capacity to explain what is meant by ‘the social brain’.
2. Acquire a basic understanding of the fundamental link between sociation (the social) and the development and function of the human brain.
3. Understand the links between physical wellbeing and management of stress to brain development and to learning and memory formation.

To structure the course, we use Cozolino’s (2013a) article, “Nine things educators need to know about the brain”. The article draws on an important book by Cozolino (2013b), *The social neuroscience of education*, which we recommend to learners in the PD stream and also use as a prescribed text in the GCBBE. Dr Lou Cozolino is a professor of psychology at Pepperdine University.

Following Cozolino’s article, we have organised and structured the course into nine sub-topics:

1. The brain is a social organ; it therefore follows that close supportive relationships stimulate positive emotions, neuroplasticity, and learning.
2. Learning and memory consolidation involve contributions from both the brain’s hemispheres. Therefore, it is important to understand how to engage both in the classroom context.
3. Early experiences shape neural structures in ways that have a lifelong impact on three of our most vital areas of learning: attachment, emotional regulation, and self-esteem.
4. Because we do many things automatically and without thinking consciously about it, then it is especially important to teach students to question their assumptions and the possible influences of past experiences and unconscious biases on their feelings and beliefs.
5. Wherever possible, it is useful to teach students about the interconnections among the brain, the body, and how we learn because this will help them to understand the importance of nutrition, exercise and sleep, and which in turn could improve their academic performance and physical health.
6. The brain has a short attention span, so teachers would do well to make sure they repeat important points in their lessons to deepen learning.

7. Since the evidence is clear about the effects of fear and chronic stress on learning, the inclusion of stress-management techniques into the curriculum is an obvious application of neuroscience to education that can improve learning, emotional well-being, and physical health.

8. Emotion determines whether the learner perceives the learning experience as positive or negative—this is because the human brain has evolved to pay attention to the behaviors and emotions of other people.

9. When concepts and problems are introduced at higher levels of abstraction, returning to them repeatedly, and by ‘chunking’ material into meaningful parts, improves memory and learning.

For each of these sub-topics, the course includes: an explanation and summarization of the main points, ideas and concepts relevant to the sub-topic; at least one short video presentation; and, (for most sub-topics) at least one reading. In addition, we provide optional presentations and readings as well as prompts for reflecting. For example, in the second sub-topic, which outlines neuroscientific knowledge challenging a common ‘neuromyth’ that one brain hemisphere tends to dominate the others, students are asked to view a video presentation that discusses the theory of ‘left versus the right’ brain, also known as the two-brains dominance theory. The video clip is four minutes and forty seconds in length. We also link to an online and peer reviewed article from the website of verywellmind.com, a verified health site partnered with The Cleveland Clinic. To fulfil the important aim of accessibility, we ensured that this reading is written for a non-specialist audience and (as with all the other online readings we link to in the course), is largely jargon-free. Under this sub-topic we also include an activity consisting of a number of prompts for note-taking and reflection.

To successfully complete the course, students are required to pass an online quiz. An important principle behind the design of the quiz is to present it as an additional opportunity for learning. The quiz can be undertaken as many times as required to achieve a pass level of eighty percent. Questions are extracted at random from a larger bank of questions, but which also ensures that students are presented with questions that cover all the nine sub-topics in the course. Where students give an incorrect answer, they are provided with explanations and examples, after which they are prompted to respond to the question again. The correct answer also has an explanation of why it is correct to immediately reinforce learning and memory consolidation.

Lastly, being the first course that we developed for our Educational Neuroscience stream and doubling as ‘proof of concept’ to persuade others within our University to join and support our project, *The Social Brain* took some time to develop, test and refine. As part of this initial process we also produced templates to guide the development and design of other courses, and thus ensuring consistency of design and pedagogy across all courses in the stream.

**Conclusion**

In this paper we have outlined and discussed the conceptualization, design and development of the first professional development course in educational neuroscience, *The Social Brain*, which is soon to be made available from the Centre for Professional Development at Central Queensland University. We have focused on the process that led to the final product, though we also briefly visited some of the drivers for embarking on this
To summarize, these include the identified need of educators in Queensland and elsewhere for professional development in educational neuroscience, emerging expectations of learners in the information and network society for flexibility in accessing professional development, and the need to develop agile instructional materials that meet the needs of learners that seek specialized professional development. As noted at the outset, the paper is largely a descriptive one that draws on our experiences and reflections within the process of developing the course. We are to still evaluate its effectiveness in addressing learners’ needs, and we plan to produce a follow up paper once we have gathered sufficient data to enable us to do so.

References


ABSTRACT

Historically, seminaries in America have been charged with the responsibility of preparing pastors to lead churches. Denominations are distinguished from each other by their idiosyncratic theological stances and are sustained by the seminaries whose curriculum propagates these distinctive differences. Unfortunately, seminaries emphasize theological training with significant disregard for the realities of pastoral ministry. As a result, the majority of seminary graduates who enter the pastorate leave the ministry and change professions after their first pastoral experience.

In the year 2000, this author evaluated the curriculum of one hundred seventeen (117) protestant seminaries in America and found that none were providing sufficient training in all three (3) of the essential people skill areas of intentional leadership development, conflict resolution, and the disciple making process of Jesus. In this study, the 2018 requirements for the primary professional degree, the Master of Divinity, are examined again and the results are compared to the results of the 2000 study. Interviews were conducted with seminarians when clarification was needed. Each seminary was given an opportunity to respond and/or correct the findings. The objective of this study is to determine if seminaries have changed and/or improved since 2000. Many seminary faculty are alumni of the same institution within which they teach. The faculty value and reproduce the seminary training which they experienced as students. Therefore, change is difficult in this incestuous-like environment.

“Changing Diapers” provides evaluative categories for this study. “Clean diapers” are seemingly desirable but here represent the absence of preparation for the “messy people business” that is ministry. “Wet diapers” represent the institutional recognition that more than theological training is needed for their graduates to survive and/or succeed in ministry. “Messy diapers” reflect the reality of ministry because people develop at different rates and in a variety of ways. Just as a parent may lovingly affirm the child’s successful filling of the diaper, so too are messy diapers desirable in this study.

Many seminaries have improved since 2000 while some seminaries have closed their doors. This author
identifies the messiest diapers, the distinctive characteristics that comprise their contents, and the opportunity each seminary has to both copy the others’ successes and/or seek out potential improvements that are suggested herein. The author offers potential opportunities as solutions for improving the tenure in ministry of their graduates. The seminaries that intentionally develop and mirror more of the successful curricular offerings identified in this study will make the greatest impact in the 21st century. Improving seminary curriculum will increase pastoral tenures, brighten the future of churches in relational disciple making, and realize more fully the Great Commission of Jesus in America.
Panel Session Abstract Proposal:
Staying the course, standing firm as aloha 'āina: Kilo lani, kilo ‘āina: Hawaiians engendering a genealogical kuleana to ‘āina, Lāhui and keiki in a college of education within a mainstream university in occupied Hawai‘i.

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Abstract:

This presentation features critical insights from an ongoing discussion amongst Hawaiian educators (teachers, professors, parents, community-members) on ways to support Hawaiian-led educational initiatives that are focused on the health, well-being, and prosperity of Lāhui Hawai‘i. Presented are “common sense” ways in which the often well-intentioned Hawaiian Education supporter may contribute in meaningful, informed, relative, and respectful ways to support Hawaiian education.

One of the main reasons for this presentation is the desire to address a common question posed to many Hawaiians working in Hawaiian education by our supportive colleagues, “How can we help?”. Another motivation is to send a message to individuals (Hawaiian and non-Hawaiians alike) who engage in and often lead “Hawaiian-focused” educational initiatives who clearly lack the knowledge, relationships, and kuleana (sense of responsibility) to do so.

An overview of the Hawaiian educational landscape contextualized within a vibrant Aloha ‘Āina movement will also be discussed.

The presenters are members of ‘Āinahou: Hawaiian Faculty Council. ‘Āinahou is a hui (organization, alliance) of Hawaiian faculty members at the University of Hawai‘i at Mānoa[1]-College of Education (UHM-COE) that envisions an educational system in Lāhui Hawai‘i (nation of Hawai‘i) based on the tenets of aloha ‘āina (Hawaiian patriotism, love for homeland), mālama (care for, preserve, protect), ‘ike Hawai‘i (knowledge) and pono (righteous, just, fair) that liberates and empowers Hawaiians to execute our genealogical kuleana to ‘āina (land), Lāhui and keiki. Their mission is to lead the transformation of the UHM-COE in the areas of research, teaching, and service consistent with the University of Hawai‘i’s commitment to being the foremost Hawaiian and Indigenous serving institution to support/achieve our vision.

The name “‘Āinahou” (literally “new land”), a traditional name for an area near the current location of the University of Hawai‘i-Mānoa in the Honolulu metropolis, was adopted to honor and further connect us to place. ‘Āinahou also serves as a metaphor for our kuleana to establish
“new land/space” within a mainstream research university for Hawaiian led and Hawaiian focused educational initiatives.
Poster Session Abstract Proposal:

5 “common sense” ways to support Hawaiian education: A message from Hawaiian Educators to the world

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Abstract:

This presentation features critical insights from an ongoing discussion amongst Hawaiian educators (teachers, professors, parents, community-members) on ways to support Hawaiian-led educational initiatives that are focused on the health, well-being, and prosperity of Lāhui Hawaiʻi. Presented are “common sense” ways in which the often well-intentioned Hawaiian Education supporter may contribute in meaningful, informed, relative, and respectful ways to support Hawaiian education. One of the main reasons for this presentation is the desire to address a common question posed to many Hawaiians working in Hawaiian education by our supportive colleagues, “How can we help?”. Another motivation is to send a message to individuals (Hawaiian and non-Hawaiians alike) who engage in and often lead “Hawaiian-focused” educational initiatives who clearly lack the knowledge, relationships, and kuleana (sense of responsibility) to do so.

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A New Transition of Information Studies on Japanese Secondary Education
- Analyzing of difference of old and new government course guidelines and a qualitative analysis of implementation contents -

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In this study, text mining was conducted on the previous three information studies courses of study, and changes were analyzed. The results quantitatively demonstrate a shift from computer science concepts such as “computer” and “database” toward more socially oriented content using words such as “problem solving”, “humans,” and “communication.” This conforms with the 21st century skills approach, and can be viewed as contributing to the development of students’ social skills.

Key Words: Secondary Education, STEM Education, Other Areas of Education (Information Studies)
Background
Today, the importance of information literacy and practical skills in information utilization is widely recognized, as evidenced for example in the global focus on 21st century skills (ex. Griffin et al. 2010). In Japan, information educations has been a required subject for all high school students since the 1990s. Curriculum guidelines are established by the government, and various private companies publish textbooks based on these guidelines which are then used in the classroom. The guidelines, which are established for all subjects and grades from K–12, are called “courses of study,” and are reviewed and revised approximately once every 10 years. Now upcoming revision will be the third curriculum revision for information education. In previous our study, text mining was conducted on the previous two curriculum guidelines of information education, and changes were analyzed. In this study, text mining was conducted on third curriculum guidelines of information education plus previous ones. We took of survey on university students having ”21th century skills,” and analysis of acquisition skills level.

Method
To conduct the text mining, frequently used words were extracted and correspondence analysis and other procedures were carried out. This analysis used the free software KH Coder (Higuchi 2016).

Result
We analyzed the essential change by clarifying teaching contents by using text mining as guidelines for change of information education in Japan.
In Japan, a subject "Information Technology" has been newly established as a compulsory subject from 1999. For that reason, in 1998 the Ministry of Education, Culture, Sports, Science and Technology provided studies guidelines for teaching. And it has been revised every ten years. In 2018 the revision was the second and the third guidelines. The 1988 education guidelines put half the time on practical training of information equipment, with emphasis on education of "Technology" using "Computer" for information education and "Software".
The 2008 education guidelines taught the significance of collecting and disseminating "Information" in "Society" and taught how to use information technology as a means of problem solving. However, at this time computer training became indispensable, so it became a problem that security and information sharing technology was hard to be transmitted.
In the 2018 education guidelines, the structure of the graph is similar to that of the 1998 version, but this is because this time the revision made it necessary for computer practice, it described new support for the content of practical training. And it is not only how to use software, but also how to combine software, contents of "Diversity" form of information handling, data integration, and the contents of teaching the effect of communication using ICT Can also be read from the graph.
This proved to further strengthen the promotion of acquiring 21st century skills.

References
Keywords of Curriculum Guidelines in 2018
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Subgraph difference based on keyword mediation centricity

1998

2008
Changes in self-organizing maps in 1998, 2008 and 2018

1998
Learning and Seeking Advice via the Web: 
A Business Communication Case Study in a Japanese City

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¹ Suwa University of Science, ² Kansai Gaidai College, ³, ⁴ Chuo University, Japan

Abstract: This research analyzes the role that city government service counters play in Japanese cities in terms of communication with residents and discusses the role of e-government systems. City government offices function not only as places to conduct public business but also as places to receive requests and inquiries from the public. By visiting a government office, citizens are able to gain greater satisfaction toward the city government and its mayor. A major part of e-governance in Japan involves the creation of a general consultation service to serve as a receptacle for general requests and inquiries.

Keywords: Japanese regional government; e-Government; Communicating with residents; General consultation service.

1 Background

Business communication is verbal and non-verbal communication that is related to work. In terms of verbal communication, there are real, in-person methods and methods that use electronic devices.

To make administrative functions more efficient, the central government in Japan is promoting the creation of e-government systems and tools, and many regional governments have digitized their administrative functions to accommodate e-government processes. In countries that have established e-government systems, such as Estonia, it is rare for residents to find it necessary to visit city halls and government offices in person. Therefore, only a few employees have to be stationed at service counters to respond to citizens’ requests, leaving other employees free to dedicate themselves to other work. Presently, government agencies in Japan have not been able to simplify their service counters in the way countries with developed e-government systems have.
2 Purpose

This research analyzes the role that service counters play in Japanese cities in terms of communicating with citizens, and through this analysis, discusses the criteria for establishing e-government systems. The research covers the following points:

**RQ 1)** As a public relations method in cities where the population is increasing, is the use of the city’s website useful?

**RQ 2)** What kind of role do in-person service counters play in society?

**RQ 3)** Is the city able to minimize the use of these in-person service counters by utilizing the city website?

3 Methods

The research method analyzed data from the city’s service counters over the past 10 years.

- **Research Target Keywords**: Data of “administrative reports” for “a city” in Tokyo (2007 – 2016). The following items were extracted from the data of the past 10 years and correlations were analyzed:
  - Population
  - Number of households
  - Number of visitors to the city’s website (CW)
  - Number of emails with requests or opinions (EO)
  - Number of requests or opinions addressed to the mayor (OM)
  - The number of times the staff engaged in general consultation (GC)

4 Results and Discussion

**RQ 1)** Is the city government’s website useful as a public relations method in cities where the population is increasing?

As shown in Table 1, there was a strong positive correlation between population and the CW’s usage (correlation coefficient = 0.86). There was also a strong positive correlation between the number of households and the CW (correlation coefficient = 0.81). These results inferred that as the use of CW increases with the increase in population. Therefore, in the municipalities where the population is growing, the municipality’s website is a very useful method for public outreach.
RQ 2) What kind of role do in-person service counters play in society?

As shown in Table 2, there is a strong negative correlation between GC and OM (correlation coefficient = −0.75). When GC is limited to only inquiries that are related to city work, a negative correlation is still confirmed (correlation coefficient = −0.52).

These results show that using the GC service and seeking help in resolve a part of the process of making a request to the mayor. When limited to city work, the correlation shows that requests that fall under “other” serve a function in increasing satisfaction with the mayor’s performance.

The city targeted in this research has not made much progress toward establishing an e-government system, and thus, it is typical of many Japanese municipalities. It has been suggested that in many Japanese municipalities, the city’s GC service functions to increase residents’ satisfaction toward the city and its mayor.

Table 1. Correlation related to the research question 1.

<table>
<thead>
<tr>
<th></th>
<th>Population</th>
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<td></td>
<td></td>
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<tr>
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<tr>
<td>CW</td>
<td>0.86</td>
<td>0.81</td>
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CW: Number of visitors to the city’s website.

Table 2. Correlation related to the research question 2.

<table>
<thead>
<tr>
<th></th>
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<th>CW</th>
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<tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GC</td>
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<td>1</td>
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<tr>
<td>GC (Limiting to city work)</td>
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<td>CW</td>
<td>-0.77</td>
<td>0.75</td>
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OM: Number of requests or opinions to the mayor.

GC: The number of times the staff engaged in "general consultation".

CW: Number of visitors to the city’s website.
RQ 3) Is the city able to minimize the use of these in-person service counters by utilizing the city website?

As shown in Table 3, a strong negative correlation was observed between CW and EO (correlation coefficient = −0.77). Moreover, there was a strong negative correlation with OM (−0.77). Conversely, a strong positive correlation was observed between CW and GC (correlation coefficient = 0.75). GC services include responding to requests such as those regarding human rights or taxes. When limiting GC to those related to city work, a slightly lower but positive correlation was observed (correlation coefficient = 0.53).

Table 3. Correlation related to the research question 3.

<table>
<thead>
<tr>
<th></th>
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<td>EO</td>
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<td>CW</td>
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<td>0.75</td>
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</table>

OM: Number of requests or opinions to the mayor.
GC: The number of times the staff engaged in “general consultation”.
EO: Number of emails with requests or opinions.
CW: Number of visitors to the city’s website.

When discussing the results of R.Q.3, it was observed that questions usually asked through email inquiries can be resolved just as well by reviewing the CW. An increase in CW appears to lead to a decrease in OM, suggesting that one of the reasons for making requests to the mayor is that residents are unable to access the necessary information elsewhere. However, when CW increases, more requests are made to consult with the staff. Regarding why the number of visitors to in-person service counters increases, there are two possibilities that could be suggested:

- The information on the website is insufficient, strengthening the need to ask more detailed questions in person.
- Reviewing information on the website increases interest in the citizen’s area of concern, encourages more questions, and results in further learning.
Considering that there is a further decrease in EO with an increase in the use of CW, it could be said that reviewing information on the web has an effect on consumer learning. Moreover, when limiting the content of consultations to those related to city work, the correlation coefficient decreases slightly. Hence, the following points could be suggested:

- It is difficult to distinguish on the website whether the matters that concern the residents are relevant to the city’s work or the work of another organization.
- The matters that concern citizens are complex, and it is often unclear what is needed to be done for resolution.
- Through reviewing the website, various information related to a citizen’s issue can be obtained. Therefore, it is necessary that a solution not only addresses the complex matters that concern the residents, but also resolves them in a way that goes beyond the residents’ expectations.

When requests contain complex elements or have more than one focus, city service-counter staff face potential difficulties. To minimize the overuse of the city’s service counters, it is necessary to establish a separate place that serves as a GC service with a concierge-like function of “being able to talk to someone without complaints and politely being directed to a solution.” Such a service can serve as a receptacle for a variety of general questions and requests related to city life with in-person queries.

5 Conclusion

Japan’s municipalities are promoting progress toward using e-government systems. There are many functions that could be done through the web instead of an in-person visit, such as ordering a copy of a residence certificate or applying for bidder screening.

The city government offices function not only as place to conduct public procedures, but also as a place for the receipt of requests and inquiries, especially when laws and applicable jurisdictions are confusing or unknown. Responding appropriately and efficiently to these issues often will result in increased satisfaction toward the city and its mayor.

The promotion of e-government systems in Japan through the creation of a GC service that will serve as a social receptacle for general requests and inquiries has great potential for benefiting city governance.

If an electronic communication tool that involves artificial intelligence learning is developed, it will greatly contribute to Japan’s progress.
References


Read Aloud Activities in Objective Observation

#681

Topic Area: Reading Education
Presentation Format: Poster

Short Abstract:
Teachers’ observations enable to classify the reading activities into many types. However, the observations are subjective, and generalization is difficult. The authors developed a system to measure the process of reading aloud. The system measures the time in the process of reading aloud the texts displayed on a display, and also does the degree of understanding about the texts using a little test. The system also measure the movements of eyes in both processes. With the system, 58 pupils of third year of a Japanese primary school are measured their reading aloud and a little test processes. This paper proposes the measuring system and the results of 58 pupils. In the measuring results, two types of reading aloud activities exist in good readers. One type read fast. The other type read slow. Pupils in both types understand well the texts.

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Read Aloud Activities in Objective Observation

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Topic Area: Reading Education  
Keywords: Reading education, reading activity, text understanding
Abstract

Teachers’ observations enable to classify the reading activities into many types. However, the observations are subjective, and generalization is difficult. The observations need much time and labor of teachers. The observations is difficult for teachers without many experiences.

The authors developed a system to measure the process of reading aloud. The system measures the time in the process of reading aloud the texts displayed on a display, and also does the degree of understanding about the texts using a little test. The system also measure the movements of eyes in both processes.

The system displays the sentence that is read with high-light. The user read the highlighted sentence, then push a key to go the highlighted part to next sentence. After reading a text, the system proposes five short questions to measure the degree of the understandings about the text. The system measures the movements of eyes in the whole process.

With the system, 59 pupils of third year of a Japanese primary school are measured their reading aloud and a little test processes. In each trial, eyes’ movements calibration is done. Then, the process of reading aloud and answering questions is done. Each trial need about five minutes. Using multiple systems, one day is needed to complete the trials for all pupils in two classes of the third grade.

In the measuring results, two types of reading aloud activities exist in good readers. One type read fast. The other type read slow. Pupils in both types understand well the texts. The measuring result reveals the problems of non-good readers. Japanese text includes Hiraka, Katakana and Kanji. Some non-good readers show the problems about reading Kanji. Some non-good readers read aloud fast without understanding the text. With the objective measurements by the proposed system, pupils are classified into the types indicated above.

Introduction

Teachers’ observations enable to classify the reading activities into many types. However, the observations are subjective, and generalization is difficult. The observations need much time and labor of teachers. The observations is difficult for teachers without many experiences.

Reading is one of important parts of human activities. Reading ability is one major theme in education. Reading ability is a base to learn many subjects.
In Japan, if a pupil shows two years’ delay of reading ability, the pupil is regarded as to have a reading difficulty. Some Japanese normal public elementary schools have about 20% of pupils with a light reading difficulty [1]. Of course, there are pupils with a heavy reading difficulty. The pupils with a heavy reading difficulty attend special support education classes or schools. In primary school years, girls show about two years progress than boys in their development. This difference makes it difficult to teach boys and girls in a same class [2].

To help a pupil, an ICT device must understand the activity of a pupil precisely. A human teacher can observe and understand not only the activity but also the inner state of a pupil. However, it need a huge computation power and a huge measuring system. In this paper, we will propose and implement the method to understand the activity precisely with the feasible ICT devices in a near future. The understanding of an activity is a start point of understanding of the inner state of a pupil.

Text reading prosody and reading comprehension have relations with each other [3]. Teachers observe a pupil to read aloud a text, and understand the ability of the pupil about text reading prosody. With some questions or tests, teachers estimate the reading comprehension of the pupils about the text. For understanding the features of a pupil, teachers need to know the abilities about text reading prosody and reading comprehension.

The authors developed the reading activity observation system. The system observes and measures the activities about reading aloud a text and answering some problems about the text [4]. The proposed system measures the operations of a subject in reading aloud a text and answering some problems about the text, and measures the gazing points of the subject through the whole trials.

The system makes many types of reports about the reading aloud and problem answering activities. At each trial that includes the reading aloud nine small sentences and answering five small questions about the text, the proposed system makes over ten pages of report that describes the activities and the eye gazing points through a trial. In experimental use of the proposed system, the precise report is interesting and helpful to understand the precise activities of a subject. However, it is difficult to examine whole reports of all pupils in a class. Therefore, we need a system that analyzes the precise reports and categorizes pupils into some types of reading and question answering activities.

This paper introduces the system that measures the process of reading aloud and answering question about the text, and generates the reports about the measuring results. Then, measuring experiments are described. Next, the measuring results are discussed. The results show that the pupils are classified into some reading activity types. This helps to understand the pupils reading activities with pure objective measures. And last, this work is concluded.
Objective measurements of reading aloud and question answering activities

Our observation system for reading and problem solving activities is based on the Japanese text presentation system for the pupils with reading difficulties [5]. A user looks at a display and shows his intention to go to next sentence with key-input. User’s activity handing part controls the text presentation and question and choices presentation, and it records the precise activities of a user. In this paper’s implementation, the recorded activities are key-inputs. Eyes’ movements are recorded throughout a trial with precise time. Text presentation sub-system displays the sentence read by the user is highlighted. With a proper key-input, the highlighted part moves to the next sentence.

Texts and problems

The text used in a trial is 252 characters and nine sentences. The first sentence means “Start”. And, the last sentence means “End”. The text used in our system is shows in Table I. Table I shows English in the second column. Figure 1 shows the text presentation on a display. On a read aloud stage, one sentence by one sentence is highlighted.
はじめ。
せんしゅうの土曜日、家の近くの公園で姉と妹といっしょにあそびました。
さいしょうは、どんぐりをひろったり、くりをあつめたりしました。
わたしは6で姉は10で、妹は3でした。
つぎに、草むらに行って虫がしをしました。
こおろぎが「リーン、リーン、リーン」と鳴く声がしたのでうっと行ってみると、いろいろなしゅるいの鳴き声が聞こえてきました。
「チンチンリン、チンチンリン」という鳴き声が聞こえくると、妹が「まつむしかなかあ。」
とさきやりました。
すると、姉が「あれは、すずむしたよ。」
と言いました。
おわり。

Figure 1. Text for the third year pupils of Japanese primary school.

In question solving stage, the right area of a display shows the question and choice box. Figure 2 shows an example of question and choice box. A text read aloud is displayed on the left area. A subject can read the text at every time in question answering stage.
Trial

One trial is constructed from three stages. The first stage is a calibration of eyes gazing measuring system. The second stage is a practice to familiarize with the system operations. In this stage, a subject read a short text, and it answers a few easy questions. In the third stage, a subject read a proper text, and it answers the five questions. In a trial, an assistant guides a subject about the operations.

Implementation of the observation system

Our proposed method is implemented using notebook PC and Tobii EyeX [6]. The displayed question and response box is shown in Figure 2. Figure 3 is an English version of Figure 2. On the top of the box, a question is shown. Under the question, three choices of suggested answers and impossible to answer are shown. A subject can select a choice using a mouse or a keyboard.
In reading aloud process, a display shows only the text read as Figure 4. A sentence read aloud is highlighted. In the right area of a display, no texts are shown.
In problem solving stage, a display shows the text and the question and answering box as Figure 5. A subject can refer the text to search the answer of a question.

Reading and question answering activity measuring experiment

Reading and question answering activity measurement trial

One trial is constructed from three stages. The first stage is a calibration of eyes gazing measuring system. The second stage is a practice to familiarize with the system operations. In this stage, a subject read a short text, and it answers a few easy questions. In the third stage, a subject read a proper text, and it answers the five questions. In a trial, an assistant guides a subject about the operations.

After the first stage of calibration of eyes gazing measuring system, all of eyes gazing points are recorded with precise time through the trial. In the third stage, all key operations and all system responses are also recorded with the precise time.
Measuring experiment

With the proposed measuring system, whole pupils of third grade of a public primary school join the experiment at June 2017. As a result, we have 59 valid trials.

Reading and question answering reports

This section proposes the reports generated by the proposed reading and question answering activity measurement system [4]. The generated reports are two types. One type is the activity timing report, and the other type is eye gazing points report. The activity timing reports has two types that are for reading activity and for question answering activity. The eye gazing report is one type that covers reading activity and question answering activity.

Reading activity timing report

The proposed system records the precise time of user’s key operation. With the recorded key operations, the reading time of each sentence is measured. From the reading time, we can estimated the reading activity type of a subject.

Figure 6 shows the reading activity timing diagram. The horizontal axis is the number of character in a sentence. The vertical axis is the consumption time at the sentence in millisecond. In Figure 6, the outlier sentences are shown with blue diamond marks. If a subject has some difficulties to read the sentences, teachers easily find the sentences that show the difficulties.

Figure 7 shows the relation between the sentence length and the reading speed of a sentence. In Figure 7, the horizontal axis is the number of characters in a sentence. The vertical axis is a reading time per character. From the diagram, other view is proposed.
The reports of Figure 6 and Figure 7 are generated at each trial. A teacher can easily consider their reports.
Question answering activity timing report

In the question answering stage, the time to answer each question is measured. Figure 8 shows an example of question answering timing report.

![Figure 8. Question answering timing diagram.](image)

In the diagram, answering time of each question is shown. At each question, a tuple of bars are shown. The left bar shows the time to select an answer. The right bar does the time to proceed to the next question. When an answer is correct, a left bar is blue. Otherwise, the bar is red. In Figure 8, the subject consumed much time to answer the question 4, and selected a wrong answer.

Figure 9 shows other example. The subject of Figure 9 selected all correct answers, and consumed less time than the subject of Figure 8. With the diagrams, teachers estimate difficulties to understand the text easily and apparently.
These reports are also generated at each trial. Therefore, a teacher easily consider all reports.

**Reading activity eye gazing point report**

At each sentence, the proposed system make the tracing of eye gazing. Figure 10 is an example of the tracing of eye gazing. With this tracing, the reading process of a subject is estimated.
Figure 10. Eye gazing points report of a sentence.

Figure 11 shows other example. In Figure 11, the gazing points are distributed other sentences. The subject of Figure 11 may have some problems about his eye movements. As this, these eye gazing diagrams show the problems about eye movements clearly.

These eye gazing reports help teachers to estimate the problem of a subject. However, nine pages of eye gazing reports of a trial are too large to consider in detail.
The reports of Figure 10 and 11 are generated at each sentences in a text read. A text used in a trial has nine sentences. Therefore, each trial generates nine pages of these types of reports. A teacher can consider the reports of a trial precisely. However, a teacher cannot consider the types of reports of all pupils in a class precisely.

Question answering stage eye gazing point report

At each question, the proposed system make the tracing of eye gazing. Figure 12 and 13 show examples of the tracing of eye gazing of a question and an answering stage. With these tracing, the degree of understanding about the text and the activity to search an answer of the question are estimated. This subject of Figure 12 did not understand the text well.

![Figure 12. Eye gazing diagram at question answering stage.](image)
Figure 13. Other example of eye gazing diagram at question answering stage.

The subject of Figure 12 searched the answer through whole text. This subject is estimated not to understand the text well in reading aloud stage. The subject of Figure 13 searched only proper sentence only. This subject understood the text well in reading aloud stage, and confirmed his understanding. This eye gazing report helps teachers to understand the activities in question answering stage well.

Five pages of eye gazing reports are generated at each trial. A teacher can consider these types of eye gazing reports of a trial precisely. However, it is difficult to consider all these types of eye gazing report of all pupils in a class for a teacher.

Types of good readers

This paper decides that a good reader must understand the text well and read aloud smoothly. The level of understanding the text is evaluated easily with the question answering timing reports shown in Figure 8 and 9. There are 21 subjects that answered all correct answers.

The smoothness of reading aloud is evaluated with the reading activity timing reports shown in Figure 6. There are 15 subjects that read aloud the text smoothly.
Only six subjects are classified into the group that is reading the text smoothly and understands the text well. Figure 14 and 15 shows all timing reports of the good subjects. In the figures, each row shows the reading timing report and the question answering timing report of a subject.

Figure 14. Timing reports of three good subjects.
Figure 15. Timing reports of other three good subjects.

All three subjects in Figure 14 keep nearly same pace to read aloud the text. They read aloud the text about 0.2 seconds per character. The last two subjects in Figure 15 are fast readers. They read aloud the text about 0.16 seconds per character. The difference of reading speed is 20%. The top subject in Figure 15 answers fast in all questions. The subject understand the content of the text well in reading aloud stage.
In the question answering stage, subjects need much time to answer the question 4. The answer of the question is not proposed in the text read directly. A subject needs to estimate the correct answer from the text. The text read shows other correct answers directly and apparently.

**Conclusion**

This paper introduces the objective and quantitative observation system about reading aloud and question answering activities, and their reports. The proposed timing reports of reading aloud and question answering activities enable to understand subject’s types. The reports are objective and quantitative. Therefore, it is easy to generalize the knowledge acquired from the reports.

The eye gazing reports are also objective and quantitative. However, it is difficult to consider all the eye gazing reports, because of the large amount of the eye gazing reports. The precise discussion about eye gazing reports about reading and question answering is the next step.

**References**


Addressing student retention and graduation rates have been identified as a top priority by state universities across the United States. In an effort to improve retention and graduation rates, universities are relying on predictive analytic tools. These predictive analytic tools enable student support services to intervene with high risk students at the time of crisis. These systems have been around for a long time, mostly used in student advising centers, counselling centers, and specialized programs designed for first-generation, low-income and educationally disadvantaged students.

At our institution, student engagement with university services is identified as a contributing factor to student success. Our university library plays a significant role in providing services and space for students to connect and be engaged with activities in the institution. Our library integrated itself into GradesFirst (now Student Success Collaborative), a predictive analytic tool that is already being used by other student support centers on our campus. One of the benefits of using an existing campus tool is that the library can directly contribute to the university data that influence student success. It is currently collecting data on student engagement with library services such as information literacy sessions, reference and research consultation services, tutoring, writing assistance, student technology training, and late-night study hours.

This presentation provides a case study, giving an overview of trends in library assessments. We will identify library services and resources where student success management systems can be used to demonstrate the library’s impact on student engagement. The paper will also discuss unforeseen organizational challenges that libraries may face, as well as opportunities to become a part of a campus-wide coordinated care network for students.
Title: Vocabulary Instruction That Works: How to Become an Effective Teacher of New Words

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Abstract

According to the National Reading Panel Report, a reader’s comprehension of text becomes extremely difficult when the reader encounters unknown words. In classrooms around the world, many students struggle with reading comprehension mostly in part to increasingly difficult vocabulary words. Unfortunately, vocabulary instruction is not always high on an educator’s priority list for teaching. The days of “look up the word and write its definition” need to be replaced with vocabulary instruction of strategies that not only help students to learn new words but also help to inform a teacher’s instruction. Teaching vocabulary goes beyond the realm of the Friday’s quiz of “Match the Definition to the Vocabulary Word” or “Use the Vocabulary Word in a Sentence.” Students need to be interacting with new vocabulary words by using them on a daily basis through effective communication with other classmates. The “Use It or Lose It” principle is demonstrated accurately through vocabulary use. If students are to comprehend the numerous types of text they encounter each and every day, teachers need to begin reflecting on their vocabulary instruction. What are they currently doing to highlight new vocabulary words? Is there a time each day that vocabulary words are the focus? What part, if any, does a student’s prior knowledge play in your vocabulary instruction? Do students continue using the learned vocabulary words after the vocabulary instruction for those words ceases? Effective vocabulary instruction includes the following: 1) Changing a teacher’s view on what vocabulary instruction truly is, 2) Tapping into students’ prior knowledge of vocabulary words through a variety of activities, 3) Allowing students to create definitions for new words by using their own vernacular, 4) Motivating students to want to learn vocabulary by creating authentic activities that relate to the students’ various backgrounds, and 5) Assessing students’ vocabulary knowledge through multiple avenues.
Designing a Built-in Module to Teach Study Skills in E-learning Materials

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Abstract: In this research, we proposed a learner model to teach appropriate use of study skills in e-learning materials developed based on the “warp and woof” model. We designed a built-in module for general use in e-learning gaming materials to teach appropriate use of study skills based on our model. Furthermore, we developed sample e-learning materials to verify the educational effects of our strategies for teaching study skills, and conducted practice lessons.

Introduction

The National Course of Studies for elementary and secondary education in Japan was recently revised (Ministry of Education, Culture, Sports, Science and Technology [MEXT] 2017a, b, 2018). A keyword emphasized throughout the discussions preceding this revision was “active learning.” In Japan, this term refers to a type of instructional methods. Demands were made to change the teacher-centered lesson style, which had been adopted thus far, to a learner-centered style by increasing questions and interactivity in lessons, introducing project-based learning and cooperative learning, or asking students to conduct flipped learning. However, such discussions focus on increasing the time students appear to be active; they do not clarify the process and mechanism by which their self-learning activity and motivation for learning increase. It falls to behaviorism to consider how people can acquire expected competencies by being prompted to engage in activities corresponding to expected performance.

This tendency is seen not only in Japan, but in other countries as well. Many countries define 21st-century skills as competency standards and aim to cultivate them through cooperative learning and problem-based learning. However, based on research in the science of learning, Bruer (1993) stated that to cultivate higher-order skills like problem-solving ability, not only domain-specific knowledge but also general strategies and metacognitive skills must be taught. In such cases, it is important that general strategies be used in general contexts, and to this end, metacognitive awareness and informed instruction are required to teach what the strategies are, when and how they should be used, and why they are useful.

Matsuda (2016) stated that ways of seeing and thinking, included in the objectives of Japanese school education, should be added to the aforementioned elements, and that general strategies can focus on a problem-solving procedure. Matsuda’s (2015) “warp and woof model of problem-solving” was proposed as a result of the above discussion, to explicitly provide learners with metacognitive knowledge by indicating the relationship among elements and the procedure for using each element in cooperation with others. Matsuda’s team developed various e-learning gaming materials that teach problem-solving activities while showing the model, and that offer clues and feedback to promote appropriate use of necessary elements in each instance, thereby facilitating informed instruction.

The model includes a self-learning element in the “woof” activities: collect ⇒ process ⇒ summarize information. The instructions and methods given in these activities, to indicate important information that must be noted and to summarize information appropriately, improve the quality of self-learning. This study defines such methods as “study skills.” Because study skills are used to recognize and process the information presented, they are distinguished from the metacognitive skills used to monitor and control one’s own cognitive activities.
Purpose

In this research, we proposed a learner model to teach appropriate use of study skills in e-learning materials developed based on the warp and woof model. Our model offers learners metacognitive knowledge to help them monitor and control appropriate use of study skills. We designed a built-in module for general use in e-learning gaming materials to teach appropriate use of study skills based on our model. Furthermore, we developed sample e-learning materials to verify the educational effects of our strategies for teaching study skills, and conducted practice lessons.

Learner Model to Express Appropriate Use of Study Skills

To construct a learner model, we adopted both the bottom-up approach of arranging and integrating study skill items and the top-down approach of defining a procedure for using study skills appropriately as a compatible part of the warp and woof model. For the former approach, because learners must read, understand, and memorize information presented in e-learning materials to use them practically, we compiled study skill items identified by researchers thus far, such as Sakamoto and Matsuda (1988), Inuzuka (2002), Kimura (2013), and Uosaki (2014). After performing four processes—extracting a common denominator for items, decomposing items consisting of two or more elements, generalizing to improve versatility, and changing expressions for easy use in e-learning—we obtained a total of 20 items.

Table 1: The 20 Study Skill Items Obtained by Reconstructing the Items of the Previous Studies

<table>
<thead>
<tr>
<th>Item</th>
<th>Item</th>
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</thead>
<tbody>
<tr>
<td>- pay attention to emphasized expressions.</td>
<td>- pay attention to figures and tables.</td>
</tr>
<tr>
<td>- pay attention to conjunctions.</td>
<td>- pay attention to unknown and unfamiliar use of words.</td>
</tr>
<tr>
<td>- consider the intention of the teacher’s question.</td>
<td>- consider the intention of the presentation slides.</td>
</tr>
<tr>
<td>- consider related or supplementary information.</td>
<td>- suppose concrete situations.</td>
</tr>
<tr>
<td>- compare with learned knowledge.</td>
<td>- compare with other’s situation of understanding.</td>
</tr>
<tr>
<td>- monitor my understanding level.</td>
<td>- ignore the contents not changing the essential meaning.</td>
</tr>
<tr>
<td>- change the words to other words not changing the meaning.</td>
<td>- make a new sentence in my words.</td>
</tr>
<tr>
<td>- arrange the contents in the form of a frame of 5W1H.</td>
<td>- add my idea/interpretation while taking notes.</td>
</tr>
<tr>
<td>- take a note of contents shown on a blackboard and a screen.</td>
<td>- consider the reliability of contents while taking a note.</td>
</tr>
<tr>
<td>- take a note as easy to review it.</td>
<td>- take notes as easy to understand their relationships.</td>
</tr>
</tbody>
</table>

For the latter approach, we examined the 5W1H required for practical use of study skills (Table 2). The 5W1H are adopted in the warp and woof model as slot names used to arrange knowledge in a frame by extending...
elements required for informed instruction—what, when, how, and why—as mentioned by Bruer. Learners must judge which study skill is useful when presented with a new slide in an e-learning material. The features of a slide’s information may provide a clue for this judgment—for example, if the slide contains a graph, learners may need to pay attention to it, or if there is a considerable amount of text, learners may be required to extract important information to reply to a question. We assumed three causes for use of study skills—the learner’s own understanding (who), the purpose of the study skill (why), and the required ways of viewing and thinking (when)—in addition to the features of the slide’s information (where).

<table>
<thead>
<tr>
<th>Table 2: The Framework of 5W1H for Study Skills</th>
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<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>What</td>
</tr>
<tr>
<td>When</td>
</tr>
<tr>
<td>Where</td>
</tr>
<tr>
<td>Why</td>
</tr>
<tr>
<td>Who</td>
</tr>
<tr>
<td>How</td>
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</tbody>
</table>

However, it would be difficult to memorize a different 5W1H corresponding to each of the 20 study skills. Therefore, by considering the purpose of using study skills, we classified the 20 study skill items into two categories, “utilizing auxiliary memory” and “sharing a protocol,” and defined a 5W1H for each category (Table 3 & 4).

<table>
<thead>
<tr>
<th>Table 3: 5W1H of Study Skill Category for “utilizing auxiliary memory”</th>
</tr>
</thead>
<tbody>
<tr>
<td>What</td>
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<tr>
<td>When</td>
</tr>
<tr>
<td>Where</td>
</tr>
<tr>
<td>Why</td>
</tr>
<tr>
<td>Who</td>
</tr>
<tr>
<td>How</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 4: 5W1H of Study Skill Category for “sharing a protocol”</th>
</tr>
</thead>
<tbody>
<tr>
<td>What</td>
</tr>
<tr>
<td>When</td>
</tr>
<tr>
<td>Where</td>
</tr>
<tr>
<td>Why</td>
</tr>
<tr>
<td>Who</td>
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<tr>
<td>How</td>
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</table>

When learners look at an e-learning material’s slide, they must associate the causes with the appropriate study skills. If two or more study skills match the causes, the most appropriate one can be chosen by referring to the what and how slots corresponding to the task at hand.

### Design of an Instructional Module to Promote Use of Study Skills

The instructional module designed in this study is intended for use as a module built into existing e-learning materials. Given this, it is necessary to avoid obstruction of the main instructions of the e-learning material. Therefore, the module supports practical use of study skills necessary to understand important contents while advancing the main instructions of the e-learning materials, and upon conclusion of the e-learning material instructions are provided to promote acquisition and retention of the 5W1H for study skills.

The opportunity to help a learner use study skills arises when he/she replies incorrectly to a question in the existing e-learning material (Figure 2(b)). In such cases, the study skills expected to be useful are shown, and the same question is repeated (Figure 3). The study skills shown are chosen based on three causes—ways of viewing and thinking, features of the slide’s information, and the learner’s own understanding—using image recognition technology. Whether the answer is correct or not, learners are asked which study skill they used, and this determines the ordering of the study skill instructions given in the review process. If they answer incorrectly twice, learners are
shown the correct answer and prompted to consider whether they used an inappropriate study skill or used the appropriate study skill incorrectly.

**Figure 2**: The model to Use the Framework of 5W1H (a) and the Procedure to Assess Learners’ Level to use it (b)
During instruction on study skills in the review process, learners virtually experience the method for using the knowledge of the 5W1H for study skills based on a learner model showing each actual slide of the e-learning material. Based on the time remaining for the lesson, the number of study skills to be instructed is modified, and priority is given to the items learners reported using in the e-learning material. Although the four causes were shown together in the model mentioned previously, the difficulty of their practical use must differ. Therefore, instruction in the review process recommends using knowledge from the when, where, and who slots before knowledge from the...
why slot. In addition, according to this order of use, criteria to assess learners’ utilization levels are defined.

Figure 4: Instruction on Study Skills in the Review Process

Figure 5: Screen Shot of a Pre- and Post-test before and after the E-learning Material

Evaluation through a Practice Lesson

We incorporated the built-in module designed in this study into an existing e-learning material and performed a trial lesson involving 104 first-year students of Tokyo Tech High School of Technology. We chose the e-learning gaming material of Goda and Matsuda (2017), which teaches a method for data analysis in “Mathematics I,” a compulsory subject for all high school students, through the solution of a given problem. Because image recognition technology was not employed in the present module, we programmed similar operation by judging the features of the slides (Figure 5). Moreover, we incorporated a pre- and post-test before and after the e-learning material to evaluate educational effect. We designed the tests to have similar features for use of study skills, but different topics.

In the instructional module developed, instruction in study skills was offered only when a student answered a question in the e-learning material incorrectly. As a result (Table 5), 50 of the 104 participants received “make a new sentence in my words” as instruction, and 74 received “pay my attention to emphasized expressions” as instruction. Subsequently, we analyzed only those students who received instruction for each study skill. As the result, 34 of the 50 and 35 of the 74 participants, respectively, increased their evaluation level in each study skill. Therefore, educational effect of the instruction was confirmed.
To examine whether the use of study skills transferred to another e-learning material, we reviewed changes in correct/incorrect answers in the pre- and post-tests. However, only 3 of the 50 and 5 of the 74 students, respectively, replied correctly in post-test questions after an initial incorrect response in the pre-test, showing that the module did not facilitate transfer of study skills’ use to another e-learning material. This may be because the present instruction in study skills emphasizes an explanation of how to use the 5W1H for study skills, not knowledge acquisition of the 5W1H. Additionally, although 32 out of 50 students were able to use the study skill “make a new sentence in my words” in the pre-test, 24 of these 32 were unable to utilize it in the post-test. This may suggest that either the problem in the pre-test was too easy, or the problem in the post-test was too difficult.

**Table 5:** The Number of Learners who were assessed Each Level at the First and Second Occasions

<table>
<thead>
<tr>
<th>Learners' Level (1st)</th>
<th>Learners' Level (2nd)</th>
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<tbody>
<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>0</td>
<td>18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learners' Level (1st)</th>
<th>Learners' Level (2nd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

Conclusions and Perspectives

In this research, we proposed a learner model to teach appropriate use of study skills in e-learning materials, designed its instructional method, and built the module into an existing e-learning gaming material to verify the educational effects of its instruction in study skills. As a result, we found it to have educational effect in raising the level of study skill use, but this effect did not transfer to other content. Therefore, we must improve our strategy and examine educational effect through continuing trials involving the same participants.

**References**


The present study first introduces the purpose and significance of developing the BTSJ Japanese Natural Conversation Corpus (hereafter BTSJ-Corpus) ver. 2018, which has compiled 333 Japanese Natural Conversations with sound recordings and transcriptions. Then, the overall quantitative characteristics of the corpus such as the number of total words and TTR are described. The BTSJ-Corpus is one of the largest corpus (928,070 words) which compiles Japanese spontaneous oral conversations in various settings such as those between unacquainted people and between intimate friends of different social sub-groups. BTSJ is the abbreviation of the transcribing rules named ‘Basic Transcription System for Japanese’ which had developed by considering the characteristics of Japanese language and communication styles such as the phenomena that each sentence-final indicates the different politeness levels and there are many backchannels and/or overlapped utterances.

Then, we will present the results of the use of sentence-final politeness levels and the use of sentence-final particles “ne”, “yo” and “yone”, depending on the settings and the relationships between the speaker and hearer. It is because in Japanese conversation the choice of speech-level, basically either polite-forms or non-polite forms, has crucial functions for smooth communication and it conspicuously represents the relationships between the speakers. The following four settings were analyzed: Conversations between unacquainted people: 1) between native speakers. 2) between native speaker and non-native speaker. Conversations between intimate friends: 3) between native speakers. And 4) between native speaker and non-native speaker.

The major results of the use of polite forms and sentence-final particle “ne”, “yo” and “yone” are as follows.

1) In both results of native and non-native speakers, the percentage of the polite-forms are higher in conversations between strangers than those of between
intimate friends.

2) In conversations between intimate friends, the percentage of polite forms used by non-native speaker is higher than that of native speakers.

3) Native speakers use few polite forms in conversations between intimate friends while non-native speakers use about the same percentage of polite forms in conversations between friends as in conversations between strangers.

4) In all settings, the frequencies and percentage of the use is higher in the order of “ne”, “yone” and “yo”, except for non-native speakers whose order is in the order of “ne”, “yo”, “yone”.

These results show that the major difference in the use of polite forms between native and non-native speakers is that the fact that non-native speakers do not switch the use of polite forms depending on the interlocutor. Also, non-native speakers more frequently use “yo” which has been reported to cause impoliteness effects when overused.

In the presentation, we discuss why we should utilize natural conversation corpus and why we should apply usage-based pragmatic analyses. We also discuss that these are necessary for fostering the ability of oral communication proficiency in second language acquisition.

Acknowledgements

I would like to thank Makoto Yamazaki who cooperated analyzing the data.

This study was conducted as a part of the sub-project 'The study on the Language Use of Japanese Language Learners' (project leader: USAMI Mayumi) in Multiple Approaches to Analyzing the Communication of Japanese Language Learners" (Project Leader: ISHIGURO Kei) , NINJAL.
Individualizing Learning and Assessment in the Language Classroom: A Critical Evaluation of Electronic Portfolios and their Practical Application in an LSP context

Portfolios in general have become a popular instrument in the language classroom for both learning and assessment purposes. Being based on a constructivist approach, portfolios help foster learner autonomy and responsibility, initiating reflection processes and applying a comprehensive, process-oriented assessment method. They therefore play a major role within the realms of individualizing learning and assessment. Electronic portfolios, the digital version of portfolios, extend the range of applications to multimedia content and can be used to assess not only reading and writing but also speaking and presentation skills by including audio and video files.

Starting with a definition of central concepts of electronic portfolios, this paper will analyse the value portfolios add regarding learning as well as assessment and determine requirements for a successful implementation of portfolio work in the language class room.

Thereafter, it will be argued that electronic portfolios are particularly useful in the field of Languages for specific purposes (LSP). Firstly, they allow tailormade tasks for different content areas and to enhance students’ skills in academic and vocational situations. Even in diverse groups, internal differentiation can easily be achieved by giving students flexibility in choosing tasks and contexts. Secondly, electronic portfolios facilitate the collaboration between language teachers and instructors of the specific content area and can be a useful tool for assessing both language and subject specific skills. These points will be exemplified by discussing tasks as well as students’ and teachers’ contributions taken from STEM-focused German language courses at the University of Cambridge, UK.

Challenges arising in the course of portfolio assessment will be a subject of discussion at the end of the paper: Should teachers follow a holistic or rather an analytic approach? Should portfolios be graded at all, let alone the reflections upon the learning progress? Controversial positions will be presented, before the discussion is opened to all panel members.

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When it comes to modern language learning and teaching, multimedia applications are being implemented on a high frequency in the classroom, which demonstrates their popularity. Nevertheless, most assessment situations still rely on traditional written work, such as essays or exam papers. In my talk, I argue that media-based projects, such as creating a Videoblog (Vlog), are a more suitable and therefore preferable approach to evaluating students’ language performances and should be considered as an alternative assessment method to the traditional essay and exam format. In addition, I will also discuss the importance of using a criteria catalogue ideally compiled by students, and not by the teacher because this involvement of the students in the assessment process encourages and helps them to succeed. I therefore suggest that this should also constitute a crucial part of the videoblog assessment.

Adopting Vlogs as assessment method challenges students to create their own video content in the target language. This will not only enhance their media competency, but more importantly, all four language skills will be used when creating the Vlogs: i) reading literacy, proven to be particularly significant for language acquisition, will be key during the literature research for the individual vlog topic, ii) writing skills will be utilised during script composition, iii) speech and iv) listening will be utilised during the filming and editing of the Vlogs.

To conclude, in my presentation, I will focus on two aspects in particular: firstly, how to incorporate videoblogs as a multimedia classroom project into the everyday teaching routine. I will give an example of its implementation and how to incorporate its supervision without the teacher “losing” time for the regular module content. I will present materials that should be provided for students and show how language learners can be directed and supported along the process of creating their own videoblog. Secondly, if used as exam replacement, I will talk about the most important part: the evaluation of the assessment, which can be as an individual and/or group assessment. I will focus on how all four skills of foreign language acquisition (listening, speaking, writing and reading) will be developed and eventually used as a foundation to evaluate and examine a student’s progress during the process of creating the Videoblog.

At the end of this talk, I will present examples of students’ Videoblogs and reflect critically on the suggested assessment method and its implementation in class based on my teaching experience at Binghamton University (NY/USA) and University College London (UK).

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Oral skills in a (foreign) Modern Language are often perceived as more challenging than reading or writing. On the learner’s side, the difficulties are apparent in both language production and reception because students are required to verbalize or ‘translate’ (pre-language) ideas from and into a foreign language within very limited time restrictions. For the teacher, oral skills pose problems in terms of assessment because the format of the oral examination needs to reflect, trigger and assess the specific characteristics of these skills; moreover, an oral exam should also generate or enable an “authentic” communicative interaction, which poses another challenge.

Looking at formats currently used in Modern Language Departments in Higher Education to assess oral performances, it seems that the understanding of a text often constitutes a central element in the exam which is usually a dialogue between an examiner and a student. Given that an oral test is supposed to measure communicative interaction, i.e. to assess the students’ actual ability to use the language in an authentic and meaningful way — at least from a communicative perspective —, this format is problematic for at least two reasons: first of all, by basing the oral on a text, an overlap with the assessment of reading skills occurs, and the oral assessment’s validity is consequently affected. Second, the authenticity and meaningfulness of the communicative interaction between examiner and student is questionable because, according to Piotrowski (2011), the teacher markedly dominates or at least manages the interaction which usually follows a question-answer-evaluation pattern. There is also a significant prevalence of so-called display questions, that is questions that the teacher knows answers to but pretends not to know.

This paper presents cartoons as an alternative basis for an oral exam because, unlike texts, they are of a (more or less) ‘non-language’ or ‘non-verbal’ nature and can therefore be used as an alternative ‘text’. They can engage the reader more directly than a written text and due to their complex, subjective, and controversial nature they invite the reader to analyze and discuss them and to comment on their topic and/or message; i.e. “a picture is worth a thousand words.” Moreover, cartoons can provide a valuable basis for the discussion of culture-related issues and
thereby contribute to intercultural learning which plays an important role especially in terms of Modern Language competence.

This paper will also argue that oral interaction with another student as partner instead of a teacher is favorable because, among other things, it increases the oral exam’s validity and is likely to decrease the student’s anxiety and help them to perform better.

Based on practical experience gathered during this and last year’s oral examinations in German Language Core Module I (Year 1, B1 or Intermediate High) at King’s College London, this paper reports on the use of cartoon analysis as an alternative format to trigger and assess oral Modern Language skills in an exam situation with a partner. It will discuss the suitability, potential and limitations of this format regarding the specific characteristics of oral skills in a Modern Language, the testing quality-concepts of validity, and intercultural competence. In addition, the assessment’s practical realization will be presented and critically evaluated.
Title
Promising Practices for Novice Teacher Onboarding Programs.

Topic area
Novice teachers support for greater retention

Presentation format
Workshop

2-3-Sentence description
This session will share promising practices to consider when creating or refining novice teacher onboarding programs. Implementing these practices will help support novice teachers as they are navigating their first years of teaching.

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Abstract

Every child deserves a high-quality teacher in their classroom. In our current reality the hope for our children to one day have that teacher down the hall is becoming less of a reality for some of our students. Darling-Hammond (2003) reported teacher retention should be a national priority. Additionally, early career teachers are most at risk of leaving the profession. Novice teacher seems to be the ones leaving the profession at alarming rates. Ingersoll and Smith (2003) noted that between 40-50 percent of teachers leave in their first five years. Using exit interviews to collect additional data, they found teachers had a variety of reasons for leaving. The two most prevalent reasons were to find another job and dissatisfaction. In order to increase job stratification, concerns of novice teachers need to be taken into consideration through an onboarding process. Scherer (1999) found that even though novice teacher onboarding or induction programs have become more popular in schools, many of the programs do not focus on or create a robust support structure. In this session, we will present four promising practices that are the guiding principles for novice teacher onboarding programs. The four promising practices are: 1) prioritizing all onboarding content, 2) ongoing professional development support sessions, 3) putting a focus on supporting those who support our novice teachers, and 4) creating a greater community with other novice teachers. These are strategies that promote greater job satisfaction thus leading to higher rates of novice teacher retention. These practices work in tandem to create a large impact for novice teachers as they navigate their school year. Each of the practices provides more intentionality during onboarding programs which creates a deeper learning experience for novice teachers. The promising practices will be unpacked through thought-provoking hands-on experiences for the session participants. Participants will leave this session with practical next steps to create a comprehensive novice teacher onboarding program.

References


Ingersoll, R., & Smith, T. M. (2003). The Wrong Solution to the Teacher Shortage. Retrieved from https://repository.upenn.edu/gse_pubs/126

Abstract:

The library is under constant renovation of its identity. With text resources readily available online and users seeking expertise online rather than at reference desks, academic libraries must offer other relevant collection and services to encourage usage. One of the efforts to break the community’s antiquated view of the library as only a house of books has been a push to fill users’ demand for computer access. For some academic libraries this translates to laptop and tablet check-out. While these materials do circulate, they are governed by auxiliary library services such as Access Services or IT departments and not considered part of the general collection or included in collection management policies. Instead, these technology resources are purchased as one-size-fits-all, having only low-end generic hardware specifications and loaded with basic productivity programs in order to appeal to all users. Items are purchased based on the library’s preferences to generate circulation numbers, neglecting the user’s perspective. This goes directly against emerging patron-driven practices being applied to general collection development. By critically analyzing technology borrowing similarly to book or electronic resource collections we can move the patron out of the margins and center the focus on the patron’s relationship with the library’s technology collection and services.

So in this instance, I propose an approach to apply apply existing standards equally to all collections. The technology selection and acquisition process has remained independent of most collection development planning or assessment and evaluation tools. Disconnecting circulating technology collections from ideas like Demand Driven Acquisition equals missed opportunities. Libraries need to stop marginalizing technology collections, and subsequently technology-borrowing patrons, by folding those collection into their assessment, evaluation, management and refresh policies and practices. This poster will chronicle the efforts of San Jose State University Library’s Student Computing Services department to apply these now standard practices as they expand their technology collection beyond generic hardware and basic programs.
Title: The Opportunity Myth: What Can 4000 Students Teach Us About School?

Name of Presenter: Nick Denton-Brown and Nichole Cooley

Affiliation of the presenter: Project Director and Site Manager at TNTP

Address of the presenter: 500 7th Avenue, 8th Floor, New York, NY 10018

E-mail address of the presenter: bailey.cato@tntp.org

Abstract and/or full paper:
TNTP’s national reports – from The Widget Effect to The Mirage – have had a significant influence on educational policy and practice. Come hear about The Opportunity Myth, TNTP’s next national report, where you’ll discover what TNTP learned after spending a year in schools around the country – observing more than 1,000 hours of instruction, rating the quality of more than 5,500 assignments, and gathering more than 28,000 in-the-moment student surveys. You’ll learn more about the quality of students’ daily academic experiences, how students themselves perceive those experiences, and how we can continuously improve the quality of those experiences.

Initially, participants will be briefed on the findings from The Opportunity Myth and will learn about the four key resources TNTP found lead to better academic outcomes in school. Participants will have the opportunity to ask questions about the following findings:

- Students have big, clear plans for college and career.
- Most students do what they are asked in school – but are still not ready to succeed *after* school.
- Students spend most of their time in school without access to four key resources: grade-appropriate assignments, strong instruction, deep engagement and teachers with high expectations.
- Students of color, those from low-income families, English language learners, and students with mild to moderate disabilities have *even less access* to these resources than their peers.
- Greater access to the four resources can and does improve student achievement – *particularly* for students who start the school year behind.

Following this, participants will discuss how the national report findings apply to their own classroom(s) and school(s). They will engage in a school-level case study using actual student assignments, student survey results, and data from observations to build a plan to improve a school. During this case study, participants will work as a team at their tables so that they can benefit from their colleagues’ ideas.

Finally, participants will build a plan to diagnose the quality of their own students’ daily academic experiences.
Title: Building Powerful Classrooms for ELLs through Culturally Responsive Family Engagement

Names of Presenters: Atyani Howard

Affiliation of the presenters: Vice President at TNTP

Addresses of the presenters: 500 7th Avenue, 8th Floor, New York, NY 10018

E-mail addresses of the presenters: Atyani.howard@tntp.org and Allison.aliaga@tntp.org

Abstract and/or full paper:
Teachers have the potential to serve as the entry point to families. Presenters will share family engagement strategies that have been proven to have a significant impact on student learning at Camino Nuevo Charter Academy and other school settings. Participants will receive concrete guidance for creating meaningful relationships with the families of English Language Learners. They will also assess the effectiveness of current efforts and improve the integration of family engagement to strengthen their literacy program. These improved family engagement strategies can then be directly translated into efforts to improve student achievement by building powerful home-to-school partnerships with families.

The session will begin with an overview of the research that shows how integrating family and community engagement efforts can strengthen the instructional program at the district, school and classroom levels to lead to positive results for ELLs. Participants will have the opportunity to place this research into context by exploring the case study of Camino Nuevo Charter Academy. This case study will illustrate how the teachers and staff at Camino Nuevo engaged students’ families as part of their academic approach and describe the positive results in students’ language acquisition and overall achievement.

From there, participants will conduct a self-assessment of their own district or school and work in small groups to explore successes and challenges of engaging families and communities towards increased student learning. Through that discussion, participants will surface the knowledge and skills their staff need to better engage ELL students’ families to accelerate student learning. Participants will end the session by identifying professional learning opportunities that may address those knowledge and skill gaps.

By the end of the session participants will:

- Gain a deeper understanding of how integrating family engagement efforts can strengthen literacy programs at the district, school, and classroom levels and lead to positive results for students.

- Learn four priorities for improving the integration of family engagement through a focus on assessing the effectiveness of current efforts, developing strong systems to support cross-functional efforts, engaging families as decision-makers, and aligning engagement efforts to academic goals.

- Explore a variety of publicly available resources for teachers and leaders to learn about the language and cultures their English Language Learner students bring to their education and how to build upon that knowledge in culturally responsive curriculum and instruction.
Education Area: **Elementary Education**

Abstract title: **STRENGTH BASED SCHOOLING - why it is important**

Presentation type: **Workshop**

Focusing on student strengths, not areas of deficit at school can improve students’ happiness, self-esteem, energy and vitality levels.

Strength based schooling also improves students’ stress levels, resilience, engagement and development.

This workshop explores the research around strength based schooling and delves into some case studies of what can happen if strengths are not harnessed, particularly for elementary school boys. It presents cases where it has worked to change the lives of students and discusses some practical ideas for teachers and schools.

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Sydney, Australia (Masters of Ed Leadership, Masters of Literacy, Masters of System Leadership (current))

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**Nicole Shepherd**- School Leadership of a large Catholic School- Sydney, Australia (Bach. Education, Masters of Gifted Education)

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“Strength may be defined as that which helps a person to cope with life or that which makes life more fulfilling for oneself and others. Strengths are not fixed personality traits; instead, they develop from a dynamic, contextual process rooted deeply in one’s culture” (Smith, 2006, p. 25). A major purpose of schooling is to help students develop the knowledge, skills, and attitudes (i.e., the strengths) that will enable them to live productive and happy lives as citizens in a democratic society. ‘ (Galasi, J.P, 2017)

All students possess areas of strength, no matter what challenges they face. If schools focus on creating a culture of recognizing and celebrating strengths, this can help students navigate challenges more positively. Young children often know what strengths they possess from an early age, and can readily and easily identify strengths in their peers, even in their first years of formalized schooling. Knowing and using these strengths to learn can positively influence the ways they make decisions, set and achieve goals and respond to challenge.

Teachers also have varying areas of strengths, and focusing on and using teacher strengths in schools can improve student outcomes and personal job satisfaction.

Strength-based schooling helps to promote a growth mindset and helps students to learn from failure, embrace challenge, focus on individual mastery and build perseverance. Students can be grouped together for problem solving according to various strengths they possess and teachers can observe and explore how these might enhance the strengths of others and add to group success.

“We have more diverse classrooms than at any point in history and at every turn we are faced with all sorts of instructional
challenges. Because of the complexity of teaching... there are strategies well worth considering and one of these is a strengths based approach. Research results are suggestive that a strengths based approach is engaging to students, they often enjoy talking about what they are doing well, instead of what they are doing wrong, and it could be something that you yourself find invigorates your own instruction." (Biswas- Diener, Robert, 2017)
Title of the submission: The Intersection of Equity, Disparities and the Multi-Dimensions of Family and Youth Engagement

Name of the author: Dr. Alice Farrell

Affiliation: President and CEO Olive Branch Clinical and Consulting Services, LLC

Address of the author: Springfield Massachusetts

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Title Page: This presentation will demonstrate how the use of effective engagement strategies can be a mechanism for counteracting disparities many student of color experience. It will introduce the multi-dimensions of engagement (MDE). I will demonstrate the power of weaving MDE to create physically, psychologically and emotionally supportive school environments. It will demonstrate how focusing on the use of best practices in engagement can yield students’ academic success, positive social and emotional development and high staff morale.

Abstract

In my over two decades of experience working with school personnel, parents, family members and young people, family and youth engagement has been and continues to be identified as a necessary but challenging task. The difficulty of engaging families and youth is also reflected throughout the literature on behavioral and physical health.

Engagement has been noted as an essential component to motivating families to continue to and/or become actively involved in their children’s educational experiences and in school related activities in general. It is also well known that the engagement of families and youth requires commitment from parents, youth, diverse stakeholder groups and leaders within the school, and the communities. For many students, and in particular, student of color, some of their experiences within the school settings are more negative than positive. In addition, adverse community experiences also negatively affect many students across the nation. These experiences impact students’ ability to remain hopeful and motivated to commit to their education.
This presentation will highlight the use of effective engagement strategies as a mechanism for counteracting the disparities many students of color experience. It will introduce participants to my framework which I refer to as the Multi-Dimensions of Engagement - focusing through multiple lens including:

(2) Addressing/Eliminating Racial and Ethnic Disparities - (Institutional Racism and Human Agents Demonstrating Apathy)
(3) Cultural Humility, Sensitivity and Responsiveness – Holistic Response
(4) Emotional IQ (personal awareness & personal management social awareness & relationship management)
(5) Trauma Informed Schools (approach and care) –Life Long Impact of Adverse Childhood Experiences
(6) Family & School Engagement Continuum (developed by Dr. Alice Farrell, Olive Branch Clinical and Consulting Services, Inc.)
(7) Micro Level Work (students and families---Maslow-Hierarchy of Needs)
(8) Mezzo Level Work (school practices)
(9) Macro Level Work (community engagement/involvement)
(10) L.E.G.S (Love, Empathy, Gratitude & Smiles) developed by Dr. Alice Farrell)

I will provide an overview of each of the engagement dimensions and use small and large group discussions to facilitate a learning experience that will transform the minds of the attendees. The Intersection between equity, disparities and the multi-dimensions of engagement will be demonstrated. The development of a commitment plan to address disparities through the use of the multi-dimensions will be explored.
Collaborative Language Learning through Cross-Cultural Understanding among Japanese and International Students in Regional Technical Colleges

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Abstract

This is a practical report of our research project on language learning through cross-cultural understanding among Japanese and international students in regional technical colleges in Japan. The goal of this educational practice is to improve the followings; students’ opportunities to encounter a multicultural, multilingual and multicultural environment, to use foreign languages, and to understand cross-cultural affairs. In order to achieve this goal, we tried to conduct lessons by virtual videolink meetings as well as real face-to-face camps.

Japanese government has been promoting the entry of international students and researchers to all universities. Now Japan has over 200,000 students from overseas. As almost half of them enter huge universities in the Tokyo metropolitan area and each university campus is adjacent, domestic or Japanese students in the area can easily meet with international students in order to have a chance at intercultural exchange. However, the other half enter provincial universities and colleges. Hokkaido is one of 47 prefectures in Japan, and also a regional, broad area, away from Tokyo. Universities and Colleges in Hokkaido are much smaller than the ones in Tokyo metropolitan area in particular. Hokkaido only has fewer than 3,000 foreign students in total and each university has a limited number of international students, scattered all around the Hokkaido area. In addition, those universities and colleges are distant from each other by 50-200 km. This means students in urban area like Tokyo have enough opportunity to encounter foreigners in and out of the campus, but on the other hand, students in regional areas like Hokkaido have much less opportunities to meet foreigners. The authors came to recognize that this might be a big problem to motivate second language learning and to understand the importance of cross-cultural understanding from the viewpoint of learning environment.

In this project, the authors tried to build a new learning environment so that even students in regional universities and colleges could encounter cross-cultural environment just as students in Tokyo metropolitan area have. They chose three provincial cities, Muroran, Tomakomai, and Hakodate, which are all located in Hokkaido prefecture. Each city is a neighbor city but away from others by 50-200km. To make the most use of a limited number of international students who belong to each provincial university or college as a resource of intercultural exchange, the authors suggested and introduced a quasi-interactive environment of a ICT, videolink space as well as a face-to-face training camps. In the future, the author hope to demonstrate the educational effectiveness of ICT-based interactions similar to face-to-face interactions.

Keywords:
Regional Colleges, International Students, Cross-Cultural Understanding, Videolink Space, Face-to-Face Training Camp
Analysis of SharePoint Usage Report on Teacher Resource Web Site

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ABSTRACT

This study was an attempt to explore whether, and if so, how a particular teacher resource website on SharePoint Platform has been used by targeted faculty. For this, teachers’ usage data for the lesson plan resource portal for five months were analyzed in terms of types of users, frequencies of visits, and navigation patterns. The results of the study revealed that the teacher resource website did not seem to serve its purpose of providing teachers additional instructional resources enough. Based on the results, the author provides suggestions on how to improve both technical (e.g., user-friendly interface design, navigation tool, etc.) and content (quality of the resource materials on the portal, relevance, applicability) elements of the web-based instructional portal as an additional powerful resource for teachers.

INTRODUCTION

Recently, web-based educational portal becomes a powerful tool to enrich teaching and learning experience. Among them, Microsoft’s SharePoint Portal, as Learning Management System (Al-Jarf, 2010), can provide immediate access to various instructional resources and facilitate information sharing among users (Shanmugam et al., 2008). Since 2008, the SharePoint Portal has been used as one of the main venues for sharing resource materials and exchanging information among faculty members at the Defense Language Institute Foreign Language Center (DLIFLC).

As an E-learning Specialist of Faculty Development (FD) Division at DLIFLC, I was in charge of developing and updating the FD’s resource website on the SharePoint Portal for 8 years since 2008. The Faculty Development Division provided various instructional resources on the SharePoint Portal as well as conducted various pre-/in-service teacher development workshops for faculty members at DLIFLC. The instructional resources on the SharePoint Portal featured a compilation of workshop participants’ final products that were collected in the following process: After the workshops, the workshop participants were
asked to submit their final products, e.g., lesson plans & resource materials, to the workshop facilitators.

The facilitators reviewed the products thoroughly, made minor revision, if necessary, and sent the selected products to me. Then, the final, edited versions of the lesson plans, along with accompanied instructional materials, were uploaded on the designated locations of the SharePoint Portal and were available for DLIFLC faculty.

Since the fiscal year of 2009, the resource website started to grow in size thanks to contributions of a number of faculty members who were willing to share their lesson plans and instructional materials with other faculty members. The users of the FD resource website can browse a variety of sample lesson plans and instructional materials, which are arranged by skill modalities (e.g., reading, listening, grammar, speaking, a combination of two or more skills), topics (e.g., culture, economy, health, politics, social issues, etc.), and proficiency levels within a user-friendly interface, by clicking the necessary links on SharePoint.

While there were numerous web-based resources and lesson plans available for foreign language teaching, it was hard to find ‘ready-to use’ materials/resources relevant to DLIFLC context. The resource website on SharePoint Portal was developed in an attempt to provide DLIFLC faculty with more relevant and context-specific instructional ideas and resources that can be readily adapted to daily lessons. Since FD resource website was developed and available for DLIFLC faculty, I consistently monitored the usage of the resource website as a part of Quality Control (QC) purposes. I particularly looked for how this web-based resource Portal site was utilized by intended user at DLIFLC with the following research questions: 1. What features in the teacher resource website did the users utilize the most?; 2. Who are the main users of the teacher resource website?; 3. How do the users navigate through the server pages? In order to answer these questions, I accumulated the site usage
reports of the SharePoint site administration page through the months of May through September, 2009.

METHODS

Four different types of usage reports were captured by the author each month beginning May through September, 2009. The following is a brief definition/explanation of each of the usage reports.

- **Top referring pages** indicate the URL (Uniform Resource Locator) pages that any user visited prior to browsing a page on the current site over the course of the last 30 days.

- **Top destination pages refer to** the URL of the page that a user navigated to from the current site over the last 30 days.

- **Top page requests indicate** the URL of the page requested over the last 30 days. “Request” counts as a single request for a page, not including additional requests for items on the page.

- **Top Users indicate** the ID of the user accessing the site over the last 30 days.

For this study, a total of 20 usage reports were exported to MS Excel files. Based on the files, the data was rearranged and analyzed to determine the nature of site usage by the website’s users. (See Figure 1 to 5 and Table A to O).

Data Analysis

Descriptive statistics were applied for data analysis due to the nature of this study. In contrast to common server log files that offer individual records, such as HTTP (Hypertext Transfer Protocol) requests and extensive client/server data, the usage reports on SharePoint
did not provide individual records except the top user report. Therefore, I tried to figure out the navigation patterns of individual users using the information gained from the referring page, destination page, and top page requests. In addition, the item codes in the referring pages were converted into page title descriptions or functional descriptions for interpretation purposes (See Table B, E, H, N, and K).

**RESULTS**

*Table 1. The total number of users who have gained access to the Teacher Resources website and the number of requests for top pages, lesson plans, and supporting materials over the period of five months.*

<table>
<thead>
<tr>
<th></th>
<th>Top users</th>
<th>Division and school(^1)</th>
<th>Top page requests</th>
<th>Lesson plans requests</th>
<th>Supporting materials requests</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>13</td>
<td>8</td>
<td>5</td>
<td>127</td>
<td>73</td>
</tr>
<tr>
<td>June</td>
<td>13</td>
<td>8</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>July</td>
<td>20</td>
<td>11</td>
<td>3</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>August</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>September</td>
<td>14</td>
<td>7</td>
<td>4</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Total(^2)</td>
<td>48</td>
<td>19</td>
<td>5</td>
<td>127</td>
<td>73</td>
</tr>
</tbody>
</table>

Table 1 shows the total number of users who have accessed the Teacher Resource website from May to Sept., 2009. A total of 48 users from 19 different divisions and language schools accessed the website through the intranet and extranet (See details for Figure 1 to 5). As seen in table 1, an overwhelmingly high number of the requests for lesson plans and supporting materials from users were made in May (127 and 73, respectively),

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\(^1\) The requests from the same target language school were counted as one.

\(^2\) The duplicates are removed.
compared with requests made in other months. On the other hand, it was hard to draw generalizations on user preferences for particular skill modalities, ILR scales, and topics due to the difficulties of acquiring individual user records (See tables A, D, G, J, & M for detailed lists.).

The number of top page requests remained mostly consistent for every month. This consistency may be attributed to the simple layout of the website (Figure A): the website consisted of two SharePoint libraries, the corresponding view options, and search database help pages. From these pages, the search database help page was seemingly the most favorite target for most users (See Table A, D, G, J and M).

In terms of navigation, a majority of the users began their search from the FD homepage, FD Public Library page, or on the Teacher Resource site, but concluded their search on the feature pages of the Teacher Resource site.
DISCUSSION/CONCLUSION

This study was an attempt to investigate whether, and if so, how the FD Teacher Resource Web site on FD Share point has been used as instructional resources by the DLIFLC faculty. The results of the study revealed that the teacher resource website on SharePoint Portal did not seem to serve its intended purpose of providing teachers with additional web-based instructional resources. There are several explanations for the result. First, a majority of DLI faculty were not informed of the existence of this web resource due to a lack of advertisement across DLIFLC for the site since its first development. Secondly, even though instructors were informed of the web-based instructional resources, they may not have found sufficient time to navigate through the site to find the necessary materials or lesson ideas because of their own hectic daily teaching schedules. Thirdly, some language schools at DLIFLC already established language-specific resources on the other venue, e.g., school-wide shared folders, and the teachers were able to obtain information or instructional materials from their resource website. Finally, some technical problems associated with migrating FD SharePoint Portal might prevent teachers from properly using the FD resource web page.

Due to a limited number of users and also, to the limited functional features of the site usage report (i.e. a lack of individual records), it is hard or almost impossible to fully gauge the effectiveness of the FD resource website. However, the site usage reports that SharePoint does provide can still be useful because they, at the very least, can provide some semblance of tracking site usage despite the rather superficial information they provide.

There can be several ways to improve the usage of the FD Teacher Resource website by DLIFLC faculty. 1) We need to disseminate and advertise the existence of the Web site wherever possible. For example, FD specialists can introduce the site to the language instructors, along with a short demonstration of how to use the web resources during both
resident and non-resident workshops. The results of the study showed that three former non-
resident workshop participants, who were informed of the existence of website, accessed the
site following its introduction. 2) The contents of the resource web page need to be expanded
in both quantity and quality to entice more users across different schools and divisions to
utilize the FD Teacher Resource website. Currently, the sources of inputs for lesson plans
and materials on the site are limited to two in-service workshops (Activity Swap and Task-
Based Language Instruction); thus, lesson plan libraries are growing at a much slower pace
than expected. Hence, we may need to extend opportunities to publish lesson plans and
materials on FD resource webpage to a larger population of the DLIFLC faculty, while at the
same time, employing more rigid criteria to review their lesson plans/materials before
publication on the web in order to ensure both the quantity and quality of materials included
in the FD resource webpage. Finally, in liaison with language schools, we need to
incorporate or merge the existing resource networks in these language schools with the FD
resource website to create a main central resource hub for language materials that can be
easily accessed. While these proposals are daunting, they can provide promising benefits,
which may be assessed in the future as another potential subject of my action research.

REFERENCES

Conference proceedings of 'eLearning and Software for Education' (eLSE), At Bucharest,
Rumania, Volume: 1, pp. 375-382.

SharePoint –An Overview. Information Technology and Multimedia at UNITEN (ICIMU’
2008), Malaysia, pp. 421-424.
APPENDIX

Figure 1. Top users captured on May, 4th, 2009. X axis represents users and Y axis represents the total number of times the user accessed this site over the past 30 days. These numbers were divided by 30 to give the daily average (UserID is converted to a division name or a title due to privacy concerns).

Figure 2. Top users captured on June, 8th, 2009. X axis represents users and Y axis represents the total number of times the user accessed this site over the past 30 days, divided by 30 to give the daily average (UserID is converted to a division name or a title due to privacy concerns).
Figure 3. Top users captured on July, 17th, 2009. X axis represents users and Y axis represents the total number of times the user accessed this site over the past 30 days, divided by 30 to give daily average (UserID is converted to a division name or a title due to privacy concerns)

Figure 4. Top users captured on Aug., 14th, 2009. X axis represents users and Y axis represents the total number of times the user accessed this site over the past 30 days, divided by 30 to give daily average (UserID is converted to a division name or a title due to privacy concerns)
Figure 5. Top users captured on Sep., 9th, 2009. X axis represents users and Y axis represents the total number of times the user accessed this site over the past 30 days, divided by 30 to give daily average (UserID is converted to a division name or a title due to privacy concerns)

Table A. Top page requests captured on May, 4th, 2009. The value represents the total number of requests to the page over the past 30 days, which were divided by 30 to give the daily average.

<table>
<thead>
<tr>
<th>Page</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>default.aspx</td>
<td>6.80</td>
</tr>
<tr>
<td>supporting materials/forms/short.aspx</td>
<td>0.87</td>
</tr>
<tr>
<td>shared documents/forms/resources.aspx</td>
<td>0.47</td>
</tr>
<tr>
<td>shared documents/zemfiraZeylOAvazarswap04222009.pdf</td>
<td>0.27</td>
</tr>
<tr>
<td>help/lp1.htm</td>
<td>0.13</td>
</tr>
<tr>
<td>help/lp1.swf</td>
<td>0.13</td>
</tr>
<tr>
<td>help/lp1_fullmotion7.swf</td>
<td>0.13</td>
</tr>
<tr>
<td>help/lp1_fullmotion8.swf</td>
<td>0.13</td>
</tr>
<tr>
<td>help/lp1_fullmotion9.swf</td>
<td>0.13</td>
</tr>
<tr>
<td>help/lp1_skin.swf</td>
<td>0.13</td>
</tr>
<tr>
<td>shared documents/rosemille0318_swap_proposalform.pdf</td>
<td>0.10</td>
</tr>
<tr>
<td>shared documents/tasklist.pdf</td>
<td>0.10</td>
</tr>
<tr>
<td>shared documents/swap_1page_excerpt.pdf</td>
<td>0.07</td>
</tr>
<tr>
<td>shared documents/nov07.pdf</td>
<td>0.07</td>
</tr>
<tr>
<td>supporting materials/Edelweiss.mp3</td>
<td>0.07</td>
</tr>
</tbody>
</table>
Table B. Top referring page captured on May 4th, 2009. The value represents the total number of times the URL was a referring page over the past 30 days, divided by 30 to give the daily average.

<table>
<thead>
<tr>
<th>Referring Page Descriptions</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Resource Homepage</td>
<td>1.10</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.40</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.33</td>
</tr>
<tr>
<td>FD Public File Library</td>
<td>0.23</td>
</tr>
<tr>
<td>Teacher Resource Lesson Plan Library</td>
<td>0.20</td>
</tr>
<tr>
<td>FD Bridges page</td>
<td>0.17</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.13</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.13</td>
</tr>
<tr>
<td>FD Contact Lists</td>
<td>0.10</td>
</tr>
<tr>
<td>Database Search Help page</td>
<td>0.10</td>
</tr>
<tr>
<td>Supporting Material page</td>
<td>0.10</td>
</tr>
<tr>
<td>FD Document page</td>
<td>0.07</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.07</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.07</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>FD Organization Chart</td>
<td>0.03</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>FD Policies and Publication</td>
<td>0.03</td>
</tr>
<tr>
<td>Supporting Material Explorer View</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Table C. Top destination page captured on May 4th, 2009. Destination URL of the page that a user navigated to from the Teacher Resource site. Requests value represents the total number of times this URL was a destination page over the past 30 days.

<table>
<thead>
<tr>
<th>Destination</th>
<th>Requests</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/default.aspx">https://portal.monterey.army.mil/org/FacultyDev/tr/default.aspx</a></td>
<td>72</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting</a> materials/forms/short.aspx</td>
<td>16</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared">https://portal.monterey.army.mil/org/FacultyDev/tr/shared</a> documents/zemfizayenalovaaarswap04222009.pdf</td>
<td>7</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.swf</a></td>
<td>3</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fullmotion7.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fullmotion7.swf</a></td>
<td>3</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fullmotion8.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fullmotion8.swf</a></td>
<td>3</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fullmotion9.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fullmotion9.swf</a></td>
<td>3</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_skin.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_skin.swf</a></td>
<td>3</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared">https://portal.monterey.army.mil/org/FacultyDev/tr/shared</a> documents/forms/resources.aspx</td>
<td>2</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/lists/org">https://portal.monterey.army.mil/org/FacultyDev/lists/org</a> contacts/org contacts.aspx</td>
<td>2</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared">https://portal.monterey.army.mil/org/FacultyDev/tr/shared</a> documents/tasklist.pdf</td>
<td>2</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.htm">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.htm</a></td>
<td>2</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared">https://portal.monterey.army.mil/org/FacultyDev/tr/shared</a> documents/rosemille0318_swap_proposalform.pdf</td>
<td>2</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/web/web/courses/icc/index.html">https://portal.monterey.army.mil/org/FacultyDev/web/web/courses/icc/index.html</a></td>
<td>2</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting</a> materials/taskii_source_new_delhi.pdf</td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting</a> materials/textaboutanairplaincrashinbishkek.pdf</td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared">https://portal.monterey.army.mil/org/FacultyDev/tr/shared</a> documents/swap_1page_excerpt.pdf</td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting</a> materials/aggio.mp3</td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared">https://portal.monterey.army.mil/org/FacultyDev/tr/shared</a> documents/kiril.pdf</td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared">https://portal.monterey.army.mil/org/FacultyDev/tr/shared</a> documents/mirateymurova 03_18_swap_proposalform.pdf</td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared">https://portal.monterey.army.mil/org/FacultyDev/tr/shared</a> documents/nov07.pdf</td>
<td>1</td>
</tr>
</tbody>
</table>
### Table D

Top page requests captured on June, 8\(^{th}\), 2009. The value represents the total number of requests to the page over the past 30 days, divided by 30 to give daily average.

<table>
<thead>
<tr>
<th>Page</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>default.aspx</code></td>
<td>2.87</td>
</tr>
<tr>
<td><code>supporting_materials/forms/short.aspx</code></td>
<td>0.07</td>
</tr>
<tr>
<td><code>supporting_materials/listening_news.ppt</code></td>
<td>0.03</td>
</tr>
<tr>
<td><code>supporting_materials/vedi.pdf</code></td>
<td>0.03</td>
</tr>
<tr>
<td><code>help/lp1.htm</code></td>
<td>0.03</td>
</tr>
<tr>
<td><code>help/lp1.swf</code></td>
<td>0.03</td>
</tr>
<tr>
<td><code>help/lp1_fullmotion7.swf</code></td>
<td>0.03</td>
</tr>
<tr>
<td><code>help/lp1_fullmotion8.swf</code></td>
<td>0.03</td>
</tr>
<tr>
<td><code>help/lp1_fullmotion9.swf</code></td>
<td>0.03</td>
</tr>
<tr>
<td><code>help/lp1_skin.swf</code></td>
<td>0.03</td>
</tr>
<tr>
<td><code>shared_documents/moti_dli.pdf</code></td>
<td>0.03</td>
</tr>
<tr>
<td><code>shared_documents/nov07.pdf</code></td>
<td>0.03</td>
</tr>
<tr>
<td><code>supporting_materials/04_22_swap_map_exercise.pdf</code></td>
<td>0.03</td>
</tr>
<tr>
<td><code>supporting_materials/aggio.mp3</code></td>
<td>0.03</td>
</tr>
<tr>
<td><code>supporting_materials/bagu.avi</code></td>
<td>0.03</td>
</tr>
</tbody>
</table>
**Table E.** Top referring page captured on June 8th, 2009. The value represents the total number of times the URL was a referring page over the past 30 days, divided by 30 to give the daily average.

<table>
<thead>
<tr>
<th>Top Referring Page</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Resource Home page</td>
<td>1.33</td>
</tr>
<tr>
<td>FD Home page</td>
<td>0.33</td>
</tr>
<tr>
<td>FD Public File Library</td>
<td>0.13</td>
</tr>
<tr>
<td>FD Bridges Home page</td>
<td>0.10</td>
</tr>
<tr>
<td>Teacher Resource Lesson Plan Library page</td>
<td>0.07</td>
</tr>
<tr>
<td>FD Faculty Leadership page</td>
<td>0.03</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>Technology Survey Attitudes Administration</td>
<td>0.03</td>
</tr>
</tbody>
</table>
**Table F.** Top destination page captured on June 8\(^{th}\), 2009. Destination URL of the page that a user navigated to from the Teacher Resource site. Requests value represents total number of times this URL was a destination page over the past 30 days.

<table>
<thead>
<tr>
<th>Destination</th>
<th>Requests</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/default.aspx">https://portal.monterey.army.mil/org/FacultyDev/tr/default.aspx</a></td>
<td>40</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/pages/vidlibrary.aspx">https://portal.monterey.army.mil/org/FacultyDev/pages/vidlibrary.aspx</a></td>
<td>3</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting</a> materials/forms/short.aspx</td>
<td>2</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting</a> materials/vedi.pdf</td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.html">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.html</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.swf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fullmotion7.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fullmotion7.swf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fullmotion8.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fullmotion8.swf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fullmotion9.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fullmotion9.swf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_skin.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_skin.swf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared">https://portal.monterey.army.mil/org/FacultyDev/tr/shared</a> documents/nov07.pdf</td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting</a> materials/04_22_swap_map_exercise.pdf</td>
<td>1</td>
</tr>
</tbody>
</table>
Table G. Top page requests captured on July, 17\textsuperscript{th}, 2009. The value represents the total number of requests to the page over the past 30 days, divided by 30 to give the daily average.

<table>
<thead>
<tr>
<th>Page</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>shared documents/forms/resources.aspx</td>
<td>5.07</td>
</tr>
<tr>
<td>default.aspx</td>
<td>3.03</td>
</tr>
<tr>
<td>supporting materials/forms/short.aspx</td>
<td>0.70</td>
</tr>
<tr>
<td>shared documents/task library_zhao.pdf</td>
<td>0.10</td>
</tr>
<tr>
<td>shared documents/0+_g_sk.pdf</td>
<td>0.10</td>
</tr>
<tr>
<td>shared documents/amna ahmed arabic level 2 to 2+ r 1 s and writing.pdf</td>
<td>0.10</td>
</tr>
<tr>
<td>shared documents/hazemjune.pdf</td>
<td>0.07</td>
</tr>
<tr>
<td>shared documents/swap_1page_excerpt.pdf</td>
<td>0.07</td>
</tr>
<tr>
<td>shared documents/swdir.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/tasklist.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/zemfirazeynalovaazarswap04222009.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>supporting materials/04_22_swap_map_exercise.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>supporting materials/bl_swaphandout.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/jieyang.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/park_bo.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/proposal_lia.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/bennett.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/chinglin.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/hazem.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/1+2_luz.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/11+_lc.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/4_22_09_swap.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/aida.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1.htm</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1.swf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1_fullmotion7.swf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1_fullmotion8.swf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1_fullmotion9.swf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1_skin.swf</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Table H. Top referring page captured on July 17th, 2009. The value represents the total number of times the URL was a referring page over the past 30 days, divided by 30 to give the daily average.

<table>
<thead>
<tr>
<th>Top referring page description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Administration</td>
<td>0.40</td>
</tr>
<tr>
<td>Lesson Plan Library page</td>
<td>0.33</td>
</tr>
<tr>
<td>FD Public Document Library</td>
<td>0.27</td>
</tr>
<tr>
<td>FD Home page</td>
<td>0.23</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.13</td>
</tr>
<tr>
<td>Foreign Language Active Swap page</td>
<td>0.07</td>
</tr>
<tr>
<td>FD Video Library page</td>
<td>0.03</td>
</tr>
<tr>
<td>FD Public Document Library explorer view page</td>
<td>0.03</td>
</tr>
<tr>
<td>Teacher Resource Lesson Plan Library explorer view</td>
<td>0.03</td>
</tr>
<tr>
<td>Old Activity Swap Home page</td>
<td>0.03</td>
</tr>
<tr>
<td>Old Activity Swap calendar page</td>
<td>0.03</td>
</tr>
<tr>
<td>FD Bridges Home page</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Table I. Top destination page captured on July 17th, 2009. Destination URL of the page that a user navigated to from the Teacher Resource site. Requests value represents the total number of times this URL was a destination page over the past 30 days.

<table>
<thead>
<tr>
<th>Destination</th>
<th>Requests</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/forms/resources.aspx">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/forms/resources.aspx</a></td>
<td>115</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/default.aspx">https://portal.monterey.army.mil/org/FacultyDev/tr/default.aspx</a></td>
<td>47</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/forms/short.aspx">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/forms/short.aspx</a></td>
<td>9</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/task_library_zhao.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/task_library_zhao.pdf</a></td>
<td>3</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/0+g_sk.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/0+g_sk.pdf</a></td>
<td>3</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/amna_ahmed_arabic_level_2_to_2+_r1s_and_writing.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/amna_ahmed_arabic_level_2_to_2+_r1s_and_writing.pdf</a></td>
<td>3</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/swap_1page_excerpt.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/swap_1page_excerpt.pdf</a></td>
<td>2</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/swdir.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/swdir.pdf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/bennett.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/bennett.pdf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/chinglin.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/chinglin.pdf</a></td>
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<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/hazem.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/hazem.pdf</a></td>
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<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/hazemjune.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/hazemjune.pdf</a></td>
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<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/park_bo.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/park_bo.pdf</a></td>
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<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/1+2_luz.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/1+2_luz.pdf</a></td>
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<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/11+_lc.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/11+_lc.pdf</a></td>
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</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/4_22_09_swap.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/4_22_09_swap.pdf</a></td>
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</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/aida.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/aida.pdf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.htm">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.htm</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.swf</a></td>
<td>1</td>
</tr>
<tr>
<td>URL</td>
<td>Count</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_ful">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_ful</a>...</td>
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<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_ful">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_ful</a>...</td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_ful">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_ful</a>...</td>
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</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_ful">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_ful</a>...</td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_ful">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_ful</a>...</td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/tasklist.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/tasklist.pdf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/zemfirazeynalovaazarswap04222009.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/zemfirazeynalovaazarswap04222009.pdf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/04_22_swap_map_exercise.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/04_22_swap_map_exercise.pdf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/bl_swaphandout.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/bl_swaphandout.pdf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/pages/vidlibrary.aspx">https://portal.monterey.army.mil/org/FacultyDev/pages/vidlibrary.aspx</a></td>
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</tr>
</tbody>
</table>
Table J. Top page requests captured on Aug., 14\textsuperscript{th}, 2009. The value represents the total number of requests to the page over the past 30 days, divided by 30 to give daily average.

<table>
<thead>
<tr>
<th>Page</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>default.aspx</td>
<td>0.53</td>
</tr>
<tr>
<td>shared documents/forms/resources.aspx</td>
<td>0.27</td>
</tr>
<tr>
<td>supporting materials/forms/short.aspx</td>
<td>0.07</td>
</tr>
<tr>
<td>shared documents/swap_1page_excerpt.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/task_library_zhao.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/zemfiraizeynalovaazarswap0422 2009.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>supporting materials/etanol_bbc.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1.htm</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1.swf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1_fullmotion7.swf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1_fullmotion8.swf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1_fullmotion9.swf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1_skin.swf</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Table K. Top referring page captured on Aug., 14\textsuperscript{th}, 2009. The value represents the total number of times the URL was a referring page over the past 30 days, divided by 30 to give daily average.

<table>
<thead>
<tr>
<th>Top referring page description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>web administration</td>
<td>0.20</td>
</tr>
<tr>
<td>FD homepage</td>
<td>0.07</td>
</tr>
<tr>
<td>Foreign Language Activity Swap page</td>
<td>0.03</td>
</tr>
<tr>
<td>Video Library page</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Table L. Top destination page captured on Aug., 14th, 2009. Destination URL of the page that a user navigated to from the Teacher Resource site. Requests value represents the total number of times this URL was a destination page over the past 30 days.

<table>
<thead>
<tr>
<th>Destination</th>
<th>Requests</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/forms/resources.aspx">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/forms/resources.aspx</a></td>
<td>6</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/default.aspx">https://portal.monterey.army.mil/org/FacultyDev/tr/default.aspx</a></td>
<td>4</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/forms/short.aspx">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/forms/short.aspx</a></td>
<td>2</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.html">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.html</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.fulimotion7.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.fulimotion7.swf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fulimotion8.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fulimotion8.swf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fulimotion9.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fulimotion9.swf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_skin.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_skin.swf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/swap_1page_excerpt.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/swap_1page_excerpt.pdf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/task_library_zhao.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/task_library_zhao.pdf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/zemfirazeynalovaazarswap04222009.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/zemfirazeynalovaazarswap04222009.pdf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/etanol_bbc.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/etanol_bbc.pdf</a></td>
<td>1</td>
</tr>
</tbody>
</table>
Table M. Top page requests captured on Sep., 9th, 2009. The value represents the total number of requests to the page over the past 30 days, divided by 30 to give the daily average.

<table>
<thead>
<tr>
<th>Page</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>default.aspx</td>
<td>1.37</td>
</tr>
<tr>
<td>shared documents/forms/resources.aspx</td>
<td>0.10</td>
</tr>
<tr>
<td>shared documents/zemfirazeynalovaazarswap04222009.pdf</td>
<td>0.07</td>
</tr>
<tr>
<td>shared documents/1+2_rc.pdf</td>
<td>0.07</td>
</tr>
<tr>
<td>shared documents/nov07.pdf</td>
<td>0.07</td>
</tr>
<tr>
<td>shared documents/sw071608.pdf</td>
<td>0.07</td>
</tr>
<tr>
<td>shared documents/swap_1page_excerpt.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/swap_proposal.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/tasklist.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/22+_lc.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/ddaoud.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/eunah.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1.htm</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1.swf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1_fullmotion7.swf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1_fullmotion8.swf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1_fullmotion9.swf</td>
<td>0.03</td>
</tr>
<tr>
<td>help/lp1_skin.swf</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/06 understand direction.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>supporting materials/04_22_swap_map_exercise.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>supporting materials/aggio.mp3</td>
<td>0.03</td>
</tr>
<tr>
<td>supporting materials/airplanecrashinindonesiatmc.mp4</td>
<td>0.03</td>
</tr>
<tr>
<td>supporting materials/audi.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>supporting materials/bagu.avi</td>
<td>0.03</td>
</tr>
<tr>
<td>supporting materials/bda.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>supporting materials/bio_lecture_swap.pdf</td>
<td>0.03</td>
</tr>
<tr>
<td>supporting materials/bo08.ppt</td>
<td>0.03</td>
</tr>
<tr>
<td>supporting materials/forms/short.aspx</td>
<td>0.03</td>
</tr>
<tr>
<td>shared documents/hazemjune.pdf</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Table N. Top referring page captured on Sep., 9th, 2009. The value represents the total number of times the URL was a referring page over the past 30 days, divided by 30 to give the daily average.

<table>
<thead>
<tr>
<th>Top referring page description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FD Home page</td>
<td>0.33</td>
</tr>
<tr>
<td>Teacher Resource Lesson Plan Library</td>
<td>0.33</td>
</tr>
<tr>
<td>FD Activity Swap Home page</td>
<td>0.17</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.07</td>
</tr>
<tr>
<td>FD Bridges Home page</td>
<td>0.07</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.07</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>Web Administration</td>
<td>0.03</td>
</tr>
<tr>
<td>FD Public File Library</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Table O. Top destination page captured on Sep., 9th, 2009. Destination URL of the page that a user navigated to from the Teacher Resource site. Requests value represents the total number of times this URL was a destination page over the past 30 days.

<table>
<thead>
<tr>
<th>Destination</th>
<th>Requests</th>
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</thead>
<tbody>
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<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/default.asp">https://portal.monterey.army.mil/org/FacultyDev/tr/default.asp</a></td>
<td>12</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/forms/resources.aspx">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/forms/resources.aspx</a></td>
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</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/nov07.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/nov07.pdf</a></td>
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</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/zemfiraZeynamovazarswap04222009.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/zemfiraZeynamovazarswap04222009.pdf</a></td>
<td>2</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/04_22_swap_map_exercise.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/04_22_swap_map_exercise.pdf</a></td>
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</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/aggio.mp3">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/aggio.mp3</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/airplanecrashindonesiatmc.mp4">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/airplanecrashindonesiatmc.mp4</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/audi.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/audi.pdf</a></td>
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</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/bagu.avi">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/bagu.avi</a></td>
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</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/bda.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/bda.pdf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/bio_lecture_swap.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/bio_lecture_swap.pdf</a></td>
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</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/forms/short.aspx">https://portal.monterey.army.mil/org/FacultyDev/tr/supporting_materials/forms/short.aspx</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/swap_1page_excerpt.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/swap_1page_excerpt.pdf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/tasklist.pdf">https://portal.monterey.army.mil/org/FacultyDev/tr/shared_documents/tasklist.pdf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.html">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.html</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1.swf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fulImotion7.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fulImotion7.swf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fulImotion8.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fulImotion8.swf</a></td>
<td>1</td>
</tr>
<tr>
<td><a href="https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fulImotion9.swf">https://portal.monterey.army.mil/org/FacultyDev/tr/help/lp1_fulImotion9.swf</a></td>
<td>1</td>
</tr>
</tbody>
</table>
In 2015, Truckee Meadows Community College (TMCC) was awarded the Department of Labor's (DOL) American Apprenticeship Initiative Grant. This program is helping train more than 500 apprentices across Nevada, preparing them for high-skilled jobs. This project is working to ensure all employers in Nevada have access to the information and assistance they need to create registered apprenticeship programs.

Combining an education with critical on-the-job experience makes for a successful career. The concept behind apprenticeship hasn't changed over the years, but the types of industries successfully using apprenticeship to develop and build their workforce has changed drastically. There are currently over 1,000 occupations for which registered apprenticeship programs have been established across the nation. These occupations span a broad range of industry clusters. Programs include Industrial Maintenance Mechanics, CNC Machine Operators and Production Operators along with others.

To accommodate 500 apprentices in our courses and labs at TMCC, we have developed flexible scheduled ½ credit courses with the major amount of coursework online. The flexible scheduling allows for individualized instruction and each course module contains learning activities which may include reading, quizzes, written exercises, and hands-on lab activities. Students work through this learning material at their own pace with instructors providing instruction as needed.

This flexibility is helpful for these working students who have limited free-time. Videos, available to the students online and on their phones, walk the students through their lab assignments, freeing up the instructors to provide any extra help to those that need it.

Data has been gathered from Canvas, our LMS, and lab logins at TMCC, comparing the time spent in the hands-on labs and completion rates for those students that were apprentices using flexible scheduling versus those students that were not. TMCC would like to propose a poster presentation showcasing these results and our “lessons learned”.

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**Title:** Flexible Scheduled Courses and Labs for Modern Day Apprentices

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ABSTRACT:
The United States is a nation of immigrants. The U.S. has always considered itself to be “accepting” of all people from various cultures, ethnic backgrounds, races and religions, and most recently, sexual orientation. Laws have been enacted to protect the rights of individuals with severe consequences given to those who violate these laws.

Title IX (equal rights for female athletes) has celebrated over 40 years of legislative rights. Although this was a controversial legislative act passed in the 1970’s, there has been considerable progress made for female athletes being provided the same athletic facilities afforded to male athletes. Title IX’s passage has since provided many females the opportunity to complete in world and Olympic competitions.

More recently, protections have been granted to LGBTQ (Lesbian, Gay, Bisexual, Transgender, and Queer/Questioning) individuals in the United States. There has been increasing pressure on schools to ensure students who identify as LGBTQ are not harassed, intimidated or bullied. The latest issue of controversy has arisen over the “rights” of transgender students using restrooms and locker rooms of the gender with which they identify (meaning a sexually male student can
enter a female restroom or locker room and vice-versa). This has caused issues with the “rights” of straight students who use these same facilities. Several states have passed laws which allow transgender students to use whichever facility they want to use which has caused uproars in school boards, staff members, parents of t-students (transgender students) as well as parents of s-students (straight students). This chapter focuses on the current issue of gender equality in the public education system in the United States, with particular emphasis given to both sides of the debate regarding the controversy of ‘transgender students’.
Title of the submission: Defining Mathematics and Reading Literacy from existing Literature

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Abstract:

Educators in the field of mathematics should consider the definition, and impact, of literacy as it pertains to their pedagogies and classroom environments. This project represents the initial phase of researching how educators in the field of mathematics think about and define the role of literacy within their classrooms. Defining literacy is complicated as the term is used in many different ways. For example, and relevant to this context, there are reading literacy and mathematics literacy. While these literacies are often used in content-specific ways (Shanahan, 2015), in context rich situations, the need to use skills from what might be considered mathematical and reading literacies are necessary. While research exists in mathematics education around students’ struggles with word problems, specifically deficient reading and comprehension skills (Akbasli, 2016), there is less research on how to incorporate reading strategies into math classrooms to address those deficiencies. The research that exists (Doerr & Temple, 2016) suggests that it may not be worthwhile to incorporate general reading strategies in the math classroom, but that the strategies needed for students to succeed at reading in math may be an advancement of the basic reading strategies they learn. Thus, moving to content area literacy strategies. Content area literacy and its teaching has been suggested by Shanahan, T. and Shanahan, C. (2008).

The purpose of this research study (under IRB review) is to gain an understanding of literacy in terms of mathematics and reading, how they are connected, and educators’ perspectives of literacy. There are three phases to this qualitative study. The first goal in this research is to explore how these content-area literacies are defined across the literature and how typical teacher education programs for middle and secondary teachers incorporate strategies for developing content area literacy that makes connections from reading to mathematics. Second, I will analyze interview/survey data from a large urban school district on how mathematics teachers define literacy and its role in their classrooms. Lastly, the prior goals will serve to begin to map the ways that reading, and mathematics literacies overlap and how teachers could be served by understanding connections between the two.

The significance of this study is to explore how mathematics educators in a large urban school district define literacy and how those perceptions align with the current definitions from the
literature in the field. This work will expand on prior research that has been done as well as lead to future research.

Challenges of teaching research to graduate students are well-known (Fraser, Jensen & Lewis, 1993; Moore & Avant, 2008). Unsuccessful attempts to engage students in evaluation and research content partially related to difficulties in convincing students that competence in such knowledge and skills will lead to successfully securing employment and high professional performance in their future work (Harder, 2010; Fisher-Borne, Hall & Casstevens, 2014; Rubin, Valutis, & Robinson, 2010). Some successful models have emerged including those that include participatory research principles and agency-based assignments that engage students in community problems and solutions (McGill, 2012; Fabelo-Alcover, 2002; Fisher-Borne, Hall & Casstevens, 2014). The purpose of the current study is to maximize student-learning outcomes through engagement and meaning making that occurs in high stakes/high-impact evaluation projects that benefit students and communities through agencies that serve them.

Methods and Plan for Future Study: Student evaluation and program assessment data collected for all sections of course evaluation project is taught in (n=549 students over 5 years). Five years of course development and review of student evaluation, assessment data, and informal instructor feedback (4-7 course sections each year, ~18 students per section). The evaluation project assignment was modified each year based on annual feedback from students. Improvements in student feedback about feasibility, engagement, and meeting course competencies were noted but overwhelming feedback about course composition and instructor expertise were noted each year. Finally, based on the five-year review of feedback and student performance, a new Capstone project assignment was created for our graduate program. The project will be conducted through a two-semester sequence Capstone course that gives students the opportunity to integrate and apply foundational social work knowledge and skills by proposing and then conducting a meaningful field-based evaluation project. Changes from the previous assignment include structure and focus of the course, how students engage with the agencies and the scope of the projects (expanded to better-fit agency needs and student interests). Starting AY 2018-2019 a formal study of student learning outcomes, student satisfaction and agency placement satisfaction will be conducted to determine effectiveness of the Capstone project assignment.

During the Conference Presenters will explore:

- Results of incremental revisions to course over 5 years
  - Students responded well to modifications with more meaning and relevance to their field placements
- The essential components of the new Capstone project assignment, a high stakes/high-impact evaluation project that benefit students and agencies
  - Improved content on research methods and shift towards evaluation focus
  - Improved student involvement and satisfaction
- Overview of study of new Capstone assignment targeting ~300 students and field placement agencies over three years.
- Strengths and challenges of the Capstone approach
  - More relevant options for projects improved student engagement but requires much more time and faculty and program resources
- Review of creative and useful Capstone Projects being conducted by students in community agencies
Retrum, Jessica

Abstract: Title: Innovations for Improved Student Learning Through Engagement in Research Projects Focused on Community Benefits

- Examples include various program evaluations, agency policy analysis and recommendations, in-depth reviews of the literature for evidence based practice recommendations, development of curriculum of training manuals, and creation of agency resources such as social documentaries.

Implications: Students are expected to demonstrate the following: integrate foundational concepts and theoretical frameworks, conduct critical analyses and effective utilization of published research, and provide meaningful feedback based on evidence in their field placements aimed to improve practice, policy, and/or programming. Creating innovative, dynamic yet evaluation focused, research methods grounded opportunities for students can lead to highly useful products for community agencies that lead to and rich learning experiences for students.

References


Exploring of longitudinal changes and factors affecting the ICT technical support on university using latent growth curve analysis

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Abstract
Along with informatization, globalization and education becoming universal in recent years, contents of education have become complicated in higher education in Japan, diversification of academic ability of students enrolled is proceeding. Against this background, effective and efficient education is required for each higher education institution. ICT is expected to be utilized as one solution. In order to promote effective use of ICT to support learning and educational activities at higher education institutions, it is necessary to grasp the actual situation of ICT utilization, including organizational support system. Until now, the actual situation of average ICT utilization in higher education institutions has been shown from survey results. However, sufficient consideration has not been made on the secular change of how the way ICT utilization and support system within each higher education institution change along the time axis.

In recent years, analysis using longitudinal data tracking individuals and groups along time has attracted attention. The reason for this is that it is possible to compare mean values between points in time and to estimate the development trajectory of the average change more accurately, to study the development trajectory and its individual differences, to investigate the causal relationship between variables it can be examined with higher accuracy. Therefore, we tried analyzing the actual situation of ICT utilization in higher education in Japan using latent growth curve analysis model. The data of all examinations for specific higher education institutions in Japan were acquired in 2010, 2013 and 2015.

The purpose of this time is to estimate the average pattern of secular change of technical support system out of the actual situation of ICT utilization. In addition, we extracted the factors influencing the secular change of the technical support system.

Specifically, the degree of improvement of the technical support system was scored and analyzed using latent growth curve analysis model. As a result, it was found that the lower the technical support system in fiscal 2010, there was a significant dispersion in technology.

Furthermore, we investigated which factor is growing 5 years of each support system, whether it defines intercept (initial value) and slope (growth) variance of technical support
system. As a result, the lower the fulfillment level of the support system in fiscal 2010, the more the 5 year growth rate of technical support system was found to be. In addition, it became clear that the factors of the organization that are likely to influence the growth of the technical support system are "degree of reflection of effect measurement", "presence or absence of promotion organization", "presence or absence of human resources".
**ABSTRACT - Young Indigenous Women’s Circle of Leadership: Creating space for Indigenous Language, Traditions and Ceremony**

Hawaii International Conference on Education, January 5-8, 2019

1. **Title** – Young Indigenous Women’s Circle of Leadership: Creating space for Indigenous Language, Traditions and Ceremony.
2. **Topic Area** – Indigenous Education
3. **Presentation Format** – Panel Session
4. **Description of Presentation**: This panel will describe the Young Indigenous Women’s Circle of Leadership (YIWCL) program and its impacts on participants. YIWCL is an educational Cree immersion program whose objectives are to mobilize Indigenous languages and Indigenous knowledge transfer. YIWCL offers a unique pedagogical approach to Cree language immersion through traditions, ceremony, and knowledge. Furthermore, it is our hope that such pedagogies and program development ideas will inform Indigenous education and language policies currently under development in Canada and beyond.

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Purpose

The purpose of this presentation is to describe and discuss the Young Indigenous Women’s Circle of Leadership (YIWCL) program, its impact on participants, and how we see YIWCL as a potential model for language and cultural retention efforts in schools and communities. YIWCL is an educational Cree immersion program whose objective is to mobilize Indigenous languages and Indigenous knowledge transfer. We believe that this program demonstrates promising practices for Indigenous language policy, Indigenous language educators and communities.

Background

The Young Indigenous Women’s Circle of Leadership (YIWCL) program is an 8-day immersion program held during the summer. YIWCL is a local group that is housed within the University of Alberta and has been in existence for 10 years. YIWCL also provides weekend “call back” sessions 3-4 times throughout the year to maintain relationships, and to continue to provide access to language, traditions, and ceremony. This yearly program supports the survival of Indigenous languages, identity and traditional teachings through language, traditions, ceremony, mentorship and relationality.

The Cree language is at the center of YIWCL, and is taught by fluent Cree language speakers, traditional knowledge holders and Elders. The traditional teachings, and Indigenous knowledge shared with the young women is centered on a Cree world view. Participants learn the traditional value of women and that knowledge influences their understanding of identity, traditional leadership, kinship, ceremony, and connection to the land.

Offering the YIWCL Cree immersion programming to young women ages 10-16 has impacted the participants in the following ways:

- Language exposure and acquisition
- Relationality
- Access to Indigenous knowledge
- Access to Elders
- Access to traditional ceremonies
- Experience traditional teaching styles
- Identity strength

Framework
ABSTRACT - Young Indigenous Women’s Circle of Leadership: Creating space for Indigenous Language, Traditions and Ceremony

In designing the program, an Indigenous Research Methodology (IRM) is used as a framework to guide the YIWCL team so as to ensure:

1) The program is centered on Indigenous ways of knowing and being.
2) The program is beneficial to Indigenous communities
3) The team and the program are accountable to Indigenous communities in four ways: mobilization, decolonization, healing and transformation.

Data sources

We have documented the YIWCL program with video recording, photographs, field notes and reflections from the participants. The youth, the Cree teachers, an Elder, and the women who lead the program have been included in providing their perspectives of their experience. They each reflect on the past years of programming to share their pedagogical approaches for this Cree immersion leadership group.

The analytical methods used are that of re-membering (Tengan, 2008), which involves the reunification of elements of Indigenous culture and society that has been dis-membered through the colonial process. Re-membering Indigenous language, knowledge and practices brings forward the stories and ways of our ancestors, and allows this knowledge and wisdom space in our contemporary realities.

Educational importance

This program offers a practical way to undergo traditional pedagogical teaching styles and will benefit the field of Indigenous language instruction, Indigenous education, curriculum, pedagogy and policy. YIWCL is a unique program which can offer practical ways in which to immerse youth in language and culture, to work with community, to work from an Indigenous epistemology, and to inform policy in the area of Indigenous education. The reclaiming of Indigenous pedagogies is central to this work.

References

Abstract

The Multiple Intelligences of iTaukei Students in University of Fiji: Basis for Instructional Strategies

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Teaching in the 21st century is challenging and more complex. It is a fact that man has the potential for complex learning but the rate of learning differs for different individuals. The millennial students have different preferences of learning styles and often do research online to answer their queries. Understanding the complexity of individual differences can help the teacher develop an appropriate strategy to enhance teaching and learning. It is the role of the teacher to provide an opportunity for every student to learn in different ways. Learning involves both academic subjects and the development of emotions, social interaction and even personality. This paper will determine the multiple intelligences
of the iTaukei students at the University of Fiji. The purpose of the research is to find out the Multiple Intelligences of the 20 iTaukei respondents using Howard Gardner's Model. A descriptive survey method will be utilized in this research. Student respondents will be randomly chosen from the University of Fiji. The findings of the study can be used by the Fijian teachers as basis for improving the instructional strategies in the classroom to promote lifelong learning. This research will have a strong implication on teaching and learning in the Pacific perspective. The outcome of this research paper would be of great help to the iTaukei students in order for the teachers to design an instructional activity that will suit the intelligences of the students.

KEYWORDS: INSTRUCTION; LEARNING; MULTIPLE INTELLIGENCE; STRATEGIES
Education Professors at The University of Virginia created a Mentor Training Program for teachers who supervise intern teachers. The “Clinical Training” is currently funded by Virginia’s Department of Education. The goals are for the professors, classroom mentor teachers, and interns to understand the role and duties of all involved parties.

A review of literature relating to the supervision of interns and new teachers revealed the evolution of the process. In the colonial period (1600s through 1900s), laymen and citizen’s committees did educational supervision. The approach was inspection for the sake of control (Marks, E., Stoops, and J. Stoops, 1971).

In 1647 when the Massachusetts General Court passed a law requiring towns to establish schools, the idea behind educational supervision changed. There was a need to hire good teachers (Marks et al., 1971). Inspectors were hired to examine teachers for proficiency. The inspectors were “less interested in improving a deficient teacher than in dismissing him” (Lucio and McNeil, 1969, p. 4). The period of 1876-1936 was called “Efficiency Orientation” (Eye and Netzer, 1965, p. 6). Emphasis was placed on teaching procedures due to the influence of business approaches. Teachers were told what to do and how to teach.

Supervision methods went through several changes before the 1950s. Morris Cogan and his associates developed clinical supervision (Cogan, 1973). Clinical supervision evolved over the years. Different versions of clinical supervision were used through out the United States. As supervision evolved over the years, administrators choose parts and pieces that fit their needs. Basically, the Education Faculty at The University of Virginia’s College at Wise has adopted parts of clinical supervision. In the clinical training, emphasis is placed on conferencing and feedback for the intern teachers. Mentors are encouraged to look at the interns as beginning teachers, not as polished educators.

References


Next Level Study Abroad: *Glocal* Engagement in Project-Based Learning
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The term *Glocal*, an English portmanteau popular in Japan, implores one to “think global” and “act local.” This mentality is seen as the best solution for small, rural communities to interface with the global community to both offer and take away concepts and customs that can lead to local betterment. Over the past decade, Hirosaki University and local Hirosaki businesses have been supporting project-based learning projects (PBL), with travel grants that celebrate *glocal* themes, as part of the area’s growing emphasis on regional studies.

Hirosaki University is located in Aomori, the northernmost prefecture of the main, Honshu, island of Japan. The local bank in Aomori is called “Michinoku,” which translates as “end of the road.” In Japanese culture, Aomori is considered the quintessential example of a remote area. Even in Aomori, Aomori City, with a population of approximately 287,000 is considered the business center, making the academic castle town of Hirosaki, with 177,000, seem even more “end of the road,” than its neighbor city.

Already part of the most isolated U.S. state, the Island of Hawaii, Hawaii County, also known as “the Big Island,” is the furthest population from the state capital, Honolulu. While Kona is host to a greater number of tourists, the county seat is Hilo, so much of the local government is controlled by the other side of Hawaii Island.

Besides being “remote,” Kona and Hirosaki have other qualities in common. They are both strongly agriculture-driven communities. In Hirosaki the best-known commodity is apples. In Kona, the most lauded product is coffee. Kona itself has a strong connection to Japan through its Japanese-American community. In fact, coffee was first cultivated in Kona by Japanese-American farmers who had escaped from the quasi-indentured slavery of the Hawaii sugar business. Japanese
immigrants were even known to utilize coffee blossoms for the traditional flower-viewing that is usually done amongst cherry trees in Japan.

For two consecutive academic years, the author has been in charge of small PBL groups from Hirosaki University engaging with residents of her hometown, Kona, Hawaii, in a *glocal* manner, through preparation, correspondence and an approximately ten-day trip. The programs have focused on exchanging ideas concerning infrastructure, wellness and longevity strategies to improve both Aomori and Hawaii lifestyles. After completing the September 2017 program, the goals and parameters were tightened and the study and research period increased to ameliorate outcomes. Adding a six-month preparation course for the upcoming February 2019 project has helped empower students to be organizers, rather than simply participants, upping the stakes.

The student financial contribution to a $3000+ trip has been limited to plus-minus (±) $525. Hence, the student responsibility to demonstrate meaningful outcomes to supporters has been part of the impetus for the instructor to insist that participants “pay it forward.”

The September 2017 (PBL 2017-18) group was comprised of five hand-picked students from four different faculties (Medicine, Health Science, Education and Engineering). They were involved in a series of pre-departure preparatory and English language seminars. Learners were also encouraged to make daily use of an online English Course (English Central), provided to them courtesy of the English Lounge (EL), the language center to which the instructor is affiliated. Students were also directed to research aspects of infrastructure in Aomori and compare and contrast it with systems in Hawaii. The course also included extensive use of outside of class assignments, a flipped classroom concept (Berman, 2016), utilizing the learning management system, Moodle.

Although PBL 2017-18 was not a typical cultural competence based study abroad program, students were immersed in local culture in Kona, an example of which is the *oli*, ceremonious welcome chant, conducted at both educational institutions to welcome them when they visited. PBL 2017-18 participants were able to job-shadow at county offices, a local medical clinic, and organic farms. They received a letter of welcome and
commendation from the mayor of Hawaii Island; they picked fruit from ancient trees, swam with manta rays and had a one-on-one impromptu information session with a geological chemist at Hawaii Volcanoes National Park Observatory just six months before the recent, devastating eruptions of Kilauea and destruction of the facility. The wealth of experiences was beyond the instructor’s initial forecast. The students had a grueling, action-packed schedule. Accordingly, the English abilities of the participants were pushed and stretched at every turn.

Upon return to Japan, the group provided a service for the Hirosaki University student body by giving English presentations on November 22, 2017 (Fig. 1) on what they had discovered. Following their academic presentations, the group hosted a version of the Family Feud gameshow (Brooks, et al. 2009), basically a survey quiz, which was based on the data resulting from original questions they had asked people in Kona. With the data they had amassed, they created a game using a PowerPoint template (Powell, 2004) to play (example, Fig. 2) that two teams of students in attendance were able to play that evening.
The PBL 2017-18 Group also gave an official account of their trip in Japanese at a ceremony of dignitaries from the university, the Hirosaki mayor’s office and various local businesses. While PBL 2017-18 was a successful, once-in-a-lifetime experience for the participating students, upon reflection, student involvement still seemed somewhat passive in the instructor’s view. Experiential learning has many merits that defy quantification, but the instructor wanted to create an experience that would involve more forethought and be even more dynamic the second time around.

The instructor analyzed all the weak and strong points of PBL 2017-18 and designed and submitted a second project for consideration. As EL faculty, the instructor is under the auspices of the Center for Liberal Arts & Practices: Institute for the Promotion of Higher Education, which is part of the Liberal Arts administrative division, rather than a faculty. It is highly unusual for such an instructor to win a PBL grant. Consequently, the instructor was told by many that lightning would not strike twice in the same place. Defying the odds, the instructor received another grant, to be fulfilled at the end of the
current school year (February, 2019). This time around, an additional instructor, Megumi Tada, a Hirosaki native, has been included in the program and the group has increased from five to six participants.

PBL 2018-19 is still in the research and organizing phase. Students were informed about the new project in June 2018 and the final group was chosen on July 20, 2018. While PBL 2017-18 focused on community infrastructure, PBL 2018-19 is zeroing in on “wellness” and longevity, with the official title: “Giving Community Wellness an Injection of Glocal Experience.”

Aomori Prefecture has the shortest lifespan of all the prefectures of Japan. Hawaii has the longest lifespan of all the states in the U.S. Aomori has made large strides in field medicine, for example. Hawaii Island is very isolated and could benefit from additional information about field medicine. There is much for the two areas to exchange on these fronts.

PBL 2018-19 has the added benefit of a six-month preparation course that students take for university credit. Students also have significant time to work on their English both inside and out of class. The goal is to have students prepare and organize multiple events. They have already begun extensive research on the Hawaii Ocean Science & Technology Park administered by Natural Energy Laboratory of Hawaii Authority (NELHA). They have also started various local research projects and will continue that throughout the fall semester. Students from the 2017-2018 Group are scheduled speak to the class in November. Students have had one short video conference with Alice Bratton, social worker at the Hawaii County Office of Aging (Kona). In the coming months, they will interact through video conferences with some of the other people they will work with in Hawaii.

During their stay in Hawaii, they will organize and present at two mini fair/educational seminars on topics related to health and wellness, field medicine, sustainable agriculture, sustainable energy and plant-based diets for Kona residents. Upon return to Hirosaki, there will be 1) a long event in English sharing research and information with Hirosaki University English that will include a new version of Family Feud at the EL, 2) a mini health fair event for the local community, in conjunction with continuing education activities, that is bilingual on the
Hirosaki Medical/Health Sciences campus, and 3) a formal event for the dignitaries sponsoring the glocal PBL programs, usually held at a hotel, in Japanese.

It is hoped is that an increase in local research, the official university course and additional reflection time while in Hawaii will make the 2018-2019 Hawaii Glocal PBL even more meaningful for everyone involved. The instructor wishes to use the opportunity of the 17th Annual Hawaii International Conference on Education, HICE 2019, to share this information with participants and elicit feedback and suggestions prior to the final few classes and the actual fulfillment of the project, which occurs in February 2019.


English Central
Retrieved from https://ja.englishcentral.com/videos

Moodle
Retrieved from https://moodle.org/

Powell, Reid (2004) Family Feud game template
Retrieved from https://www.youthdownloads.com/games/family-fued-powerpoint
Development of a System to Support Learning by Video Annotation on Portable Mobile Device and Verification of a Function to Support Reflection Activities

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Abstract: Among information and communication technologies (ICT), video annotation is currently used for presentation rehearsal and micro teaching in higher education. Most university students have smartphones or other portable mobile devices, so they can be incorporated in support of learning in higher education with video annotation. For university students who study peer review online, it is preferred to support the use of video annotations for learning on portable mobile devices, which have limited screen size and input interfaces. Kurata (2017) developed a system to support learning through peer review, using video annotation on portable mobile devices. Functions that enable annotation activities were validated through experimental practice. However, this function that enable reflection activities has not yet been verified. This study developed a system (VOVAM: visual online video annotation for mobile devices) that supports video annotation on portable mobile devices for education of non face to face. And we verify a function (marker overlap playback function) that enable reflection activities. The function that support reflection plays back markers and displays multiple markers overlapping. This function makes it possible to visualize video annotation from others at the same time as video playback, even on small screens of portable mobile devices. The aim of this function is to realize a visually easy to understand reflection activities for learners to reflect. We examined the visibility of the marker overlap playback function enabling reflection activities by using video annotation in VOVAM. The survey was a questionnaire with responses on a four-point likert scale and free description. There were 16 participants who conducted the simulated practice. The items were “easy to understand the timing of the evaluation,” “easy to understand the target position of the evaluation,” “visibility of the video screen,” “understanding correspondence between the marker and the comment by text,” and “easy to understand category of the marker.” As a result, it was a positive subjective evaluation in all items. We found that the marker overlap playback function assisted learners to visually understand during reflection activities, even where the markers from evaluators were displayed on portable mobile devices.

Keywords: Video Annotation, peer review, mobile learning, system development,
1. Introduction

Currently, small size of the mobile devices such as smartphones (portable mobile devices) has become widespread, and the importance of mobile learning in higher education has increased (Sarrab 2016). Mobile learning is a part of e-learning (Georgiev 2004), and it is a learning that assumes that the learners are constantly moving. Therefore, learners can learn anytime and anywhere. On the other hand, it is required interfaces that enable easy and sustainable learning (Sharples 2002).

It is said that video annotation tools are important in the education field (Peter 2009, Chuanxue 2016). The video annotation tool is a technology that makes it possible to scaffold for reflection in performance activities by using annotation information on the video (video annotation) (Peter 2009). Currently, there are system development studies that can realize effective learning by using video annotation for peer review of learners (Christo 2015, Chuanxue 2014).

Video annotation by only text is not appropriated for accurately indicating points to be pointed out. Therefore, there are system development studies to support peer review using visual video annotation. For example, there is a system development studies that visualizes the intention of a character by making a balloon on the screen (Ogawa 2011). This system made it possible for teachers with little experience to be conscious of action factors. There is a system development research that visually indicating points to be pointed out by specifying the target position on the video image by the figure (Yamamoto 2007). This system made it possible to annotate overlookable parts on the video. There is a system development study that realize video annotation by handwriting and enable detailed observation and discussion (Hori 2008). This system made it possible to reflect efficiently by showing the pointed part in detail on the video.

Simplicity is important when learners use video annotation in education and learning situations (Okawa 2016). In addition, when learners perform use visual video annotation on portable mobile devices, they cannot perform detailed operations because they operate small screens with their fingers. For this reason, it is important to make video annotation easier in portable mobile devices. Therefore, there are several issues when learners use systems about their previous researches on portable mobile devices. For example, the video annotation in balloons and figures is premised on operation with a mouse, and text comments are entered in balloons or figures. Therefore, operability and visibility are not good on portable mobile devices. In addition, the video annotation of handwriting requires a margin outside the video screen. Therefore, it is difficult to set space for handwriting on the screen of the portable mobile devices. From these, it is required a system that supports visual video annotation for peer review on portable mobile devices with limited screen size and input interface. However, such a system does not currently exist. If such a system can be effectively utilized in learning situations, for example, micro teaching or presentation rehearsals in peer review, it is possible to conduct peer review by using portable mobile devices anytime and anywhere. With this, many opinions necessary for reviewing are shared even if learners do not face each other. This merit makes it possible to notice the point of view not noticed by self-rehearsals alone and
contribute to the learner's performance. For that purpose, the authors developed a video annotation system (VOVAM: Visual Online Video Annotation for Mobile-Devices) that can be used in portable mobile devices utilized for self-rehearsals such as micro teaching and presentation rehearsal. The flow of self-rehearsal utilizing VOVAM shown in Fig.1. In this learning, learners have a role to demonstrate self-rehearsal (presenter) and a role to view and evaluate rehearsals of others (viewer). Then, learners conduct peer review while switching roles to each other. This system mainly supports the annotation activities and the reflection activities as shown in Fig.1. Kurata (2017) verified the functions to support the annotation activity. However, the function to support reflection activities has not been verified yet.

The purpose of this research is to propose a function to support the reflection activities in self-rehearsal on portable mobile devices. The method of this research is to verify about visually easy-to-understand of the function to support the reflection activities on portable mobile devices.

2. VOVAM

2.1. Overview

The system design of VOVAM is shown in Fig.2. Main functions of VOVAM supports two activities to realize learning using video annotation on portable mobile devices. The first is the activity that the evaluator reviews using the video annotation (annotation activity). In order to support that activity, we implemented a marker preset function and a D&D annotation function. The marker preset function always displays the video annotation limited to contents necessary for peer review as a marker. The D&D annotation function can easily input the review target position and timing by dragging and dropping the marker onto the video screen. Secondly, the presenters reflect own activities by watching the video while confirming the reviews of the evaluators (reflection activities). In order to support that activities, we implemented a function to display markers and comments from evaluators on the video screen during playback (marker overlap playback function).

When the learner logs in to VOVAM, the learner can select either video sharing activities, annotation activities, and reflection activities as shown in Fig.2. In the video sharing activities, the presenter uploads the video file that recorded the activity of the presenter, and saves the file in the storage on the server side.
of VOVAM. In annotation activities, the evaluator evaluates the contents of the presenter's video by reviewing the video using video annotation. In reflection activities, the presenter reflects on the content of own performance by making sure the evaluation contents from some evaluators while watching their own video.

2.2. Marker preset function

The marker preset function shown in Fig.3. The marker preset function supports the evaluators review by using video annotation on a portable mobile device while being organizing and being conscious of the type of evaluation. Therefore, this function has a feature of presetting markers (markers) which illustrate the types of evaluation of video annotation on the screen of the portable mobile devices and always presenting them. Hori (2008) reported the effectiveness of organizing evaluation by presetting multiple evaluation viewpoints on the screen in each type of evaluation such as good point or improve point. In this study, since the screen size of the portable mobile devices is small, we implemented markers consisting only of evaluation types in VOVAM. Markers were classified into three types based on classification of evaluation contents in online evaluation (Kurata 2015). The contents of the marker are praise / agreement (praise), opinion / pointed out / suggestion (opinion), question / difficult to understand (question) as shown in Fig.3. The size of the marker was about the size of the home button of iPod Touch which is portable mobile devices. By the way, markers are used not only for annotation activities but also for notifying presenters in reflection activities. Therefore, in order to make it easier for the student to understand, each color of the marker was set to a different color, and the design was made to be easy to understand intuitively.

2.3. D&D annotation function

The D&D annotation function shown in Fig.4. The D&D annotation function supports easy input of target position and timing. There are two main features for that. This first feature is an evaluation method in which markers are dragged and dropped onto the screen of the video being played back. In peer review, when the evaluator informs the presenter the target position, text comments have been used traditionally. However, the screen size of the portable mobile devices is small. Therefore, it is not good to have a long...
sentence by including the target position in the text comments. It has also been reported how to inform the target position by operating the mouse on the video screen (the portable mobile terminal is a tap). However, when tapping on the portable mobile devices, the target position is hidden by the tapping finger, so it is difficult to accurately inform the correct target position. Also, it may be difficult to tap in one-handed operation. Therefore, we implemented a D&D annotation function that enables simple and accurate video annotation with the portable mobile devices. This function supports peer review by evaluating by dragging and dropping the marker on the target position of the video screen. If this function is utilized, we thought that the evaluator could easily and accurately inform the target position even with the portable mobile devices. This is because the evaluator can drag and drop while visually checking the marker while dragging. In addition, we thought that the evaluators can inform the target position simply by dragging and dropping the marker without having to include the content on the target position in the comment explicitly. After the marker is dropped on the video screen, a window that can be commented with text is displayed as in Fig.4. In this window, the evaluator can comment by text using either the soft keyboard or speech recognition while confirming the target position.

The second feature is to pause the video when the evaluators touched the markers with their fingers. This feature supports that the evaluators can annotate at appropriate timing. Because there is time to delay from the action the evaluator touches the marker to the action the evaluator drops the marker on the video screen.

There are some ideas on annotation activities using the D&D annotation function. In order to evaluate the sound of the video, the drop part of the marker for the sound (presenter’s voice) was set on the screen of the system. When the annotation activity is over, the evaluator moves to the confirmation screen for the final check. On the confirmation screen, the evaluator can check all the annotation information in the annotation activity, modify the comment, etc. After the evaluator makes the final check, the annotation information is transmitted to the server.

2.4. Marker overlap playback function

The marker overlap playback function shown in Fig.5. The marker overlap playback function supports the effective reflection activities of the presenter on portable mobile devices. There are two main features for that. The first feature is to display the marker by overlapping it on the video screen in synchronization with the target position and the timing annotated by the evaluators while the video playbacks. From this, the video annotation from the evaluators is visually

![Fig.5 Description of the marker overlap playback function](image-url)
displayed in an easy-to-understand. In addition, the presenter can also check the video of the overlapping part with the marker by making the marker translucent. The second feature is to display comments under the video screen in synchronization with the marker display during video playback. Serial numbers are displayed in circles of markers and at the beginning of text comments to correspond markers and comments.

There are some ideas on reflection activities using the marker overlap playback function. We implemented a skip button to search and display the marker scene during video playback. We implemented the marker gradually from transparency to translucent in 3 seconds according to the timing when the evaluator annotated. The reason for displaying the marker for 3 seconds is that when the marker is displayed for a short time, the evaluation information hides before the presenter can understand the contents. This function aggregates and displays evaluation contents from all of the evaluators. Therefore, markers may be overlapped and displayed as shown in Fig.5.

2.5. Screen layout

Screen layout of VOVAM shown in Fig.6. We designed the VOVAM screen according to the vertical screen of the portable mobile devices. Because, we also assumed a learning scene in which the learners operate while keeping the portable mobile device vertically and holding it with one hand while the learner is moving.
In the annotation activity, there is a video screen in the center of the screen, and markers are always displayed at the bottom of the screen. From this, the evaluators can always be conscious to the marker and can use the marker at any time. At the bottom of the markers, there are parts for controlling video playback (search bar, play / pause button, button to skip video every 15 seconds). And, the drop part of the marker for the sound (presenter’s voice) has been set on the screen at any time. Furthermore, at the top of the screen, there are a video playback time, a button to return to the top screen, and a button to move to the confirmation screen as shown in Fig.6.

In the reflection activities, there is a video screen in the center of screen, and text comments from the evaluators is displayed at the bottom of the screen. There is no illustration in the circle of the marker displayed in the reflection activity. Therefore, explanation about the type of marker is always presented under the area of comment. At the bottom of the area of comments, there are parts that control video playback (Search bar, play / pause button, button to skip to the timing of the marker display timing). At the top of the screen, there are video playback time and a button to return to the top screen as shown in Fig.6.

3. Verification of the function

3.1. Aim of the survey

The aim of this survey is to investigate the ease to understanding and the visibility of the marker overlap playback function. Therefore, we investigated the two features of overlapped display playback function. The first feature is to overlap and display the marker at the timing evaluated from the evaluators during video playback. The second feature is to display comments by text synchronized when markers are displayed.

3.2. Procedure of the survey

After the experimental guidance to the participates, we carried out the practice that the participate experienced the marker overlap playback function using VOVAM. The video used in the survey is two sample videos prepared in advance. After the experiment, we conducted a paper questionnaire survey.

3.3. Condition of the survey

Contents of the questionnaire shown in Table.1. We investigated visually easy-to-understand of this function in order to achieve the aim of the survey. The first one is about evaluation timing (timing). The second one is about the evaluation target position (target position). The third one is about the video visibility when displaying the marker (video visibility). The fourth one is the correspondence between marker and comment (marker and text). The fifth one is about distinguishing categories of markers (categories of
markers). However, the impression that the presenter feels may change in the display situation of the markers. Therefore, we investigated each of two types of scenes where only one marker is displayed (single marker) and scenes where markers are displayed in duplicate (overlapping markers). There are no scenes where more than two markers are displayed simultaneously. For this reason, this questionnaire item is ten.

We conducted the questionnaire survey based on a four-point likert scale (4=Strongly Agree, 3=Agree, 2=Disagree, 1=Strongly Disagree). In addition, we added a free description column to the questionnaire sheet and investigated the feedback about using the marker overlap playback function.

The participates were 16 students from the 3rd and 4th grade teacher training universities. The equipment used is the portable mobile devices with iOS installed. The sample video and the evaluation contents concerned the oral presentation for the graduation thesis, and the authors prepared in advance. Therefore, the video used for the experiment is not the video created by the participate. Because the aim of this survey is to verify the marker overlap playback function, so we should set the experimental conditions of each participate including the contents of the video the same. The sample videos are the presentation format movie consist of slides and audio.

### 4. Results and Discussion

Survey result of consciousness on features of marker overlap playback function shown in Table.2. Number of valid responses is 16.
We analyzed the results of investigating about "timing". As a result, Number of strongly agree was 11, Number of agree was 5, number of disagree was 0, number of strongly disagree was 0 in the scene of single marker. Number of strongly agree was 7, Number of agree was 9, number of disagree was 0, number of strongly disagree was 0 in the scene of overlapping markers. We classified strongly agree and agree as positive, disagree and strongly disagree as negative, and analyzed the data with a binomial test (two-tailed test). As a result, the number of participates with positive opinions was high score compared to the number of participates who have negative opinions on both scenes (Single marker: p=0.00, overlapping markers: p=0.00). From the above, it can be said that the evaluation timing was visually easy to understand.

We analyzed the results of investigating about "target position". As a result, Number of strongly agree was 6, Number of agree was 10, number of disagree was 0, number of strongly disagree was 0 in the scene of single marker. Number of strongly agree was 3, Number of agree was 12, number of disagree was 1, number of strongly disagree was 0 in the scene of overlapping markers. We classified strongly agree and agree as positive, disagree and strongly disagree as negative, and analyzed the data with a binomial test (two-tailed test). As a result, the number of participates with positive opinions was high score compared to the number of participates who have negative opinions on both scenes (Single marker: p=0.00, overlapping markers: p=0.00). From the above, it can be said that the target position of the evaluation was visually easy to understand.

We analyzed the results of investigating about "video visibility". As a result, Number of strongly agree was 6, Number of agree was 10, number of disagree was 0, number of strongly disagree was 0 in the scene of single marker. Number of strongly agree was 4, Number of agree was 6, number of disagree was 4, number of strongly disagree was 0 in the scene of overlapping markers. We classified strongly agree and agree as positive, disagree and strongly disagree as negative, and analyzed the data with a binomial test (two-tailed test). As a result, the number of participates with positive opinions was high score compared to

<table>
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<th>Items of questionnaire</th>
<th>No</th>
<th>Positive (n)</th>
<th>Negative (n)</th>
<th>Binomial test</th>
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</thead>
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<tr>
<td>Timing on scene of single marker</td>
<td>(1)</td>
<td>16</td>
<td>0</td>
<td>p=0.00, **</td>
</tr>
<tr>
<td>Timing on scene of overlapping markers</td>
<td>(2)</td>
<td>16</td>
<td>0</td>
<td>p=0.00, **</td>
</tr>
<tr>
<td>Target position on scene of single marker</td>
<td>(3)</td>
<td>16</td>
<td>0</td>
<td>p=0.00, **</td>
</tr>
<tr>
<td>Target position on scene of overlapping markers</td>
<td>(4)</td>
<td>15</td>
<td>1</td>
<td>p=0.00, **</td>
</tr>
<tr>
<td>Video visibility on scene of single marker</td>
<td>(5)</td>
<td>16</td>
<td>0</td>
<td>p=0.00, **</td>
</tr>
<tr>
<td>Video visibility on scene of overlapping markers</td>
<td>(6)</td>
<td>12</td>
<td>4</td>
<td>p=0.07, +</td>
</tr>
<tr>
<td>Marker and text on scene of single marker</td>
<td>(7)</td>
<td>16</td>
<td>0</td>
<td>p=0.00, **</td>
</tr>
<tr>
<td>Marker and text on scene of overlapping markers</td>
<td>(8)</td>
<td>15</td>
<td>1</td>
<td>p=0.00, **</td>
</tr>
<tr>
<td>Category of markers on scene of single marker</td>
<td>(9)</td>
<td>16</td>
<td>0</td>
<td>p=0.00, **</td>
</tr>
<tr>
<td>Category of markers on scene of overlapping markers</td>
<td>(10)</td>
<td>13</td>
<td>3</td>
<td>p=0.02, *</td>
</tr>
</tbody>
</table>
the number of participants who have negative opinions on both scenes (single marker: \( p = 0.00 \), overlapping markers: \( p = 0.07 \)). From the above, it can be said that the visibility to the video does not become extremely low due to the overlapping display of the markers. However, "When two markers overlap, the line of sight goes to the text below it. Therefore, I could not see the video image perfectly." in comments of questionnaire. From this, there was a problem that information became excessive because not only the markers but also multiple comments were displayed in the scene of overlapping markers.

We analyzed the results of investigating about "marker and text". As a result, Number of strongly agree was 11, Number of agree was 5, number of disagree was 0, number of strongly disagree was 0 in the scene of single marker. Number of strongly agree was 6, Number of agree was 9, number of disagree was 1, number of strongly disagree was 0 in the scene of overlapping markers. We classified strongly agree and agree as positive, disagree and strongly disagree as negative, and analyzed the data with a binomial test (two-tailed test). As a result, the number of participants with positive opinions was high score compared to the number of participants who have negative opinions on both scenes (Single marker: \( p = 0.00 \), overlapping markers: \( p = 0.00 \)). From the above, it can be said that it is visually easy to understand and correspond to markers and comments displayed at the same time.

We analyzed the results of investigating about "categories of markers". As a result, Number of strongly agree was 6, Number of agree was 10, number of disagree was 0, number of strongly disagree was 0 in the scene of single marker. Number of strongly agree was 6, Number of agree was 7, number of disagree was 3, number of strongly disagree was 0 in the scene of overlapping markers. We classified strongly agree and agree as positive, disagree and strongly disagree as negative, and analyzed the data with a binomial test (two-tailed test). As a result, the number of participants with positive opinions was high score compared to the number of participants who have negative opinions on both scenes (Single marker: \( p = 0.00 \), overlapping markers: \( p = 0.02 \)). From the above, it can be said that the category of markers is visually easy to understand.

On the other hand, there were some problems as a result of analyzing the contents of questionnaire. There was an improvement opinion on marker size. For example, there were comments about "It is easy for understand to see a circle looking big but sometimes I do not know where the marker is showing", "I do not know where I'm pointing when the marker shows a detailed place". In Addition, there was a problem that it was hard to see since numbers in the circle were displayed overlapping on the scene of overlapping markers. For example, there was a comment about "It was easy to understand because the number of which text corresponds to which marker, but it felt difficult to understand when the markers overlapped".

5. Conclusion and Future plans

In this study, we developed VOVAM which is a video annotation system for portable mobile devices. We examined whether VOVAM’s marker overlap playback function can support reflection in peer review using portable mobile devices. As a result, we have found that the following.
- In reflection activities, the evaluation timing is visually easy to understand for learners on portable mobile devices by using the function we proposed.
- In reflection activities, target position of the evaluation is visually easy to understand for learners on portable mobile devices by using the function we proposed.
- In reflection activities, the visibility to the video does not become extremely low due to the overlapping display of the markers on portable mobile devices by using the function we proposed.
- In reflection activities, correspond of markers and comments displayed is visually easy to understand for learners on portable mobile devices by using the function we proposed.
- In reflection activities, category of markers is visually easy to understand for learners on portable mobile devices by using the function we proposed.

However, in this practice, there were only scenes have one or two markers overlapping in the reflection activities. If more markers are displayed overlapping, the visibility in the reflection activities might be lowered. Therefore, it is necessary to discuss in the future to solve the problem in the case where many markers are displayed overlapped in reflection activities.

**Acknowledgements**

This work was supported by JSPS KAKENHI Grant Number JP17K14042.

**References**


ABSTRACT

Despite the recognition of the benefits of voluntarism in the United States in general terms, there is not much discussion regarding the role of voluntarism in students’ organizations in the higher education institutions, particularly how it contributes to graduate students’ professional development and academic pursuits in higher education as part of higher education institutions’ mission on commitment to students’ success and leadership. This paper addresses a case study of a voluntarism program designed for improving even more the services provided by the Graduate and Professional Student Association (GPSA) of the University of New Mexico to the graduate students’ community.

In this paper, we present a seven-component major design called here essential pillars – as they relate to the meaningfulness of service to be offered to students as well as the excellence in higher education. It is a conceptual model as a foundational program tailored for the Graduate and Professional Student Association (GPSA) of the University of New Mexico with its mission of an institution connected with the diversity of the southwest region of the United States and its international relevance as a higher education institution nationally and internationally. Through
this case study, an overview of the main essential pillars of this conceptual model is presented
and to what extend they play a role to ensure a delivery of a high quality graduate students’
experience as graduate students while they take a path to be successful in the academia for their
higher education and how challenging are for students’ to move on a path of successful human
beings and lead within their careers.

Keywords: higher education, voluntarism, student success, leadership, professional development,
academic, academia, student organization, international, conceptual model, US Southwest

Introduction

Voluntarism is a practice recognized in the world, and particularly in the United States. The
understanding of voluntarism is various as the spectrum can be revealed as feeling good
(references to be cited), civic roles (references to be cited), . All of these understanding is
revealing for the context of higher education, specifically in the public universities of Southwest.
A geographical region of diversity and contrasts that resides (have a good grasp on
characterizing the southwest region in terms of its major aspects that includes physical and
sociocultural. For being able to narrow down student population that a public university serves,
here in this paper, it is UNM, more particularly the role of a graduate student organization.
Because International education aims to prepare new generation of global citizens, preparing
students to lead is an agenda that intertwine with different catalysts at UNM, including the role of
graduate organizations for leadership and student success.

This paper highlights the database in progress that is part of the project about surveying
information in voluntarism to make a resource on this topic available to other people interested
in learning more about voluntarism in their industry for making this world a better place. Our own interest on understanding voluntarism and its value globally made the first steps of this project happen. Through the literature we will able to pinpoint the major aspects to consider when the theme is about voluntarism. Narrowing down to focused discussion on the role it plays for strengthening student success as the main goal of public universities, direction is given to address on the leadership and the pitfalls of democratic higher education institutions to serve underrepresented groups of a diverse US public universities. Also, highlighting the valuable student energetic participation in their graduate organization, such as the Graduate and Professional Student Association - GPSA. The paper is organized as follow. Section one brings a literature review for the plethora of semantics of the term voluntarism. This is
1. Title of Submission (Submission ID Number 811)
   Strategies impacting student engagement in an undergraduate science classroom through diversity in the classroom practices

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6. Abstract and full paper.

   **Abstract**

   Students actively participate in the classroom when they are interested and engaged in their learning. In a large enrollment introductory science classroom for undergraduate it becomes challenging to engage all the students during the class. Many undergraduate students enroll in a science course not out of interest, but it is a mandatory part of their program. Effective learning happens when students are included as part of the teaching process and they are not passive listeners, but they think, question, interact and try to solve problems.

   In this session we will discuss about strategies to engage students in a science course. In-class activities are an example where students are engaged, and each student need to participate to complete the activity. We will discuss our syllabus for an introductory biology course and how we have used the following tools, clicker questions, brainstorming, case studies/context-based
approaches, and team based cooperative learning in the in-class activities to promote student engagement and diversity. The in-class activities are build using the theoretical framework of scientific teaching. Scientific teaching provides methods to teach science that has been established through research and students can use it to assess their learning (Handelsman, Miller, & Pfund, 2007). Teaching science using this approach motivates students to connect with real life situations, integrate knowledge from different areas and apply it to solve problems. Prep-assignments before doing the activity in class provides necessary scaffolds for doing the activity. A classroom that welcomes a range of possibilities for students to participate, creates an environment where students with diverse intellectual, social and cultural background can succeed. It is important to include a variety of teaching methods, examples, learning style, activity and participation opportunities so that every student become part of the learning community. In-class activities when incorporate diversity enhances student engagement by stimulating their interest and interaction in the class. It helps students to perform better academically.

*Key words:* diversity, engagement, in-class activity, introductory science courses, undergraduate students.
**Introduction and Background**

Engaging students in their learning is associated with positive learning experience which motivate students to actively participate and learn (Martin, 2001; 2006). This kind of learning experience help students to connect real world context and inspire them to further learn science. American Association for the Advancement of Science (2015) emphasizes to use student-centered instruction and interactive lecture methods instead of the traditional teacher-centered classroom to engage students in their learning. Seymour and Hewitt (1997) indicated that poor science teaching is one of the important reasons why students do not pursue science majors. Glasson and Lalik (1993) advocated for active participation by both students and teachers in the process of learning science. Higher education institutes are encouraging faculty to use methods of teaching science that can engage students in doing science (American Association for the Advancement of Science, 1990) and personalize instruction to motivate students to continue to learn science (Fraser, 2015). Therefore, student engagement and instructors’ teaching approaches are crucial in helping students learn science.

The introductory biology course, Human Biology with core Physiology (BIOL 101G) is designed for students who do not intend to continue in science courses such as biology, animal sciences, nursing major, etc. This is a three-credit biology lecture course taught in a Hispanic Serving Institution at Southern New Mexico. The course goals are to make students foster biological understanding, enable their knowledge of biology to effectively communicate, make personal decisions, develop positive attitudes and take action with issues in our community (Ebert-May, Brewer & Allred, 1997). Usually large number of students enroll in this course, most of whom are from biology non-majors, who often enroll in a science course not out of interest, but it is mandatory part of their program. So, it becomes a challenge to engage these
students to learn biology (Shuster, 2014) and practice student-centered learning strategies in the
classroom (Preszler, 2006). Whole class lecture is about 50 minutes which takes place three
times a week.

Close interaction between the instructor and the students encourages students to ask
questions more comfortably, engage in interaction and in this way they become active partner in
learning (Bloom, 1984) which is a problem in a large classroom (Amstrong, Chang & Brickman,
2007). When the students are engaged through classroom activities and they become a part of the
science education community in the courses they take interest in learning science. Thus, there is
a need to transform our classroom from traditional teacher-centered to student centered
classroom which encourages students to learn by engaging them in diverse kinds of activities
(Bonner, 2004; Handelsman et al., 2004; Preszler, 2006).

High enrollment courses rely much on lectures for teaching (Handelsman et al., 2004). In
a lecture session it is not enough that students interact, but they should be able to explain the why
and how of their choices during the interaction. One way of fostering student engagement is to
make them take part in in-class activities during the full one class period or by doing mini
activities in between lecture sessions. Orzechowksi (1995) discussed about several ways to
support the transition of student from passive listeners to active participants by starting slowly
with a new concept, introducing change in the beginning and empowering students with their
learning. A learning environment which stimulate students to think and inquire and make them
feel safe to participate can engage them to interact and learn from one another.

According to Handelsman, Miller, and Pfund (2007) it is a challenge for an instructor to
consider and value every student without assumptions based on the learners’ background, ability
or performance. They argued that instructors often have expectations based on their assumptions
and it influences their instructional methods and materials. Therefore, instructors need to think, implement, reimagine the strategies and their combinations which reflects diversity in classroom practice to involve students in their learning of science (Burgstahler & Cory, 2008). In-class activities developed based on the theoretical framework of scientific teaching which includes different tools such as clickers questions, brainstorming prior knowledge, case studies and cooperative learning are used to incorporate diversity in teaching for the BIOL 101 course.

Theoretical framework: Scientific teaching

Teaching of science is important and can take place when a teacher teaches a science course, but it is imperative to remember that it should happen in a way that reveals the true nature of science. Teaching science contents and concepts stimulating interests in students to learn and become curious to explore, connect and inquire is the key in learning science. Scientific teaching provides methods to teach science that has been established through research and students can use it to assess their learning (Handelsman, Miller, & Pfund, 2007). The authors described that the process of research helps to think critically to practice with rigor and develop the attitude to experiment and be creative. Moreover, scientific teaching enables the teacher to utilize the theories and methods, and implement the appropriate approach for teaching science to the students. The approach should entail the objectives, needs, priorities, interests, preferences, assessments, and outcomes for a diverse population of students. This is true for every science classroom and especially for teaching an introductory biology course to large number of students with non-major science background. Handelsman, Miller, and Pfund (2007) discussed that scientific teaching involves the systematic way of presenting facts and information and developing concepts and skills in students through contextualization of the content. This is possible when we can use diverse instructional strategies to engage different types of learners.
They explained that for implementing a method or strategy it is important to pay attention to the students’ feedback about its effectiveness. Also, it helps instructor to practice instructional strategies that explain what they teach, supporting it with evidence and reasoning.

According to Handelsman, Miller, and Pfund (2007) the undergraduate course curriculum that emphasizes teaching information and facts needs to be redesigned with concepts, contexts and meaningful scientific experience. It will help to build the twenty first century scientific skills among the diverse population of students in the classroom who can develop their analytical skills and apply those concepts later in life. In this respect teachers play an important role by customizing the teaching learning process with scientific teaching features to help students prepare themselves for the future jobs. This is possible when students know about the objectives and outcomes and are engaged with activities that help them experience these learning outcomes.

In a large class there should be strategies to involve each student to participate in class discussion and enrich their class experience in the process of stimulating interest for learning science. One such way is through in-class activities which incorporate diverse tools to engage students to actively participate and make their learning experience meaning. Tools such as clicker questions to assess learners’ prior knowledge and encouraging students to brainstorm and explore connection between their prior knowledge and the new learning are helpful. Also, students when solve problems of case studies while working in groups they exchange ideas knowledge and perspectives with their peers which can help develop their communication and cooperative learning skills (Preszler, 2009).

Methods

This study includes the findings of two researchers who develop in-class activities based on the theoretical framework of scientific teaching and teaches biology courses at the undergraduate
level. The researchers analytically examined their activity development journals and deconstructed their collaborative conversations about the criteria of developing an activity. The researchers used autoethnography for the investigative method to recount, analyze and reflect on the strategies to incorporate diversity in their classroom practice (Chang, 2008; Cunningham & Jones, 2005; Hoppes 2014).

Data Collection and Analysis

We have used our personal data in the form of field notes collected during in-class activities, class discussion, presentation, review process and other related events as a primary source to analyze our experience. To reflect on the external data, we have analyzed the use of learning artifacts for this course, such as clicker questions, case studies used in this course, prep assignments and in-class activity worksheets. For interpreting the data, we deconstructed our collaborative conversations using our personal experience.

Tools and strategies to incorporate diversity in the classroom practice

Students can be actively engaged in constructing their knowledge by doing an activity in the classroom, and receiving feedback from instructors and peers (Handelsman, Miller, & Pfund, 2007; Smith, et al. 2005). For the undergraduate course BIOL101 we discuss the in-class activity as one such way to engage learners in the class for interaction with peers and instructor which can help them better understand the scientific concept. Students are provided with content materials based on a topic for reading before they come to the class on the day of the activity in the form of “Prep assignment”. At the start of the class, Activity Worksheets are distributing to each student in the class and students are encouraged to discuss about the prep assignment for three to five minutes. Then students answer three to six clicker questions based on the prior knowledge and the prep assignment readings. The interactive lecture session using a PowerPoint
presentation along with videos are used to discuss the activity and students answer clicker
questions which helps to assess their understanding of any new concept. Instructor discuss one or
two case studies with the whole class and then a problem is given to the students to discuss in
groups of three students. Students work in groups during the whole time but at the end submit
individual worksheet for assessment. We will discuss below how the following strategies and
tools are adopted and implemented within in-class activities to enhance student engagement
through diversity in classroom practices.

**Clicker Questions**

The clicker questions at the start of the activity is used to gauge whether students have
read and understood the concept provided to the students in the prep assignment. Answering
these questions gives an idea about learner’s prior knowledge about the concept before they start
doing the activity. During answering the question students discuss with their peers and learn
about different ways to think about the same topic and are often guided by the instructor. In this
process student-student and student-instructor interactions are promoted which also support
individualized learning (Jensen, Moore & Hatch, 2002; Preszler, Dawe, Shuster & Shuster, 2007;
Caldwell, 2007). In this system students feel free to answer questions asked in the class using
their personal clicker remote or smart phone and they can change their answer after discussion
with peers because the machine records student’s latest unique response. After students have
answered, the instructor displays the histogram showing the class response and try to understand
the different responses through reasons and arguments placed by the students in favor of their
answers. The whole class discussion enables students to gain better understanding of the concept
and they can figure out the correct answer. The instructor uses this formative assessment to get a
better understanding of which concept needs to be reviewed, which concept needs more clarity
or what needs more explanation to address student’s misconception. This kind of participation in informal small groups during class discussion are helpful for students who hesitate to speak in front of the whole class during question answer session; though students are encouraged to ask questions and share their thoughts to the whole class. This approach helps diverse kinds of learners in the classroom to think, express and exchange knowledge in a variety of ways.

**Brainstorming Prior Knowledge**

Buehl (2017) discussed brainstorming prior knowledge as a precursor to comprehension of a new topic. A key concept of the in-class activity is used by the instructor to ask a question to the students, for example students doing an activity on malnutrition are asked, “What words or thoughts come to your mind when you think about malnutrition?” Students are asked to make a list of words they can associate with malnutrition and then they share their list and work in a small group of three to four students where they refine and make one list for one group after discussion. Then each group can share one item from the list with the whole class and in this way each group will get an opportunity to share their ideas. Instructor prepares a list of those words on the white board and then the words are categorized under different headings such as nutrients, global occurrence, digestive system, disease or infection and other categories based on their responses. Again, there can be subheadings such as causative agent, immune system, familial history, behavior, treatment, number of deaths and other ideas under the heading disease. Next the association between the key concept and the categories are analyzed to find out the depth of learners’ knowledge. It also helps to address any misconception and clear confusion such as starvation and obesity whether both are malnutrition or not and are caused under what situations. Using Vaughan and Estes (1986) LINK (list, inquire, note and know) strategy during the activity helps to provide an overview of students’ collective knowledge. Also, students will be able to
evaluate how much they know about the causes, effects, and other ideas related to the main concept.

**Case Studies**

Context based learning through case study reports, or real-life scenarios are an example to extend the main learning concept to situations which stimulate students interest and they become curious to explore. Tanner and Allen (2005) discussed how case study use in teaching biology can implement the student-centered learning environment where students successfully make connections and develop new concept using their prior conceptual framework. One such example during an activity is, students watch two videos of malnutrition cases in two different parts of the world as one in an underdeveloped country and one in a developed country followed by a brief discussion by the instructor. Then students discuss the two cases, cause and effect, similarity and differences, and other factors such as community, traditions, lifestyle, agricultural productivity, economy, education and answer the critical questions related to the key concept.

These type of case studies bring diversity in the process of learning and helps in comprehending the issue based on diverse social, economic, political and cultural situations. It facilitates social and emotional connection during learning which help learners to further process the inquiry, and identify relationship between science, individual and community (Lundeberg, Levin & Harrington, 1999; Lundeberg & Yadav, 2006). The different connections established while interpreting a case study helps learners to remember better and think critically. Case studies help students to connect their experience, background knowledge, readings, and other factors for understanding a problem on a broad perspective and support their explanations with reasons and evidence.
Cooperative learning

Cooperative learning foster connectivity between students and the instructor, and create opportunities for students to recognize diverse knowledge, values and experiences. Students must understand the benefits of diversity through engagement in groups assignments where they exchange and share ideas. Students interact to discuss the problem in small groups and then synthesize their group members responses and discuss their findings with the whole class. Group problem solving is an engaging experience as they need to pay attention to each learner’s response and then formulate their group findings. Realizing the process of transition from individual way of thinking towards a group work help them learn peer facilitation, meaningful interactions and development of general learning skills (Preszler, 2009). It aids in understanding that scientific process which not only depend upon objective answers, but also requires students’ subjective analytical discussion and communication skills (National Research Council, 2003).

During in-class activity students start discussion with their peers starting with reviewing the prep assignment and then for answering the clicker questions. Students work in small groups of three to four students during brainstorming prior knowledge and discussing the critical questions of the case studies. While working in groups they explain their own findings and then summarize, compare and synthesize the whole idea. Students come to know about different kinds of examples for the same concept from their peers. Cooperative learning helps students to clear confusion and misconception as many students are thinking about one concept and interacting among themselves (Preszler, 2004). Cooperative learning is an opportunity to utilize diverse skills among a group of students which can benefit all learners in the group.

Cooperative learning fosters a sense of community among the students (Dirks & Cunningham, 2006), and help them solve critical problems. It can enhance their general learning
skills (Preszler 2009) and improve feedback between the students and instructor along with outcomes (Amstrong, Chang, & Brickman, 2007). In cooperative learning through group work students generate ideas and use creativity as each member contribute in the group (Handelsman, Miller & Pfund, 2007). Collective approach to a problem and reflecting on the reasons for their choices help them build critical thinking skills. Students active engagement in activities through group work help them build a learning community.

**Discussion**

Learning is meaningful when learners are engaged, that is they think actively, work to solve problems and enhance their learning experience through interaction during an in-class activity (National Research Council, 2000). Learning by doing activities helps students and instructors to address misconceptions, prior conceptions and newly acquired conceptions (Handelsman, Miller, & Pfund, 2007). Developing in-class activities based on scientific teaching and practicing in the classroom will aid in the process of teaching and learning with “rigorous, reflective and evaluative” components (Handelsman, Miller, and Pfund, 2007, p.3). An in-class activity when combined with diverse classroom practices motivate students to become engaged through participation in their learning in a variety of ways and become reflective learners.

Students should be motivated to understand science and apply to solve personal and social issues (Boyer Commission on Educating Undergraduates, 1998). During in-class activities students read and discuss with peers about global issues for example malnutrition in different countries of the world, and then they can compare similar issues in their community and try to think about ways to solve it. Students learn about diverse people, race, ethnicities, natural habitat, social, cultural and political activities around the world that is different from their own
experience. Moving beyond their experience helps them to think deeply, analyze critically, and solve problems innovatively.

In-class activities which incorporate diversity in classroom practices by adopting tools and strategies such as clicker questions, brainstorming prior knowledge, case studies and cooperative learning are crucial for engaging students. It focuses on a student-centered classroom which motivates students to participate, learn and become productive. It can help students to learn about the nature of science, appreciate how real-life problems can be solved with the knowledge and skills developed in the process of doing the in-class activity.

References


The Impact of a Literacy Strategies Course Taught in a Public-School Setting on Teacher candidates and Students with Emotional Behavioral Disorders.

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Abstract

This study describes the impact of a literacy strategies course taught at a local public school that involves special education teacher candidates working with students with emotional behavioral disorders (EBD) on literacy strategies that are taught in the classroom portion of the course. Within the framework of the course, participating students with EBD receive 45 minutes of small group literacy strategy instruction from special education teacher candidates each week as they implement the instructional strategies taught in the course. The teacher candidates work in pairs with groups of 2-3 students with EBD and teach literacy strategies within the context of a book that matches students' interests and reading level. The results show that EBD student participation in the reading strategies activities increased over time as relationships were formed with the teacher candidates. Data on the impact on teacher candidate growth include positive ratings on course evaluations on the school-based literacy strategies course when compared to sections of the same course taught on the college campus and the results of a questionnaire given to teacher candidates at the conclusion of the semester that show the positive impact of the course on their professional growth as well as their attitudes toward students with EBD.

*keywords*: literacy strategies, school university partnerships, emotional behavioral disorders, teacher education
The Impact of a Literacy Strategies Course Taught in a Public-School Setting on Teacher Candidates and Students with Emotional Behavioral Disorders.

School-university partnerships have been among the most frequently recommended approaches to educational reform. From the university perspective, the goal of these partnerships is to bridge the disconnect between what teacher candidates are taught in on-campus courses and what they implement in P-12 settings with students. Effective partnerships have been shown to enhance the development of pre-service teachers with strong, applied classroom experiences, and increased opportunities to work with diverse students (Price, 2005). In-service teachers benefit from increased opportunities for on-site professional development, opportunities to put research into practice, and work in settings that reduce isolation and encourage collaboration, often with experts in their field (Price, 2005). The current study describes the impact of a literacy strategies course taught at a local public school that includes special education teacher candidates working with students with emotional behavioral disorders (EBD) on literacy strategies that are taught in the classroom portion of the course. Within the framework of the course, participating students with EBD receive 45 minutes of small group literacy strategy instruction from special education teacher candidates each week as they implement the instructional strategies taught in the course. With this collaborative effort, our teacher candidates benefit from implementing the strategies covered in the course in an authentic context with students with disabilities under the direction of a teacher in the field. In addition, the P-12 students with EBD benefit from needed individualized literacy strategy instruction.

Even in the best of situations, students with emotional or behavioral disorders (EBD) can be challenging, demanding, and frustrating for teachers (Bakken, Obiakor, & Rotatori, 2012). EBD affects virtually every aspect of a students’ lives. Students with EBD traditionally have difficulty
developing and maintaining positive peer and adult interpersonal relationships as well as mastering academic skills (Farley, Torres, Wailehua & Cook, 2012; Otten & Tuttle, 2011). Academic performance has consistently been shown to be inversely related to problem behavior beginning early in a child's schooling (McEvoy & Welker, 2000) and severe problem behaviors have been found to correlate with long-term academic failure (Fleming et al., 2005). Approximately 38% of students identified as EBD have been retained by the time they reach secondary school (Wagner, Kutash, Duchnowski, Epstein & Sumi, 2005) with most 1.5 to 3 grade levels below same age peers (Coutinho, 1986). For these students, EBD will persist over time often disrupting social, academic, and community functioning (Wagner, Kutash, Duchnowski & Epstein, 2005). Students identified with EBD are consistently found to have the highest school dropout incidence rates in children and youth identified with disabilities (Reschly & Christenson, 2006).

Skills in reading and literacy serve as the fulcrum for a majority of other learning demands. However, approximately 60% of elementary/middle school children with EBD perform in the bottom quartile on reading measures with 85% making up the bottom two quartiles (Wagner et al., 2005). Conversely, students with poor reading skills are more likely to experience negative behavioral and or antisocial outcomes in the future (Good, Gruba, & Kaminski, 2001). The early identification and prevention of academic deficits, particularly in reading, may even ameliorate the development of behavioral problems. If not overcome, these deficits in literacy development, which increase over time, place students with EBD at risk of failing to learn the necessary literacy skills that are important for future success in society (Griffith, Trout, Hagaman, & Harper, 2008). Adding to the problem, most elementary age students who struggle with reading respond positively to interventions, but students with or at risk for EBD appear to profit less
from these supports (Al Otaiba & Fuchs, 2002; Benner, Nelson, Ralston, & Mooney, 2010). This unresponsiveness to literacy interventions may be the result of behaviors that interfere with learning, including inattention and child-teacher conflicts (Miles & Stipek, 2006). High quality classroom supports, particularly early in a child’s schooling may help improve reading achievement by creating more time for learning and increasing student engagement (Farley, et al., 2012; Fruth, 2014) and counteracting the effects of behavior problems.

**Statement of Purpose and Research Questions**

The purpose of this study is to investigate the effects of having teacher candidates work with students with EBD on evidence-based literacy strategies on an individualized basis on students with EBD as well as the teacher candidate’s perceptions of the impact of the course on their teacher preparation. We investigated the following research questions in our study.

1. What was the impact of the literacy strategy instruction by the teacher candidates on the reading comprehension of the students with EBD as measured by pre, medial, and post intervention curriculum-based assessments administered by the teacher candidates?

2. What is the impact of the individualized literacy strategy instruction on the academic engagement of the students with EBD as relationships are formed with the teacher candidates?

3. What is the impact of the school based literacy strategies course and working with the students with EBD on teacher candidates as measured by course evaluations and a teacher candidate questionnaire in which they describe the course’s impact?

**Participants**

The participating teacher candidates were 20 undergraduate students enrolled in a special education Literacy Strategies class. The class met for three hours one morning per week for
fifteen weeks. The weekly schedule consisted of the teacher candidates taking part in classroom literacy strategy instruction for approximately 140 minutes followed by 40 of working with students with EBD on select literacy strategies in small groups. Each small group consisted of 2 teacher candidates with 2-3 students with EBD. This configuration was chosen because the small groups could continue functioning even if a teacher candidate or a student were absent.

The participating school part of the Georgia Network of Educational and Therapeutic Supports (GNETS) program for students with severe EBD. GNETS is best described as a special school for students with EBD whose IEP has determined this setting to be their least restrictive environment. The school serves all grades. Each classroom has between 5 and 10 students and all of the students in the classroom are in the same grade level except for the high schoolers. The high school students, are provided instruction online and the classrooms consists of students from multiple grades in a computer lab setting. The participating students ranged in grade from second grade to twelfth grade and were chosen by the director of the school based upon having low reading ability.

**Materials and Procedures**

A key component to the success to the program was a strategic pairing of students with teacher candidates in order to establish a positive mentor relationship. The school director, classroom teachers, a teacher candidate who had been to the school for an internship, and the researcher constructed one on one pairings of teacher candidates and students with EBD. These parings were based upon common interests and personality traits. During the first meeting with the students with EBD, the teacher candidates carried on a conversation with their paired students in order to establish rapport and then conducted a reading interest
inventory. Based on the student reading interest inventory, reading level, and age, groups were formed and appropriate books were chosen in collaboration with the students. and establish small groups that read the same book. Examples of books that were read by the groups included *Bud Not Buddy, Goosebumps, and Diary of a Wimpy Kid* and *Junie B. Jones*. Afterward, on a weekly basis, the groups read the books in their groups or one-on-one depending on which is most successful for positive student engagement. Examples of literacy strategies that were implemented within the context of reading the books were, partner reading, paragraph shrinking, prediction relay, story mapping, questioning the author, question answer relationships, directed reading and thinking activities, the LINCS vocabulary strategy and the PATH writing strategy.

Class sessions were held in the cafeteria of the school and lasted three hours. The beginning of the class sessions were spent on literacy strategy instruction. The second portion of the class was spent in book groups preparing for the sessions with the students. The third part of the class sessions were spent working with the students with EBD reading and working on the chosen literacy strategy for the day. During the first class session, the director of the program gave the teacher candidates an orientation on how to effectively interact with students with severe EBD and how to de-escalate potential situations and what to do if a situation does occur. Curriculum based assessments on reading comprehension using *Easy CBM* were conducted with the students with EBD during the third session with the students before reading, during the eighth session before reading, and during the fourteenth session before reading. The fifteenth and final session was a celebration with food and music.
Impact on Students with EBD

During the first reading session with the students, teacher candidates conducted curriculum based assessments to determine baseline reading comprehension levels. The grade level of the CBMs were determined by their classroom teachers and individualized for each student. The initial administration of the CBMs revealed very few valid scores. The students with EBD, for the most part, did not give adequate effort determine their baseline reading comprehension. Of the twenty-four students with EBD who took the assessment, only 18 completed the assessment and teacher candidates reported that several students attempted to answer the questions without adequately reading the paragraph. The classroom teachers reported that this was a common occurrence, even when taking high stakes assessment. In addition, during the initial three weeks of reading, several students refused to participate or read. On week one, 9 students, out of the 24 participating students, refused to read with many of the students refusing to read after finding out that peers were refusing to read. This possibility of this situation occurring was talked about in class in preparation for the first reading session after the classroom. The classroom teachers alerted us of problems with getting several students to read. In these situations, we were told by the director to not escalate the non-compliance into an adversarial situation and to just read aloud to the students. During the initial two reading sessions, several students were read to while the students often had their heads on their desks. However, by the fourth reading session, all but one student with EBD read at least some of the book and all students had theirs heads up. The one remaining student who refused to participate was attempting to disrupt the reading of others so he and his partner were moved to a nearby office to read on-on one. This student still refused to read but did agree to play the “hang man” game using vocabulary from the
book with his mentor teacher candidate. This student expressed an interest in hunting so he was allowed to read from a hunting magazine for the remainder of the sessions instead of reading from a work of fiction. By the fifth session, all the students in every group were reading and participating in the strategy instruction. The second CMB administered on week 8 showed much greater effort and participation with 22 of the 24 students completing the assessment. For the remainder of the semester all students with very few exceptions, participated in the readings and activities. On the final CBM 22 out of the 23 participating students completed the CBM.

The first research question related to the impact of the literacy strategy instruction by the teacher candidates on the reading comprehension of the students with EBD as measured by curriculum-based assessments administered by the teacher candidates. With many students refusing to give their best efforts on the baseline assessment, no conclusions can be drawn relating to the increases in the CBM scores. Student scores increased significantly from the initial CBM to the medial and end CBM administrations. However, it cannot be concluded that these increases were the result of growth in reading comprehension and not the result of increased student effort. However, if the increase in CBM scores is due to increased effort, then these results provide further validation to research question two dealing with the impact of the individualized literacy strategy instruction on the academic engagement of the students with EBD. As the students with EBD established relationships with the teacher candidates, participation levels in reading, participation in literacy strategy activities and participation in CBM assessments all increased. The director of the program and the classroom teachers were amazed at the level of engagement in the literacy activities replying “that’s hard to believe, I am
thrilled” when walking down the hall and looking into classrooms of students reading with their mentor teacher candidates.

**Impact on Teacher Candidates**

Research question three relates to the impact of the school based literacy strategies course and working with the students with EBD on teacher candidates. The previous year, this same course with the same content was taught as a traditional course on the college campus and involved no interaction with students. The course the previous year was taught by a different instructor, however, the instructor was a tenured associate professor. Student course assessments are given on a five point Likert Scale with 1 = Definitely False, 2 = False, 3 = Neutral, 4 = True, and 5 = Definitely True. One prompt states: “As a result of this course, I have more positive feelings about this field of study”. The School based section average was 4.6 while the campus section averaged 3.8 and the subject average for this question was a 4.0. In addition, this section of this course was significantly higher that the subject average of 3.8 for this question. Another prompt from the course evaluation was, “Overall, I rate this course as excellent”. The school based section average was 4.6 while the campus based section was 3.3. Finally, in the course evaluation prompt, ”Overall, I rate this instructor as an excellent teacher”, the school based section average was 4.8 while the campus based section averaged 3.3. and the subject average for this question was a 3.8. The results make it clear that the teacher candidates recognized the benefit of learning and practicing the literacy strategies in an authentic context and recognized the benefit of the strategies and the benefit of working with the students with EBD at their school. In addition, at the end of the course evaluation survey, the instructor added qualitative open ended questions about the course
and the way the course was delivered. The results included one teacher candidate replying, “I was initially very worried about going out to GNETS for this class. I had heard rumors. Now I look forward to meeting with my group each week. I have really bonded with them.” Another candidate wrote, “Although it was difficult at times, we benefitted from working with students as well. It is a much different learning experience to work with actual students than just talking about strategies in a classroom. Working in a school taught us more about applying strategies than we could have learned in a college classroom.” Other comments included, “It gave us a chance to be put in the field and experience things for ourselves, It also gave us a different perspective from placement because we were with our other classmates” and “I Loved having this class at GNETS – very interactive”. The only comment that could be perceived as negative was “I think we should spend more time in the classroom with the students. There were a few times we were rushing our student, so we might not have seen his full potential”. Again, based on these results, it is clear that the teacher candidates valued the hands-on experience of working with the students with EBD and applying what they learned in the classroom portion of the class.

Lessons Learned and Next Steps

This method of instruction for teaching this class was done without any grant money or without any special material. When issues arose, such as the arrival of new students or other students being placed back in their local school, they were worked out. If a student was having a bad day and needed to be left alone, they were left alone. The biggest lesson learned by the instructor and the teacher candidates was to be patient. When the candidates reported back that the students refused to take the initial CBM and refused to read
the book, I was thinking that this was an experiment that went wrong and that we were going to claim our classroom back on campus. However, the director assured me that this behavior was typical and that they were overall very responsive even in those initial weeks of uncertainty. When all of the students started reading and participating in activities, the teacher candidates realized the importance of relationships in teaching. They also realized that the students with EBD had academic potential and that it was possible for that potential to be actualized through planning and caring.
References


Title of the submission


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◆ Abstract

This is a report on a three-year longitudinal research project sponsored by Grants-in-Aid for Scientific Research in Japan, investigating 80 beginning learners of English for three years, their ages being approximately 11 to 13. The purpose of this study was to investigate the efficacy of a “Focus on Form Approach,” an originally created method of instruction, in relation to two English post-modified structures, compared to the “Presentation-Practice-Production” (PPP, hereafter) method of instruction ordinarily carried out in Japan.

Acquisition of word order in typologically different languages (for learners whose mother tongue does not have a corresponding word order, or whose mother tongue is an
agglutinative language such as Japanese), tends to be problematic (see Heilenman and McDonald, 1993; Zobl, 2006). English and Japanese are typologically different in that the order of the verb and the object is opposite after the subject: SVO vs. SOV. Based on two preliminary studies (Takashima, et al., 2006; Takashima, et al., 2013), two post-modification structures, a noun modified with a prepositional phrase, e.g., a cat on the piano, and to-infinitive as adjectival, e.g., time to go home, were selected out of English structures that were found to be difficult for Japanese learners of English.

In order to cope with these learning problems, we decided to utilize an original way of teaching, a “Focus on Form Approach,” which combines the “Focus on Form” concept in the ESL context with the ordinary PPP approach in the EFL context, in order to make use of the best characteristics of each method. To verify its effects, the progressive learning of these structures by the same students has been observed for three years, since 2016. We measured both writing and speaking abilities, in order to examine the learners’ development of implicit as well as explicit grammatical knowledge.

In 2015, when this project was launched, a pilot study was conducted at three elementary schools and two junior high schools, all of which are public schools in different parts of Japan. Two sets of teaching materials, along with speaking tests and questionnaires, were developed, and the results were taken into account in setting up the following three-year research.

In 2016, three different public schools, each with a system of six years of continuous elementary education, were carefully chosen, in order to examine the same learners’ development with regard to the same two structures over the three-year period, from Grade 6 (the last year of elementary school), Grade 7 (the first year of junior high school), and Grade 8 (the second year of junior high school). At elementary schools in Japan at that time, 6th Graders had an “English Activity” class once a week. Since these classes focused on listening and speaking, only the speaking test and the questionnaires were used to measure their learning in this first year of the research.

In 2017, the same learners were investigated at their respective junior high schools, where English is taught as a regular subject. Thus, measurement of the writing mode was added to that of the speaking mode, along with the questionnaires.

Based on the data collected over the past two years (Grade 6 and Grade 7) and also added data in 2018 (Grade 8), this presentation will report on (1) the extent to which the “Focus on Form Approach” proved to be more effective, and (2) the reasons for this efficacy. Motivational factors, based on the results derived from two kinds of
questionnaires, one given at the beginning and the ending of the project as well as one given after each lesson, are of particular interest as these qualitative data supplement and/or back up the quantitative data.

References:


Abstract

In this article, I propose “guidelines for information education,” created to cultivate ICT problem-solving abilities that society demands of students. This is what I developed as a member of the Japan Universities Association for Computer Education (JUCE). A bachelor’s degree education aims to foster the ability to reflect, judge, and act in diverse ways, so as to think subjectively and derive the best solutions. We proposed these guidelines for skills that all students must master by the time they graduate from university.

Therefore, in this article, we suggest an educational model for teaching a problem-solving framework in information literacy education in the first year and to develop practical ICT problem-solving abilities in each specialized field.

Information education in universities nurtures "problem-solving powers," or the abilities to solve newly established problems. The guidelines target the systematic connection of information education between universities and primary and secondary schools.

The overall objectives of the "guidelines" are as follows.

"Achievement objective A" aims to teach students to master the framework of problem-solving. There are three goals to be reached.

- Goal 1: Students understand the framework for thinking about problem discovery and solutions.
- Goal 2: Students can solve the given problems, using the framework.
- Goal 3: Students can solve problems themselves, against problems without answers.

"Achievement objective B" aims to help students recognize both the effectiveness and challenges of an information society and to acquire the ability to make judgments, based on their own initiatives.

- Goal 1: Students can infer a source’s intention, read the information, and explain the contents.
- Goal 2: Students understand their responsibilities as members of society and can handle information safely, with consideration for others.
- Goal 3: Students can understand the light and shadow of information society and reflect on what makes a desirable information society.

"Achievement objective C" aims to instill in students an understanding of the mechanism of ICTs and acquire the ability to utilize modeling and simulations for problem-solving.

- Goal 1: Students can explain the features of ICT.
- Goal 2: Students can make predictions, using modeling and simulations as the means to verify hypotheses.
- Goal 3: Students can look at the ways information communication systems manifest in society.

I propose an educational model for each university, to conduct information education by utilizing these "guidelines."
Stemming the Tide

1. topic area of the submission: STEM
2. presentation format: Panel Session
3. a 2-3 sentence description of your presentation which should not exceed 75 words in total.

The evolution of a collaborative STEM project, the first initiative of the Nhulunbuy Learning in Excellence Consortium in remote Arnhem Land, Northern Territory, Australia is in partnership between Nhulunbuy High School, Nhulunbuy Primary School and Southern Cross University. Underpinned by a ‘pedagogy before technology’ inquiry-based teaching and learning framework, it explores both ways learning as a futures orientation for 21st Century learners and their teachers. We will share student, teacher and local indigenous and non-indigenous voice.

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Abstract

This panel session presents a case study of a learning community consortium comprising a high school and a primary school, working in partnership through Project Readiness, with a university in the remote Northern Territory of Australia. The research that underpins the design and implementation of a model/framework for readiness for improvement centres on 3 identified foci: alignment; capability and engagement. These core foci bind site and system specific Project Readiness program elaborations to the overall strategic intent of the relevant Education system/jurisdiction and align schools to the identified shareholder goals. In line with effective professional learning evidence and in a context of client stipulated requirements and unique school circumstances, a professional learning program is designed and facilitated through professional cycles of inquiry (Donohoo, 2013; Jensen, 2016), to find solutions to data identified problems of practice (Sharratt, 2018). In effect, the Project Readiness Model becomes a framework for how teachers and leaders harness and apply a series of formal learning experiences in their schools and classrooms to enhance teacher practice and leadership efficacy and ultimately maximise potential student outcomes: wellbeing and academic.

The Nhulunbuy Learning in Excellence Consortium is situated in a bauxite mining town and its student population is 40% Indigenous Australian and 100% of these students are classified English as an Additional Language (EALD). There are a further 10 % of students, who are not indigenous Australians but represent six international cultures who are also classified EALD. At the high school, the EALD Indigenous students include 35/40 who attend the on-site boarding facility and there is a purpose-fit programme of teaching and learning called Liya Djambatj which aims to equip indigenous students with skills for continuous learning, aspiration and confidence that will transition them into mainstream schooling. The Liya Djambatj students are predominantly Yolngu students and an ancient tribal value system is the foundation of who they are – it is their dreaming, language, culture, songlines and totem. Crucial to this two-way or both ways learning context, is respect for other peoples and other cultures and the sharing of knowledge through a multi-literate approach in an intercultural perspective for a global community (Bat, Kilgariff and Doe, 2012). The complexities, tensions, paradoxes and contradictions embedded within the relationships between inclusion and exclusion are crucial considerations in ensuring equal opportunities for all students, not only the indigenous students.

This case study is about moving a teaching and learning paradigm by investigating and establishing our emerging processes and structures for inclusion through a futures orientation: a capacity to look forward in anticipation of using technologies that do not yet exist while reflecting on the past to harness the wisdom of ancient knowledge to interpret the future, to dance it, sing it and tell it (Doe, 2007). Drawing on previous experience with the ESTEME program in Melbourne, Australia and acknowledging the challenges faced in delivering curriculum programs in remote Northern Territory, steps are being put in place to examine the processes, protocols and mechanics of providing STEM education as a means of engagement for indigenous and non-indigenous students. High impact strategies will underpin the development of a pedagogical model that draws on evidence informed practice to allow STEM to be explored from both 21st century and Dreamtime perspectives. Our aim is to allow all students to understand the scientific nature of their worlds from various viewpoints and to be able to draw generalisations using modern and ancient knowledge for the benefit of their respective futures. This initiative is about acknowledging the dreaming within the dream and using synthesised knowledge to create a new STEM paradigm.
Comparison of the effects of introducing ICT in universities education in each fiscal year and university's scale

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Abstract

In Japan, higher education institutions are required to qualitatively transform for each and every student to engage proactively with learning (Ministry of Education, Culture, Sports, Science and Technology: MEXT 2012). For this reason, some institutions in Japan have already promoted initiatives of MOOC and flipped classroom, therefore use of ICT in higher education is considered important in order to realize efficient and effective education and to improve the quality of education.

Based on the reason mentioned above in Japan, several organizations regularly conducted questionnaire surveys of higher education institutions throughout Japan, with the support of MEXT (The Open University of Japan 2011, Kyoto University 2014) and Academic eXchange for Information Environment and Strategy (AXIES 2016).

The purpose of these surveys are to perceive the real state of achievement of ICT use education in each institution of Japan, the latest questionnaire items consist of 57 questions in 5 categories, which are "organizational strategy", "open education", "implementation status of ICT use in education", "advantage and disadvantage of ICT use in education", and "help desk".

However, although these surveys enable us to grasp the actual condition of each year, there has been little analysis of the secular trends, such as how they have changed beyond the fiscal year, and also been little analysis of its causality what effects are actually obtained by introducing ICT in university education.

Therefore, in this research, we focused on the responses of "the effect of introducing ICT in university education" item, and extracted 4 common factors enabling comparison over the fiscal years (FY) by conducting an exploratory factor analysis based on the responses of the surveys of FYs 2010, 2013, and 2015 (Tsuji et al. 2017). The 4 factors were composed of “Increasing the university's
brand power”, “Improving educational methods”, “Educational effects”, and “Cost reduction”. On the other hand, it is pointed out that there are differences in the ICT introduction situation depending on the size of the university in Japan, and the necessity of public support especially in small-sized universities is mentioned (Sakai et al. 2016).

Based on the backgrounds, in this paper, we investigated the difference in the scale scores of the 4 factors mentioned above in each "university size" and each “FY”. As a result, no interaction was confirmed between "university scale" and "FY". In Factors “Increasing the university’s brand power” and "Improving educational method ", it is found that the scores of the large-sized universities are significantly higher than those of the small-sized universities, and the score of the "cost reduction" factor is significantly higher in FY 2015. In addition, "Educational effect" factors tended to have higher scores in FY 2015 and large-sized universities.
Cluster Analysis based on Personality and Behavioral Factors on School Counselors in Korea.

Yunkyung Au
Kongju National University

ABSTRACT

This study classifies school counselors into three ‘clusters’, according to personality and behavioral factors. Based on previous research, personality factors were focused on depression(D), psychathenia(Pt), and social introversion(Si). In addition, behavioral factors focused on both active and passive coping strategies. This study used MMPI-2; Depression(D), Psychathenia(Pt), Social Introversion(Si) T score and the stress coping scale revised in 1987. A cluster analysis was conducted on a sample of 87 Korean middle and high school counselors, 8 males(9.2%), and 79 females(90.8%) and was guided by the following research questions: Can Korean school counselors be clustered according to personality factors (depression, psychathenia, and social introversion) and behavioral factors (active coping strategies, passive coping strategies)? Which demographic factors differ according to the clusters? How do patterns of personality and behavioral factors vary according to the clusters? The results demonstrated that the school counselors were divided into three clusters; namely, adaptive perfectionism, maladaptive perfectionism and noncompetitive clusters. Furthermore, this study found that adaptive perfectionism counselors are less susceptible to burnout and maintain their mental health better than the other clusters. The adaptive perfectionism cluster also showed the lowest rates of depression, psychathenia, and social introversion amongst counselors while demonstrating high levels of active and passive coping strategies. On the other hand, the maladaptive perfectionism cluster, however, had the lowest levels of coping strategies and high levels of depression and social introversion. The study also confirms that the use of active coping strategies as well as passive coping strategies prevents psychological burnout in school counselors. Furthermore, school counselors need to consider two or more personality factors at the same time. Thus this information could be useful not only in the
application to school counselor’s mental health but could also possibly be applied to students as well.

Key words: depression, psychathenia, social introversion, school counselor, coping strategy
INTRODUCTION

Many researchers have emphasized that a counselor's mental health has an important effect on the counseling process (Gnilka, Chang, & Dew, 2012; Hill, 2004). Counselors with a high level of well-being are more likely to maintain a good interaction between clients and their supervisors (Gnilka, Chang, & Dew, 2012). Counselor educators also have difficulty balancing their personal needs such as self-care, friends and family relationships, and work (Randall, et al., 2016). Nevertheless, there are few studies on the stress and burn-out of school counselor, so it is urgent to study it (Randall, et al., 2016).

In a recent study, Randall and colleagues (2016) classified professional counselors into three clusters: Adaptive perfectionists, maladaptive perfectionists, and nonperfectionists. This study classifies school counselors in Korea into three clusters according to personality and behavioral factors, based on the previous research results. The first set of factors were established as personality factors while the second factors were behavioral factors. The purpose of this study is to prevent the counselor’s burn-out through personality and behavioral patterns.

THEORETICAL BACKGROUND

The American Council of Counselors regards 'Counselor Wellness and Impairment Burnout' as a response to long-term stress (Harrison, 1999, p. 25). That is to say, it is defined as a state of physical, emotional, and mental fatigue that occurs during long periods of work in an emotional part. Thus, the school counselor may burn out if they think that they do not have enough resources in the counseling process, which can negatively affect the counselor's physical health and productivity (Blix, Cruise, Mitchell & Blix, 1994; Sangganjanavanich & Balkin, 2013).

Recently, several researchers have reported the relationship between the counselor's mental health and personality factors (Ghorpade, Lackritz, & Singh, 2007; O'Connor & Paunonen, 2007; Childs & Stoeber, 2012). In other words, Ghorpade and colleagues (2007) found that the counselor's personality was related to burn-out, and Childs and Stoeber (2012) noted that the tendency towards perfectionism is considered a secondary personality traits.
There are many studies on coping strategies, which involve behavioral factors (Randall, et al., 2016; Ward, et al., 2003). Randall and colleagues (2016) argue that the school counselors could be clustered based on the use of coping strategies as well as personality factors. That is because people who have negative cognitive styles do not use adaptive coping strategies (Lyubomirsky, et al., 1999; Ward, et al., 2003).

On the other hand, the tendency towards perfectionism is related to burn-out in the workplace. Perfectionism is regarded as a secondary personality trait (Childs & Stoeber, 2012). Therefore, personality factors related to this can be seen in the form of depression, psychathenia, and social introversion (Benjamin & Daniel, 2016).

In recent years, studies of personality and behavioral characteristics have been conducted in relation to the job (Benjamin, & Daniel, 2016; Jefferis, et al., 2011; Paul & Moser, 2009). At first, negative psychological characteristics related with the job are depression, psychathenia, and social introversion. Depression is a condition in which all psychological functions decrease and is directly related to social problems such as unemployment (Han, Kyung-Hee et al., 2011; Jefferis, et al., 2011; Lerner, et al., 2004). Psychathenia, on the other hand, means a long-standing chronic anxiety. People with high levels of psychathenia are anxious, nervous, indecisive, and worry about minor things (MMPI-2 Training Slides, University of Minnesota Press, 2015). Also, social introversion refers to the tendency to avoid interpersonal and social activities (Kim, Young-Hwan et al., 2002).

The more the school counselors cope with their stress, the better they can deal with the client. However, the response to stress is very different from person to person, so it is more important to use appropriate methods that are consistent with their personality and behavioral characteristics rather than deploy effective coping strategies all the time.

**RESEARCH QUESTIONS**

First, can Korean school counselors be clustered according to personality factors (depression, psychathenia, and social introversion) and behavioral factors (active coping strategies, passive coping strategies)?

Secondly, what are the differences in demographic factors according to the clusters?

Thirdly, what patterns of personality and behavioral factors are observable according to the clusters?

**METHOD**
**Participants**
This study analyzed a total of 87 school counselors engaged in counseling in korean secondary schools. The number of male and female respondents were 8(9.2%) and 79(90.8%).

**Measures**
Measuring Depression, Psychathenia, Social Introversion
This study used MMPI-2(Minnesota Multiphasic Personality Inventory); Depression(D), Psychathenia(Pt), Social Introversion(Si) T score

Measuring Coping Strategies
This study used the stress coping scale revised by Kim, Jeong-Hee(1987). A total of 62 items were included. The active coping strategy was 27 items and the passive coping strategy was 35 items(Cronbach α coefficient; active coping strategy was .792, passive coping strategy was .795, and total reliability was .844).

**Analysis**
This study used SPSS / PC + 21.0 statistical program and the collected data were analyzed by cluster analysis. In particular, K-mean cluster analysis, which is a non-hierarchical cluster analysis method, was applied.

**RESULTS**

**Clusters Analysis based on Depression(D), Psychathenia(Pt), Social Introversion(Si)**
Korean school counselors were categorized into meaningful clusters as like previous research results that classified the counselor into three meaningful clusters. Based on the final cluster value, cluster 1 was a total of 33 persons, cluster 2 was a total of 18 persons and cluster 3 was a total of 36 persons. Each cluster was named Adaptive perfectionists, Maladaptive perfectionists, and Nonperfectionists(Table 1).

In Table 2, the distance between cluster1 and cluster3 was closest and the distance between cluster2 and cluster3 was farthest. In Table 3, the mean difference between the clusters were statistically significant. The results of the cluster analysis through each variable are shown in Table 1. Also, the results of the distance
between clusters are shown in Table 2 and the result of ANOVA are shown in Table 3 respectively.

Table 1. The results of Clusters Analysis

<table>
<thead>
<tr>
<th>behavior factor</th>
<th>cluster</th>
<th>1 Maladaptive perfectionists (N=33)</th>
<th>2 Nonperfectionists (N=18)</th>
<th>3 Adaptive perfectionists (N=36)</th>
</tr>
</thead>
<tbody>
<tr>
<td>active coping strategies</td>
<td>43</td>
<td>36</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>passive coping strategies</td>
<td>41</td>
<td>36</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>psychathenia (Pt)</td>
<td>44</td>
<td>54</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>social introversion(Si)</td>
<td>97.61</td>
<td>90.00</td>
<td>94.17</td>
<td></td>
</tr>
<tr>
<td>depression(D)</td>
<td>118.97</td>
<td>106.22</td>
<td>101.92</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. The distance between clusters

<table>
<thead>
<tr>
<th>cluster</th>
<th>1 Maladaptive perfectionists</th>
<th>2 Nonperfectionists</th>
<th>3 Adaptive perfectionists</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>23.760</td>
<td></td>
<td>22.282</td>
</tr>
<tr>
<td>2</td>
<td>23.760</td>
<td>32.667</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>22.282</td>
<td>32.667</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. The result of ANOVA

<table>
<thead>
<tr>
<th>behavior factor</th>
<th>error</th>
<th>F value</th>
</tr>
</thead>
<tbody>
<tr>
<td>active coping strategies</td>
<td>mean of squares</td>
<td>df</td>
</tr>
<tr>
<td>passive coping strategies</td>
<td>mean of squares</td>
<td>df</td>
</tr>
<tr>
<td>psychathenia (Pt)</td>
<td>mean of squares</td>
<td>df</td>
</tr>
</tbody>
</table>
Demographic Difference by Cluster

In Table 4, the demographic differences between those clusters showed no significant differences by gender and school. But there were significant differences in the group with less than 60 months, the group with 60-89 month group and the group with more than 90 months in the counseling career ($p<.05$).

Table 4. Demographic Difference by Cluster

<table>
<thead>
<tr>
<th></th>
<th>Cluster1 frequency(%)</th>
<th>Cluster2 frequency(%)</th>
<th>Cluster3 frequency(%)</th>
<th>total</th>
<th>$\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>males</td>
<td>2(25%)</td>
<td>2(%)</td>
<td>4(%)</td>
<td>8(100%)</td>
<td>.626</td>
</tr>
<tr>
<td>females</td>
<td>31(39.2%)</td>
<td>16(20.3%)</td>
<td>32(40.5%)</td>
<td>79(100% )</td>
<td></td>
</tr>
<tr>
<td><strong>counseling career</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>less than 60 months</td>
<td>19(45.2%)</td>
<td>6(14.3%)</td>
<td>17(40.5%)</td>
<td>42(100% )</td>
<td>9.666*</td>
</tr>
<tr>
<td>60-89 months</td>
<td>12(35.3%)</td>
<td>6(17.6%)</td>
<td>16(47.1%)</td>
<td>34(100% )</td>
<td></td>
</tr>
<tr>
<td>90 months</td>
<td>2(18.2%)</td>
<td>6(54.5%)</td>
<td>3(27.3%)</td>
<td>11(100% )</td>
<td></td>
</tr>
<tr>
<td><strong>school</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>District</td>
<td>8(44.4%)</td>
<td>4(22.2%)</td>
<td>6(33.3%)</td>
<td>18(100% )</td>
<td>7.55</td>
</tr>
<tr>
<td>middle school</td>
<td>20(35.1%)</td>
<td>10(17.5%)</td>
<td>27(47.4%)</td>
<td>57(100% )</td>
<td></td>
</tr>
<tr>
<td>high school</td>
<td>2(40.0%)</td>
<td>3(60.0%)</td>
<td>0(0%)</td>
<td>5(100%)</td>
<td>1</td>
</tr>
<tr>
<td>technical high school</td>
<td>3(50.0%)</td>
<td>1(16.7%)</td>
<td>2(33.3%)</td>
<td>6(100%)</td>
<td></td>
</tr>
<tr>
<td>missing</td>
<td>0(0%)</td>
<td>0(0%)</td>
<td>1(1.15%)</td>
<td>1(100%)</td>
<td></td>
</tr>
<tr>
<td><strong>total</strong></td>
<td>33(37.9%)</td>
<td>18(20.7%)</td>
<td>36(41.4%)</td>
<td>87(100% )</td>
<td></td>
</tr>
</tbody>
</table>

* $p<.05$
Patterns of Personality and Behavioral factors

Cluster 1. Maladaptive perfectionists among the three significant clusters classified through the cluster analysis showed the levels of negative personality factors such as depression, psychathenia, and social introversion was high, and the levels of the active and the passive coping strategies were low. On the other hand, cluster 3. Adaptive perfectionists cluster had the lowest levels of negative personality factors. Also the levels of the active coping strategies and the passive coping strategies were higher than those of cluster 1. Cluster 2. Nonperfectionists cluster showed lower levels of depression, psychathenia, and social introversion than Cluster 1. and higher than group 3.

DISCUSSION

School counselors must have a high level of psychological expertise. Nevertheless, there are relatively few studies of various groups of counselors. This study tries to suggest a method to prevent school counselors' burn-out by clustering the counselors according to their personality types; depression(D), psychathenia(Pt), and social introversion(Si). Thus, the study divided into three clusters according to related personality and behavioral factors as personality and behavioral patterns were reported according to the clusters.

Firstly, Korean school counselors were classified into three clusters based on depression, psychathenia, and social introversion. This result confirms that Korean school counselors can be categorized into three clusters as they were in the United States(Randall, et al., 2016). The results of this study show that adaptive perfectionism counselors are the best group to prevent burn-out and maintain their mental health. The characteristics of adaptive perfectionism cluster demonstrate the lowest levels of depression, psychathenia, and social introversion and while displaying the highest levels of active coping strategies and passive coping strategies. As a result, both active and passive coping strategies may be appropriate according to the situation, thereby preventing psychological burnout. On the other hand, the maladaptive perfectionism cluster had the lowest levels of coping strategies and high levels of depression and social introversion.

Nowadays extroversion is emphasized as an essential trait in positive interpersonal relations while social introversion is often perceived as a disadvantageous characteristic(Han Kyung- Hee, et al., 2011). However, the results of this study imply that social introversion is not always negative. In order to prevent the burn-out of school counselors, we need to consider at least two or more personality factors. We also need to
understand the personality and behavioral characteristics of the adaptive perfectionism cluster and apply them to students for improving their mental health.

References


Han, Kyung-Hee et al. (2011). MMPI-2 Multifaceted Personality Test II Manual Revision, Maumsalang.


prospective study (the predict cohort). Social Science & Medicine, 73, 1627–1634.
Abstract
Compared to traditional landline phone services, Voice over Internet Protocol (VoIP) technology has emerged as a competitive alternative in the communication field in 1973. Studies have shown that VoIP technology has a high adaptability and portability, along with its low cost and robustness. In higher education, although we can teach theoretical knowledge in the classroom, it is not easy to provide a hands-on practice to verify learned knowledge. The research question we have is: how to design a hands-on practice for the students to verify learned knowledge of VoIP technology. In this paper, we present ReadyComm, which is a project designed to help the students create and manage their own VoIP network. The current results indicate that ReadyComm not only helps understand VoIP technology and wireless mesh network, but it also provides a hands-on practice to strengthen the understanding. We firmly believe this is a good example that should be shared to other similar teaching institutes.

Keywords – VoIP, Wireless Mesh Network, SIP, Hands-on Practice.

I. INTRODUCTION
The first landline phone service was constructed in 1877-78 and it has dramatically changed the people’s life in communication [1]. However, this kind of landline phone service suffers from its inherited nature, i.e. easily impacted by natural disasters. For example, Hurricane Maria, which struck Puerto Rico in late 2017, was the second longest recorded blackout in world history [2]. This incident seriously affects landline phone services. From technology point of view, it is not acceptable due to the amount of resources we have in the 21st century.

Voice over Internet Protocol (VoIP) is a methodology starting in 1970s for enabling voice communications over Internet Protocol (IP). Since voice and multimedia data can be transmitted over the IP layer, a VoIP system can be considered as a possible solution to areas affected by natural disasters. In higher education, although we can teach methodology and theory of VoIP and wireless mesh network in a traditional classroom in higher education, we have a difficulty to provide a hands-on practice for the students to verify learned knowledge. This difficulty motivates us to design a hands-on practice for VoIP Network.

We propose ReadyComm, which is hands-on practice for VoIP network. We construct a Wireless Distribution System (WDS) with 4 Linksys access points (APs). The cost of each AP is between $35 and $50. As for the VoIP server, we adopted Raspberry Pi Model 3 B that is around $35. Raspberry Pi, produced by Raspberry Pi Foundation, is an affordable, lightweight, single-board computer that has roughly the size of a credit card and can serve as a VoIP server. Once given a proper software, the Raspberry Pi can process the routing of calls based on the dial plan architecture. We used two separate smart phones as clients, one is a Samsung Android Galaxy Note 8 and another is an iPhone 7 Plus. In order to enabling communication between the VoIP server and its clients, Asterisks, an open-source public branch exchange (PBX) software, was installed on the Raspberry Pi along with FreePBX, an open-source graphical interface, to provide easy configuration. The service will be able to run without relying on any external service or specialized hardware beyond the
Raspberry Pi, APs, and devices running Session Initiation Protocol (SIP) softphone applications. To enhance security of the service, we also run an authentication server on an Ubuntu Virtual Machine (VM).

In the following of the paper, we will introduce the design of ReadyComm in details, following by the implementation and testing of the system. At the end, we will conclude our study and explain future work.

II. READYCOMM

The ReadyComm network consists of two servers: the VoIP server running on the Raspberry Pi and the authentication server running on an Ubuntu VM. Each of these servers is connected to an AP and from here clients can be added to our network as necessary as long as they are within range of the APs. These APs come together in a WDS that acts as a mesh network. Figure 1 shows a diagram of our network architecture.

2.1 VoIP Server

To configure our VoIP server on the Raspberry Pi which operates on the Raspbian operating system, Asterisks 13 was installed as well as FreePBX. After the initial install, the FreePBX web-based graphical interface is ready for use. The first step in securing the system was to move into the first point of entry which is to secure the management interface of both the Pi and FreePBX by changing the usernames and passwords from default. Next, the extensions were set by utilizing the Add Extension feature, which allows a user extension to be created through a web form by going through 2 steps. The first step of the process involves selecting an
extension type, extension number, display name for the user, password, and optionally the Outbound Caller ID, and Email Address. For Type, PJSIP is selected, which is a new SIP channel driver for Asterisk and is built on the PJSIP SIP stack. As shown in Figure 2, the Extension Number and Display Name can be entered to match any numbering and naming convention desired. The Password must be shared with the user and will be used on their mobile device to register with the VoIP server. The second step simply asks if the user will be a user manager, meaning the user has center privileges to control their extension. Once finished, Apply Changes must be click in on in order for new configurations to take effect. That completes the process to add an extension. There is also a Quick Create Extension option which removes some of the optional fields and streamlines the extension process. Once added, the extension will appear in FreePBX’s dashboard, as seen in Figure 3.

Fig 2. Adding Extension to Server

Fig 3. Dashboard of added extensions
This started the base of our VoIP system as the server will be the hub that contains all the information necessary to facilitate the necessary functions for VoIP. With the Raspberry Pi setup, it was time to complete the network that acts as the communication bridge for server and clients.

2.2 Wireless Distribution System

The mesh network itself began with flashing each AP and installing the Tomato firmware [3]. The correct firmware version must be selected to match the AP model. Tomato is a small, lean and simple replacement firmware that works in junction with our Linksys WRT54GL routers. Tomato features an easy to use GUI, bandwidth usage monitor, more advanced QoS and access restrictions, and most importantly is capable of wireless features like WDS and wireless client modes [3]. With Tomato installed our wireless mesh can begin to be built.

The concept behind mesh networks is to create a truly wireless network that is extremely scalable. In a wireless mesh network, the network connection is spread out among dozens or even hundreds of wireless mesh nodes, in our case the Linksys WRT54GL routers, which communicate to each other to share the network connection across a large area [4].

![Tomato Version 1.28](image)

**Fig 4. Basic Network Setting of WDS Main AP**
Once the AP is flashed and rebooted the WDS configurations can begin. The WDS configuration begins with the setup of a main AP, which is no different than the others except for the fact that it provides DHCP services to the network and will serve as the default gateway. The first step in configuring the main AP is to disable the WAN interface by selecting disable under *WAN Type* in the Basic Network configuration menu as shown in Figure 2. Then we configure the IP and IP services. The AP’s *Router Address* is set to be 192.168.1.1 with a *Subnet Mask* of 255.255.255.0, which gives 254 usable IPs for hosts. The checkbox next to *DHCP Server* must be checked to enable DHCP services then we assign a range of 192.168.1.100 – 192.168.1.149 in the *IP Address Range* box that can be handed out to hosts as they connect to the network. This DHCP range can be set to any range of IPs within the 192.168.1.0 network, but for testing purposes the range was kept small. The next step is to ensure *Enable Wireless* is checked and from there the *Wireless Mode* is set to Access Point + WDS. The *SSID* is set to any desired ID and can optionally have *Broadcast* disabled by checking. The *Channel* setting can be left default, however if there are interference concerns it can be changed. As shown in Figure 3, in the *Security* field, select *WPA/WPA2 Personal* then select AES for *Encryption* and enter a desired *Shared Key*. In the *WDS* option select *Link With…* and then enter the Mac address of the other non-main APs. As additional APs are added their Mac addresses must be entered here. For changes to take effect *Save* must clicked on at the bottom. All these settings can be found below in Figure 4.

For the other APs all settings are virtually the same except for the Router IP, which must be unique, the *DHCP* check box must be unchecked, and the *WDS* option must be set to Automatic. To verify WDS links select *Device List* under Status on the left hand side menu and check for the WDS peering in the list of connected devices.

![Figure 4](image-url)

**Figure 4.** Encryption on the APs for WDS network

### 2.3 Authentication Server

We need to consider some further security within our WDS network. As shown in Figure 5, WPA2-Personal was the security protocol in place for this network. WPA2 uses Pre-shared Key Authentication (PSK) in order to accept devices into the network. PSK is essentially a secret value manually entered on both the AP and each wireless device. This creates several areas for weaknesses. For one, the key needs to be kept secret and manually updated, and the key itself may be weak.
For example, WPA2 can be cracked quite easily using tools supplied by the Kali Linux operating system. The Aircrack tool can help some with malicious intentions into picking up all available traffic within its vicinity, capturing a packet of a user using WPA2 to join a network, and ultimately using a dictionary attack or whatever means preferred for cracking the password that is the packet [5]. To prevent this, an additional server, an authentication server, was put in place to prevent unauthorized access into our network.

![Fig 6. Adding APs to FreeRADIUS](image)

FreeRADIUS was used as our authentication server and it was implemented running on an Ubuntu VM. Installing FreeRADIUS is as simple as `sudo apt-get install freeradius` from the terminal. With FreeRadius installed, we added all the APs into the `clients.conf` file by adding its name, IP address, and secret key. This way, our network will only operate with the APs we specifically define. The edit to this file can be seen in Figure 6.

Statically adding the APs in our topology provides a huge security benefit. Having to authenticate routers prevents the ability of a man-in-the-middle attack. Without this implementation, a person with malicious intent could crack WPA2, join the network, and add their own AP into our network without any of the users knowing. If a user were to have their phone automatically connect to our network as soon as they are in range, they would automatically be funneled their traffic through the hacker’s AP without being aware.

This same logic can be applied to end devices that are a part of our network, so FreeRadius can again help add another layer of security. User accounts can be created with a simple `sudo vi username` to add create a base user. From there a passkey can be created for that user. In our case, we wanted to further the security implementation with this passkey by first running the password through a hashing function to create a ciphertext so the password is not stored in cleartext. Figure 7 shows the example of inserting hashed password for user. The only additional libraries needed are the `passlib.hash` in order to encrypt the password.
This, in a way, creates a dual-authentication in order to functionally use our VoIP services, as we require authentication to access the network as well as access in order to sign into the VoIP service through Zoiper. With all this in place, we ultimately have a fully functional VoIP server via a wireless mesh that has its own authentication server as an additional layer of security to keep out intruders.

2.4 VoIP Client

After creating the VoIP server on our Raspberry Pi and the creating of the WDS network via our Linksys APs, we add the clients to make a functional service.

To configure the mobile devices, the Zoiper app was downloaded from the respective phone’s App Store. Once the application is downloaded and installed, the device is set to airplane mode (optional) then connected to the ReadyComm network by finding the SSID configured on the APs and attempting to join by entering the configured password for the WDS network. The next step is to have the device register with the VoIP server by opening the Zoiper application and going into Settings. In Settings set the Account Name to any name desired, the enter the VoIP server’s IP in the Domain field (192.168.1.50). The Username and Password must be entered to mirror what was configured on VoIP server during the extension setup steps. Once all required fields are filled in tap on Register and if successful the Registration Status will change to OK. This entry can be seen in Figure 8.

Fig 8. The SIP registration process on an iPhone using Zoiper
III. TESTING ReadyComm

In order to verify the functionality of the system, several tests were conducted and compared against the project’s goals. FreePBX’s testing capabilities proved helpful for this section.

Calls were tested following successful SIP registration. This was done by calling the configured extensions several times and checking for quality of the calls utilizing FreePBX to verify the metrics. The call performance of the system provided 100% call completion and 100ms or less of latency. The only call issues were observed when the APs were placed too far from one another causing latency and packet drops.

Fig 9. A floor plan of 4th floor in Beatty Hall

These test calls took place on the fourth floor of Beatty Hall at Wentworth Institute of Technology. As shown in Figure 9, APs were placed throughout the entire floor of the building. The call was placed from Classroom 8-419, the room hosting the servers, and was received in the corner Office 8-404 diagonally across the span of the room.

The amount of calls that can be simultaneously held were to be measured. Upon testing for max amount of concurrent calls while maintaining stability it was determined the system can handle 10 calls at once. This is due to the Raspberry Pi’s processing limitations. Call encryption was tested to ensure the call data is encrypted as the raw data was encrypted as it passed through the WDS network using AES.

The WDS network was tested by placing calls using each access point and monitoring call performance from different distances. It was determined each AP should be placed roughly 35 feet from one another for optimal performance. This can differ based environmental variable such as building materials. As mentioned earlier, our success rate for calls was 100% of the ten test calls that took place. More detailed results of these tests can be seen below in Table 1.
Table 1. Call Rate Averages

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Received Bitrate</td>
<td>83178.8 bit/s</td>
</tr>
<tr>
<td>Average Sent Bitrate</td>
<td>85 bit/s</td>
</tr>
<tr>
<td>Current Received Bitrate</td>
<td>83310.8 bit/s</td>
</tr>
<tr>
<td>Current Sent Bitrate</td>
<td>85 bit/s</td>
</tr>
<tr>
<td>Sent Bytes</td>
<td>308974.4 bytes</td>
</tr>
<tr>
<td>Sent Bytes Payload</td>
<td>236344 bytes</td>
</tr>
<tr>
<td>Received Packets</td>
<td>2943.8 packets</td>
</tr>
<tr>
<td>Sent Packets</td>
<td>2914.2 packets</td>
</tr>
<tr>
<td>Received Bytes</td>
<td>548.2 bytes</td>
</tr>
<tr>
<td>Received Bytes Payload</td>
<td>468.2 bytes</td>
</tr>
</tbody>
</table>

The authentication server was tested using \( \text{radtest} \), which tests the service by sending queries requesting to join the network after passing in parameters of the username and password. This ran internally but we also ran tests attempting to join the network. We ran tests with two different accounts, \textit{Chris} and \textit{Bob} and their successful connection can be seen below in Figure 10.

![Fig 10. Successful connection to network with](image)

**IV. CONCLUSION AND FUTURE WORK**

In higher education, learning VoIP network in a traditional classroom is dry and there is no standard hands-on practice for verifying learned knowledge. In this paper, we present \textit{ReadyComm}, which is an effort of creating a hands-on project for undergraduate students. The project creates a VoIP server from scratch to strengthen the understanding of fundamental knowledge. The proposed idea is not only adaptable for business with different sizes, but it also saves money in a long term. The demonstrated implementation particularly is very scalable. It is easy to add more APs to the network to supply a large number of clients, such as different smartphones and tablets. In addition to the scalability, the cost of the design can be remained reasonable for added licenses.

In the future, we are considering including more challenges in the design to mimic a real usage. For example, creating extension APIs for the developers to add more SIP compatible services, creating security holes for vulnerability learning, standardizing the project to make it as a regular practice for networking classes, etc. The current result not only presents a good example of learning by doing in VoIP technology, but it also provides a flexibility to include more interesting topics to extend the students’ learning in computer networking domain.
REFERENCES

[1] 1870s-1940s-Telephone: http://www.elon.edu/e-web/predictions/150/1870.xhtml


Teaching medical students how to use electronic tools for clinical practice through lecture gamification

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6. Abstract.

During clinical rotations, medical students are tasked with efficiently searching up information for clinical queries. Students often learn these skills on-the-job, when needs arise. Prior to clinical placements, students sitting in lectures may be less motivated to learn how to navigate clinical resources, as they are not actively on clinical duties. The use of gamification to teach library resources can help promote interest and active participation, so that students can be encouraged to develop and adopt life-long learning early on.

The objective was to create an interactive session that equipped second-year medical students with knowledge on how to use several library resources that are useful during clinical practice. The session incorporated hands-on practice to showcase relevancy for students and to allow an opportunity for students to demonstrate their learning of navigating clinical tools.

In 2017, an academic medical librarian and clinical educator collaborated to develop a 50-minute session. The initial segment was a lectured overview of 5 electronic tools frequently used in clinical practice. Thereafter, students played a team-based game called “Fast Finder” to practice using the tools to find answers to clinical questions. The first time we implemented the game, teams of 10 students completed as many questions as possible from a 100-question, multiple-choice quiz, in 15 minutes. The team with the most correct responses received a prize. Based on student feedback after the 2017 session, we made changes that were implemented in the 2018 session, including changes to the game. In the 2018 session,
we used Kahoot.com to create a game that students played as individuals, racing against their fellow students to answer correctly in the least amount of time; this new game format still achieved the goal of rewarding accuracy while placing importance on efficiency. Prior to the game, we also introduced practice questions throughout the session to keep students engaged and to better prepare students for the final Kahoot.com activity. The interactive activities implemented within this session have increased the session ratings given by students, over the past 3 years.

This presentation will discuss the benefits and challenges in creation and implementation of a game for teaching library resources to medical students, as well as the ways in which the information gathered from the game, and a post-game survey, can be used to assess both learning and student engagement. This session will also compare and contrast the two different games used and discuss the advantages and disadvantages of each.
Title of the submission: The main determinant of wage differential between Vocational high school tracks

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Abstract:

One of the common hypotheses regarding the effects of vocational education in Korea is that technical track earns better labor market outcomes (including employment rate, earnings) than commercial track. However, there are few literatures about what makes technical tracks in Korea earn better than the other track. In general, many literatures proved how gender impacts on labor market outcomes while they do not include vocational high school tracks. Even though some literature concerns about the labor market outcomes of vocational high school graduates, they only identified cross-sectional outcome data, especially, the year right after graduation.

This study demonstrates the difference of longitudinal labor outcome between technical vocational high school graduates and the other vocational high school graduates. Based on YP(Youth panel) data of individuals graduated from upper secondary vocational high school, this study provides (1) empirical evidence of individuals’ labor market outcome across 10 more years and (2) the determinants of labor market outcome gap between technical track and others.

This study consisted longitudinal data of earning and employment status from 475 participants. This used linear probability model and multinominal logistic regression to analysis research question (1) and (2). The descriptive labor market outcome patterns indicate support for technical tracks is better than others regarding labor market outcomes and especially the pattern of earning/employment rate change between technical and other tracks is similar the pattern between man and woman. This study also confirms that the gap of tracks’ labor market outcomes is determined by gender. When both gender and track are taken into account, only gender is significant and wage is not significant.

The result of this study supports the view that technical vocational high school’s outcome is getting greater across ages and the other tracks graduates’ outcome is getting smaller across ages. And this study provides a solid evidence that the better outcomes of technical track attributed to higher proportion of male students, not just track itself.
Construction of E-Learning System for Programming

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Abstract

Recently, information technology has been developed, and many computers with Artificial Intelligence (AI) and data communication facility have been more familiar. In such situation, programming educations become increasingly important, and various efforts such as programming education at Japanese elementary school in 2020 have been begun.

Programming contests have played a great role in improving programming skill for programmers and have been held in Japan and abroad. In these contests, contestants compete how quickly to solve problems such as algorithms.

In our study, we now construct “E-learning system for programming” for learners who are aiming for high prize in such a programming contest. The system will be implemented on the following function of; (1) AI recommendation for problems to be solved based on learning information (e.g. edit record and biological information); and (2) e-portfolio by which learners can grasp learning situation and reflection. By utilizing the e-portfolio, learners make goals, learn and evaluate problems, repeat the learning cycles, and improve learning method. And then, learners promote their learning [1]. In programming learning, repetitive learning is important, because it is necessary to do trial and error for completing the assignment programs.

We define e-portfolio as a system, that is able to be promoting learner’s learning and his/her evaluation activities, and to collect evidence to demonstrate learning outcomes [2]. Our e-portfolio system is constructed on Moodle [3] which is a kind of Learning Management System (LMS) that can realize portfolio activities such as distribution of educational materials and preservation of learning information and can collaborate with Mahara [4] that is a kind of e-portfolio system. In order to promote reflection of learning for programming, our system will be needed for the following functions of; (1) creating courses for programming problems; (2) creating learner’s rubrics; (3) evaluations of the problems; and (4) publishing learning outcomes.
In this paper, we explain a construction method that is “(1) creating courses for programming problems” on Moodle platform. In our system, we adopt online-judge problems which are for learning programming contests, and adopt the system [5] which has functions of editor, simulation and reserving edit record. Our research is characterized by constructing an e-portfolio system to combine these systems for acquiring various learning histories. We implement the system based on the proposed method and report advantages and disadvantages of the system.

Acknowledgement

This work was supported by JSPS KAKENHI Grant Number JP18K11585.

References

Effects of Teacher’s Training Program: Focus on STEM/STEAM Education at a Japanese Elementary School

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In this pioneering research, we aimed to analyze the effects of teacher training programs for elementary schools that address the issue of creating awareness among teachers regarding programming education in the field of STEM/STEAM education. In the teacher training programs, one teacher conducted a sixth-grade class on programming education and then discussed the ways to implement class design with other teachers at the school. The content of the programming lesson was to move LEGO® WeDo 2.0; the students had created mechanisms similar to those of space probes, which made the cars move from a starting point to multiple destinations, and finally, made them return to the starting point. Learning activities were conducted with 40 children in small groups of about four people. After this class, the teacher who had taught the class, and 30 teachers who were observing, discussed the merits and the scope of improvement of this lesson design. We questioned the teachers about this programming education class’s relation to STEM/STEAM education. Their responses indicated that the science aspect of STEM/STEAM education was covered through “the structure of the motor, and trial and error,” the technology aspect through “making a car and programming (procedure),” the engineering aspect through “car operation and programming (conditions),” the arts aspect through “car design,” and the mathematics aspect through “speed, time, and calculation of distance.”

Keywords: Teaching skills with ICT, teacher’s training programs, STEM/STEAM education, elementary schools, programming education

Introduction

In recent years, it has become increasingly important to develop teaching skills of Japanese teachers in terms of using ICT (Information and Communication Technology). In particular, their recognition about “ability to teach children how to use ICT” is low (Ogawa et al., 2015; Kitazawa et al., 2017). However, Japanese elementary school teachers will have to teach programming from 2020 onward (MEXT, 2018). Since subject teaching is important at Japanese elementary schools, the teachers have to design lessons to

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teach the subjects included in “computational thinking (CAS, 2015).” Therefore, teacher training programs on programming education for elementary school students are needed.

Since STEM/STEAM education includes computational thinking along with science and mathematics, it is considered to be one of the effective ways to educate students. Therefore, we targeted the teachers of a Japanese public elementary school that provides STEM/STEAM education.

The purpose of this study was to analyze the changing teacher’s recognition about teaching skills with ICT at elementary school teachers that was preserved across teacher’s training programs included STEM/STEAM education.

Methods

First, we administered a questionnaire survey titled “Teacher’s ICT Instruction Capabilities Checklist (MEXT, 2007)” to elementary school teachers. The survey had three categories: (A) “ability to use ICT for study materials, instruction preparation, and assessment”; (B) “ability to use ICT in class”; and (C) “ability to teach children how to use ICT.” The questionnaire had a total of 12 questions that were scored on a 4-point scale (1 = strongly disagree to 4 = strongly agree). Additionally, we conducted another questionnaire survey that had four self-efficacy items that were scored on a 5-point scale (1 = strongly disagree to 5 = strongly agree). For the results of the preliminary study (May 31th, 2018) and the follow-up study (Jun 6th, 2018), we performed a comparative analysis of the differences in the average value of each item by using a paired t-test.

Second, we designed a teacher training program for elementary schools that addresses the issue of teachers’ awareness of programming education in the field of STEM/STEAM education. In the teacher training program, one teacher conducted a sixth-grade class on programming education and then discussed the ways of implementing class design with other teachers at the school. The content of the programming lesson was to move LEGO® WeDo 2.0; students had created mechanisms similar to those of space probes, which made the cars move from a starting point to multiple destinations, and finally, made them return to the starting point. Learning activities were conducted with 40 children in small groups of about four people. After this class, the teacher who had taught the class, and 30 teachers who were observing, discussed the merits and the scope of improvement of this lesson design. The teacher training program was held on Jun 6th, 2018. Afterward, we administered the questionnaire survey as a follow-up study.

Results

Before and after the teacher training program, 31 elementary school teachers completed self-efficacy surveys on ICT programming education. The results of a comparative analysis of the averages of pre- and post-answers analyzed by t-tests (indicating correspondence) clearly indicated that there was a positive change in the teachers’ recognition of the importance of the following ideas: “B-4 To increase the children’s knowledge when summarizing the contents of the class, I effectively present lesson materials using computers, presentation devices, and other related equipment.” (t(19) = 3.58, p < .05) (pre-test: $M = 2.50$, post-test: $M = 3.15$) and “C-4: Through repeated practice, I help children acquire the knowledge and master the skills necessary for using educational software and the Internet.” (pre-test: $M = 2.45$, post-test: $M = 3.05$) (t(19) = 2.85, p < .05) (Figure 1).

We also noted a positive change in teachers’ recognition of the importance of the ideas that “we can be taught to effectively use computers when children do collaborative learning” and “we can be taught to make computer use effective when children interact with each other” (Figure 2).

In addition, we questioned the teachers on programming education class’s relation to STEM/STEAM education. Their responses indicated that the science aspect of STEM/STEAM education was covered through “the structure of the motor, and trial and error,” the technology aspect through
“making a car and programming (procedure),” the engineering aspect through “car operation and programming (conditions),” the art aspect through “car design,” and the mathematics aspect through “speed, time, and calculation of distance.”

Figure 1: Results of “teacher’s ICT instruction capabilities checklist” survey

Figure 2: Results of “teacher’s self-efficacy of teaching (with ICT and teaching computational thinking)” survey
Conclusion

In this research, we aimed to analyze the effects of teacher training program in an elementary school that address awareness of programming education in the field of STEM/STEAM education. Especially, we found that teacher’s recognition of the importance of teaching skills that are required “to teach children to help them acquire the knowledge and master the skills necessary for using educational software and the Internet” had increased after participating in the teacher training program that included lesson design and discussions. In addition, they could comment on the relationship between the programming education lesson and STEM/STEAM education.

From the findings of our research, we expect not only to improve teacher training programs’ methods of teaching programming education, but also to target other subjects (science, mathematics, arts, and so on) so that it becomes easy for teachers to teach with ICT and computational thinking.

Acknowledgements

We thank the participating pre-service teachers. This paper was supported by JSPS KAKENHI Grant Numbers 17H02003 and 18K02814.

References


Teaching Elementary School Students to Solve Problems through an Educational Game

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Abstract: The purpose of this study was to create a prototype educational game for social skills education and to evaluate this game through practical application with elementary school students. Our aim was for the students to experientially learn about ways to solve problems and build consensus by implementing this educational game in SSE classes. In order to achieve the purpose, after the students played the game, we explained how the game relates to real consensus building.

Purpose

In Japan, Social Skills Education (SSE) for elementary school students has been attracting attention since the 2000s. SSE has been implemented across different classes in many elementary schools, and has contributed to the improvement of children's social skills. However, many of these programs target only basic skills, such as greetings, how to listen, and how to refuse. Active learning has been emphasized in Japan's next educational guidelines, to begin in 2020, and discussion skills have also been emphasized in different subjects. However, only a few programs deal with problem-solving skills in situations of interpersonal conflict, such as interpersonal negotiation strategies and consensus building methods.

Therefore, we created an educational game to teach elementary school students the art of problem-solving. With this game, students can experience thinking about convincing each other and learning about their ideas by discussing them, especially when their opinions disagree with those of others. After playing this game, students will be able to discuss ways to solve problems in different situations. For example, it can be applied to situations where students decide through discussion which type of play to engage in during a break. In other words, we aimed to enable students to think creatively so that they can integrate multiple ideas or conceive new ideas by considering elements and opinions that they have in common with others.

The purpose of this study was to create a prototype educational game for social skills education and to evaluate this game through practical application with elementary school students. Our aim was for the students to experientially learn about ways to solve problems and build consensus by implementing this educational game in SSE classes. In order to achieve the purpose, after the students played the game, we explained how the game relates to real consensus building.

Methods

1. The development of the educational game for SSE

In order to acquire problem-solving skills for consensus building, we created a card game. This game is played with four students, and a pack of cards. A guide explaining the use of the cards is provided in Table 1. The rules of the game are as follows:

1) One group of four people plays the game.
2) Each player receives seven cards. Each person should flip the cards carefully and pile them up face down in front of them.
3) Each player draws one card from the top of their pile, and all players show their cards at once.
4) The cards may match in terms of signs, or colors. Only the final result is the score. Based on the kind of match, the following scoring structures apply:
   - If two pairs can be made, they score the lowest point.
   - If three pairs can be made, they score the highest point.
   - If everyone shares common elements, everyone gets a point.

5) To keep the game going, the players discard the card drawn in the first round. They then return to #4 and continue till the game ends. When the pile of cards comes to an end, the final score determines the winner.

The descriptions of the scores for each of the cards are presented in Table 2. Cards with seven points, though highest in terms of points, are the lowest in terms of collaborative levels. These cards will not match unless the others cooperate at their own expense. Even if the player’s card matches someone else’s card, only seven points can be obtained. On the other hand, all members try to find something in common with cards with five points. At the same time, they place equal importance on what they want to do. The cards with five points are the highest in terms of collaborative levels. If everyone matches, all players can earn the highest score, which is 20 points.

The teacher will explain the score of Table 2 using the following specific example. If the play that four students (♢, ♡, ♠, ♣) want to engage in between classes is different (♢: baseball, ♡: soccer, ♠: tag, ♣: basketball), cards with seven points compel others to play baseball. Cards with five points signify trying to find common elements with every player, for example kickball (☆). If, in the example, they chose to kickball, they could use the ball and they could run, and all of the students would get to do what they wanted. Cards with three points mean students divide the break time into four parts, taking time to engage in each type of play in order or mean students take turns engaging in various types of play each day, eventually engaging in each type that all of the students want to try.

Table 1: Cards used in the game

<table>
<thead>
<tr>
<th>Score</th>
<th>Player 1</th>
<th>Player 2</th>
<th>Player 3</th>
<th>Player 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>♦</td>
<td>♥</td>
<td>♠</td>
<td>♣</td>
</tr>
<tr>
<td>6</td>
<td>♦</td>
<td>♥</td>
<td>♣</td>
<td>♣</td>
</tr>
<tr>
<td>5</td>
<td>♦ ☆</td>
<td>♥ ☆</td>
<td>♣ ☆</td>
<td>♣ ☆</td>
</tr>
<tr>
<td>3</td>
<td>♦ ♥ ♣</td>
<td>♥ ♣ ♦</td>
<td>♣ ♣ ♣</td>
<td>♣ ♣ ♣</td>
</tr>
<tr>
<td>2</td>
<td>♦ ♥ ♣</td>
<td>♥ ♦ ♣</td>
<td>♣ ♣ ♣</td>
<td>♣ ♣ ♣</td>
</tr>
<tr>
<td>1</td>
<td>♥ ♣ ♠</td>
<td>♦ ♣ ♠</td>
<td>♣ ♠ ♣</td>
<td>♣ ♠ ♣</td>
</tr>
</tbody>
</table>

2. Implementation of the game

There were 75 students (25× 3 classes), all of whom were in fourth grade. The lesson was 45 minutes long, including the introduction, implementation, and review of the game. During the introduction, we showed the students a role play of a scene where opinions were in conflict with one another, and invited the students to think about a solution. During the review, we explained ways to form a better consensus while matching it with an example and the scorecard in Table 2.

Table 2: A description of the scores
<table>
<thead>
<tr>
<th>Rank</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>♦</td>
<td>Absolutely never give up / constantly endure what others do. This card holder compels others to do what they want to do. Collaborative level : 0</td>
</tr>
<tr>
<td>6</td>
<td>◊</td>
<td>There is a possibility that the cardholder can earn points if others cooperate with what the cardholder wants to do. Collaborative level : 0</td>
</tr>
<tr>
<td>5</td>
<td>◊☆</td>
<td>While trying to place importance on what the cardholder wants to do, the cardholder tries to find common elements with every player. Collaborative level : 3</td>
</tr>
<tr>
<td>3</td>
<td>◊♡♧♤</td>
<td>The cardholder tries to understand everyone's opinions gradually (time lag etc.) Collaborative level : 1</td>
</tr>
<tr>
<td>2</td>
<td>◊♡</td>
<td>Of the four people, two people who want to do the same thing play in pairs. e.g.: Two people play soccer, two play baseball. Collaborative level : 2</td>
</tr>
<tr>
<td>1</td>
<td>♥♣♠</td>
<td>The cardholder will endure what they want to do and try to resolve interpersonal conflict by giving priority to what others want to do. Collaborative level : 0</td>
</tr>
</tbody>
</table>

**Expected outcomes**

We examined the effect of an educational game by recording the way in which children left their cards during the game and based on their responses to questionnaires seeking their free description of their experience.

**Keywords:** social skills, social skills education, educational game, problem-solving, interpersonal conflicts.
CONSTRUCTION OF E-LEARNING SYSTEM FOR PROGRAMMING: ESTIMATION OF COMPREHENSION LEVEL FROM BRAIN WAVE

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CONSTRUCTION OF E-LEARNING SYSTEM FOR PROGRAMMING: ESTIMATION OF COMPREHENSION LEVEL FROM BRAIN WAVE

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ABSTRACT

Programming education has become more and more important with the development of Artificial Intelligence (AI) and Internet of Things (IoT). Various efforts for programming education are discussed in Japan. For example, programming is going to be made compulsory at Japanese elementary schools from 2020.

Programming contests have been really useful for programmer to improve their skill. One of the most famous programming contest is the ACM International Collegiate Programming Contest (ACM-ICPC). In these contests, programmers solve several problems about algorithm and compete for speed and correctness.

Authors are now trying to construct an e-learning system for learners trying these programming contests. This system offers a programming problem to a learner, and estimate comprehension level of the learner to the problem from source codes, editing records, biological information and so on, which are measured when the learner solves the problem. Moreover, from the estimated comprehension level, this system recommends next programming problems that the learner should try to solve. In this year, as the first step of this study, we are collecting editing records and brain wave records of learners solving programming problems, and are analyzing them. In this paper, the analysis of brain wave records is reported.

In previous works by Umezawa et al. (2017) and Saito et al. (2018), brain wave records of learners solving programming problems have been already collected and analyzed. The works covered about 20 high school students who are all beginners of programming, and used programming problems made by themselves. The works concluded that the ratio of low-\(\alpha\) wave and low-\(\beta\) wave (low-\(\beta\)/low-\(\alpha\)) represents how hard students feel when solving problems. In other words, the difficulty for learners to problems can be measured from the low-\(\beta\)/low-\(\alpha\).

In this study, we follow the previous work by Umezawa et al. (2017) and Saito et al. (2018), and make additional experiments. Main points of our study is as follows.
1. Programming problems in Online Judge, that is often used for many learners trying programming contests, are used in our experiment. The difficulty of these problems are previously determined.
2. Our experiment covers university students with various programming levels. The programming levels of these students are previously determined by questionnaires and tests.

From results of this experiment, we verify the difficulty measured from low-\(\beta\)/low-\(\alpha\) in detail, and discuss how the brain wave records can be applied to our e-learning system.

ACKNOWLEDGEMENT

This work was supported by JSPS KAKENHI Grant Number JP18K11585.
REFERENCES


How to Assess Japanese Elementary School Pupils' English Ability Using Can-Do Statements

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Abstract

In 2020, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) will implement English as an official subject in public elementary schools all over Japan. Twice a week English will be taught and pupils will be assessed on three objectives. The first goal is to acquire basic fundamental knowledge and skills, and the second is to foster the ability to think, to make decisions and to express themselves. To cultivate an attitude of proactive learning and to develop pupils’ individuality is to be the third objective. The teaching of literacy starting with the sound and the letter correspondence is to be introduced along with this reform the Course of Study. How to assess elementary school pupils' English literacy ability, therefore, will be one of the most crucial issues facing elementary school teachers who have never been required to do so. Allen-Tamai (2017) proposed that literacy development should be developed on a solid base of phonemic awareness and alphabetic knowledge while many inexperienced home room teachers in Japan tend to focus more on how we best teach elementary school pupils to write letters correctly.

The present research focuses on how to develop young learners’ English literacy skills while pupils’ self-evaluation was implemented as an alternative assessment. Can-Do statements with young learners were given as a possible means of assessment.

This research investigated Japanese elementary school pupils’ English ability by using the originally developed Can-Do reflection sheet consisted of 4 scales and enabled pupils to reflect on their performance in terms of can-do statements.
The participants in this study were 143 pupils of Grade 5 who completed Can-Do statement sheets along with taking pre and posttests of alphabet writing and phonemical awareness. During three weeks, four short time lessons for nine minutes each were taken for worksheets.

The result showed two positive effects on pupils and instructors. Firstly, pupils were able to enhance their self-efficacy and sense of ability as they continued to monitor and reflect on what they did at the end of each class. Secondly, teachers were able to reflect on their classroom as well as monitor pupils’ self-evaluation. This led to English classroom improvement.

In conclusion, pupils’ self-evaluation using Can-Do statements is considered to be an effective and beneficial method of enhancing both pupils’ and instructors’ metacognition and autonomy.
Abstract

In this report, we are concerned about the common mistakes made by learners of programming. The spread of information technology has increased demand for programming educations; in Japan, elementary school programming education will be mandated from 2020. Following this background, we construct and provide an “e-learning system for programming” for programing learners.

We have 3 presentations, “Construction of e-Learning System for Programming: Estimation of Comprehension Level from Brain Wave”, which presents the outline of an “e-learning system for programming” and the difficulty measured from the brain wave records, -can be applied to our e-learning system. “Construction of E-Learning System for Programming: Construction of e-portfolio”, which presents about the construct an e-portfolio system for acquiring various learning histories.

In this study, we extract patterns of mistakes prone to occur when beginners write source code, as a preparatory stage for learning content creation. We also clarify the contribution rate using multiple regression analysis with the mistake patterns as explanatory variables and comprehension as the objective variable.

The following specific data collection method was adopted, we set some programming problems in a programming lesson for beginners, which the students had to resolve. The editing history visualization system accumulated all the source codes of the process, such as timestamp of
edit and run, differences of text editing, number of edits to completion etc. We used an editing history visualization system, which is a learning environment for programming, proposed by Aramoto et al. [1]. The two target languages were C and Java.

In the future, we plan to use the obtained results as a basis to estimate learners’ comprehension levels. In addition, we will select and create learning contents. Moreover, we propose improvements to the learning effect by increase the percentage of questions answered correctly. Since our system is operated by artificial intelligence, which selects the tasks to be presented next based on learner's information learning and comprehension levels, it results in effective programming learning.

**Acknowledgment**

This work was supported by JSPS KAKENHI Grant Number JP18K11585.

**Reference**

Title
A Preliminary Analysis of Learners’ Lexical Network Changes

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Abstract

It is widely acknowledged that one of the important aspects of the lexical knowledge is how words are organized into a structured whole. However, to our knowledge, how such organization is achieved, or how a learner’s lexical knowledge can be assessed in this structural aspect are not sufficiently explicated. On the other hand, it has been also observed that extensive reading in the target language can contribute to development of lexical knowledge: it can be speculated that, in understanding a rough outline of the stories, learners are provided with ample opportunities to acquire new vocabulary used with other familiar and/or unfamiliar words, thus enabling learners to establish interwoven associations among individual words.

In our previous studies, we have applied recent developments in statistics, namely, Asymmetric von Mises Scaling (AMISESCAL; Shojima, 2011, 2012) in an attempt to explicate and visualize the network properties of learner’s mental lexicon. Based on the Japanese EFL learners’ data collected by using free association and similarity judgment tasks, these preliminary studies have indicated AMISESAL can be employed in successfully grasping the network aspect of learners’ developing lexical knowledge. Also, we have applied association analysis, a data-mining procedure, to extract patterns of co-occurring words within sentences. These obtained patterns are then submitted to a network visualization tool, viz., Gephi (Bastian et al., 2009), to graphically represent interrelatedness among the lexical items.

We have thus developed procedures to explicate the structural nature of the lexical knowledge, or to profile lexical networks inherent in various types of texts. In the present study, applying these procedures, we are to compare learners’ lexical knowledge before and after undertaking extensive reading tasks. First, association analysis is used to identify co-occurrence patterns in the extensive reading materials. The words obtained in this way are then used as primes in free association task. Participants’ responses in this task prior to the extensive reading activity and those after the activity are compared from the viewpoint of lexical network, i.e., how words are interconnected in their lexical representation. Some of the network features, such as the number of nodes (words), degree (the number of connections a given node has), clustering coefficient, and closeness centrality, are also to be compared. Being a small-scale preliminary study, we are aware that it would be too hasty to generalize the findings or to draw educational implications at this stage. Instead, methodological considerations in extending the study to a wider population of learners will be discussed.
Title
An Investigation on Student Assistants’ Motivation and Self-Efficacy through a Tutor’s Experiences in PBL

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Abstract
Problem-based tutorial learning, or PBL, has been employed to a nursing course in Japan as one of the effective self-directed learning methodologies. Previous studies in Japan reported that it improved students’ self-learning abilities, problem-solving skills, and interpersonal skills. The School Education Act in Japan ordains that every elementary and junior high school must staff at least one nursing teacher. Nursing teachers play an important role in children’s mental and physical health at school. As children today are exposed to a lot of stress such as bullying, violence, non-attendance at school, juvenile delinquency, or suicide, what is required of nursing teachers is not only to take care of children with problems but also try to foresee any children’s abnormal changes and conduct proper health counseling. They are not a nurse but a teacher; however, PBL that are introduced to students who are majoring in nursing science can also be an effective learning method for students who are majoring in education to be a nursing teacher.

Takase (the first author) has been practicing PBL at the faculty of Education of Tokai Gakuen University for freshmen who are taking a nursing teacher course. She investigated the effectiveness of PBL by conducting a questionnaire survey of the
participants, and reported that they improved their abilities in independency in learning, problem-solving, and cooperation with others. Although tutors in PBL are usually expected to have expertise in both content and process facilitation, she invited some senior students in the same course as student-assistant tutors. She conducted preparatory instructions and post-activity meetings for them in order to let them exchange their problems and opinions. They played a role as an advisor in a small group of students, and led the group to achieve a goal. PBL can give a great opportunity not only for learners but tutors to learn a lot of new ideas and develop various abilities.

This study investigated if, and how, the tutors grew, especially focusing on their motivation and self-efficacy, through their experiences in PBL. The educational significances and implications regarding using student assistants as tutors in PBL for a nursing teacher course will be discussed.
Recruiting and Retaining Teacher Leaders through ECU’s College of Educations Living-Learning Community

Topic Areas: Academic Advising and Counseling, Higher Education, Teacher Education, Cross-disciplinary areas of Education, Other Areas of Education

Presentation Format:
Poster Session or Round Table Discussion

Description: The Education Living-Learning Community at ECU was designed to give first-year Education students a unique residential learning experience that connects faculty, staff, and classroom learning with Residence Life, to ease the transition into the University and contribute to their success within the College and beyond. Explore ideas for developing and sustaining a living-learning community to support student recruitment and retention as well as program design and ideas, and University buy in methods and partnerships.

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Abstract:
East Carolina University (ECU), along with other institutions of higher education, has experienced steady declines in teacher preparation program enrollments, resulting in the development of some innovative ways to recruit students into the program and to provide the support to retain students in the major. Students who are engaged in higher education and who reside in special living communities tend to have higher grade point averages than other students, and their retention rate towards graduation from the university is higher than students living in other living situations. Strassen (2003) states that Tinto’s research supports that learning communities have a “positive influence in promoting student integration and engagement, as well as academic success and persistence” (p. 582). Understanding Vincent Tinto (1993) and Alexander Astin’s (1993) work with student success and persistence, ECU’s College of Education decided to develop a Living-Learning Community to give first-year Education students a unique residential learning experience that connected College of Education faculty, staff members, and classroom learning with Residence Life, to ease the transition into the ECU community and contribute to their success within the College of Education and beyond. This support system and living community is structured to allow students to enjoy the experience of traditional residence hall life with the added benefit of living with other students who are also going into the Education field. In addition to the in-hall discussions and guest speakers, students in the Education Living-Learning Community have the opportunity to engage in a number of activities outside the University environment, attend cultural events, a team-building ropes course, and social activities in and around the ECU community.

The Education Living-Learning Community was designed to provide students with individualized attention and support; early and continuous development of leadership skills; an environment that is conducive to academic achievement; an opportunity to experience different cultures and ideas that will enhance personal and professional development; overall assistance with the transition from high school to college; the opportunity to serve as a leader for the College of Education and volunteer with community partners; and the opportunity to grow academically, professionally, and personally in the quest to become an ECU Educator.

Explore how ECU’s College of Education has developed an Education Living-Learning Community to assist with Teacher Education student recruitment and retention. Additionally, we will share program design and ideas, funding strategies and University buy in methods and partnerships.

Graduate nurse practitioner student’s perceptions and attitudes of teamwork in the clinical setting

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“This project is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) under grant # D09HP28679, Mutually Beneficial Clinical Partnerships for $1,080,000.00 over 3 years financed 100% by HRSA. This information or content and conclusions are those of the author and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS or the U.S. Government.”
Abstract

Teamwork takes place when interaction, coordination, and communication take place and is essential to providing quality care to clients. Nurse practitioners play an important role in the leadership of teamwork in the clinical settings and need to understand how to promote and encourage effective teamwork. TeamSTEPPS® program, developed by the US Department of Defense and is based on five domains to effective teamwork; team structure, leadership, situation monitoring, mutual support, and communication. Teamwork is an important to providing quality patient care. Identifying the attitudes and perceptions of teamwork of doctoral students throughout their education is essential to identifying gaps and promoting teamwork throughout the curriculum. This project evaluated both attitudes and perceptions of teamwork over a three-year period in five different cohorts of students. Faculty teaching in the graduate program participated in a TeamSTEPPS® curriculum at the University of Arkansas. Seven clinical courses were identified in the Doctorate of Nursing Practice graduate program. Faculty were instructed to include elements of the TeamSTEPPS® program within each identified clinical course. Two surveys, one evaluating attitudes and one evaluating perceptions of teamwork, were emailed to students at the end of each identified clinical course. A five point Likert scale was used for both surveys, with a score of three as the threshold. The attitude survey had two questions in Mutual Support that was a reversed Likert Scale, but the threshold remained a three for that topic. Participation was voluntary and results were anonymous. Response rates varied between cohorts and courses, but the average response rate was 85% over the three-year period. Attitude scores remained fairly constant over the three-year period and in all four cohorts. Communication scored the lowest consistently over the three-year period. Perceptions seemed to slightly increase over the three-year period between cohorts, with the exception of cohort two, all scores remained lower in every categories throughout their educational period. There appears to be a correlation between the scores in perceptions and scores in attitudes. Perceptions scored slightly lower than attitudes in all categories except for communication that noted a minimal elevated score in perceptions. Introducing TeamSTEPPS® into clinical courses did not seem to improve attitudes of teamwork by graduate nursing students. There was minimal increase in scores of perception of teamwork as cohorts progressed. Student cohorts scored above the threshold after their first clinical course and scores did not seem to significantly improve as the cohort progressed through the DNP program. Future research should evaluate individual student scores as well as student cohorts to identify changes in scores. A survey given prior to starting the clinical courses would assist in evaluating changes in scores. Offering the TeamSTEPPS curriculum to the clinical sites could also assist in increasing attitudes and perceptions of teamwork.

Introduction

Teamwork, an essential component in providing patients with safe and high quality care, takes place when there is interaction, coordination, and communication between staff. As healthcare continues to change, collaboration between professions needs to become an integral part of the work environment. In order to meet the needs of patients, staff must learn to provide interprofessional care (IPC). By working together, coworkers can collaborate to achieve a common goal in providing patients with complementary, patient-centered care.

Nurse practitioners play an important role in the leadership of teamwork in the clinical settings and need to understand how to promote and
encourage effective teamwork.\(^3\) The TeamSTEPPS® program was developed by the US Department of Defense and is based on five domains to effective teamwork: team structure, leadership, situation monitoring, mutual support, and communication.\(^1\) Teamwork is an important to providing quality patient care.\(^3,4\) Identifying the perceptions of teamwork of doctoral students throughout their education is essential to identifying gaps and promoting teamwork throughout the curriculum.\(^5\)

**Background**

Hood et al., studied the attitudes of teamwork among healthcare professional students.\(^6\) In the study, all students identified the importance of teamwork in developing trusting relationships, patients benefit from teamwork, and collaborating with other students allowed each individual to be an effective team player. Of all the students, nursing students had significantly stronger values of teamwork and collaboration than other healthcare professional students. Perceptual definitions of teamwork can impact the quality of a team\(^7\) and the inconsistency of perceptions of teamwork can allow for professionals to misunderstand other team members and result in decreased collaboration.

Of the articles reviewed, three discussed the importance of knowing the roles and responsibilities of self and of other professionals. Among all of the studies, having unclear roles and responsibilities had a negative impact on the ability to work as a team. Interprofessional courses report a significant increase of understanding the roles and responsibilities of other professionals’ scope of practice which led participants to engage in teamwork.\(^8\) Medical students have identified a lack of knowledge about the roles of nurses and, therefore, were reluctant to share the responsibilities of caring for patients with nurses; in contrast, nursing students identified themselves as complementary to physicians and able to collaborate in patient care.\(^9\) Having clearly defined roles and proper delegation of tasks were facilitators of teamwork in the family practice healthcare setting.\(^10\)

The work environment has an impact on ability to work as team members. Having a large team size negatively influences teamwork as does working in separate locations.\(^5\) Having a heavy workload, lack of time, and inadequate pay result in a decreased effort to work as a team.\(^11\) The availability of space and computers to access electronic health records had a significant positive impact on one’s ability to be a team member.\(^2\) Having an effective team is associated with high performance and positive outcomes such as safety, job satisfaction, improved mental health, and reduced staff turn-over.\(^11\)

Effective communication was also identified as a crucial component of teamwork and resulted in negative patient outcomes.\(^8\) When nurses and physicians are allowed to collaborate and share information a more positive environment, effective teamwork, and shared goals for patients are more likely.\(^9\) Team meetings that allow for open discussion assist in engaging teamwork and open channels of communication allow for teamwork to occur.\(^2,10\)

New graduate nurses do not have the experience or knowledge to communicate effectively to physicians and other healthcare staff.\(^12\) Lack of experience and knowledge resulted in diminished conflict resolution and deferring decision making to others. Furthermore, a lack of communication resulted in inadequate consults, poor participation in interdisciplinary rounds, and difficulty addressing social issues with patients and family members. Poor communication among co-workers resulted in a lack of awareness, poor decision making, and errors when caring for patients.\(^7\)

When staff share relevant knowledge gained through experience, professionals worked as a team to have a positive impact of patient-centered care.\(^11\) Clinical experience facilitated teamwork among new graduate nurses by allowing them to gain knowledge, this knowledge assists nurses to anticipate the needs of others when working in teams.\(^12\)

Mutual respect and trust result in a more positive team experience and contribute to effective teamwork.\(^2\) Multidisciplinary education assists in developing trusting and respectful relationships.\(^7\) whereas unidisciplinary education hinders the development of those trusting relationships.\(^10\) Lack of support and disrespect among staff, even within single disciplines
impede effective teamwork in healthcare settings.12

Methods

Attitudes and perceptions of teamwork were evaluated over a three-year period in four different cohorts of graduate nurse practitioner students. Seven clinical courses were identified in the Doctorate of Nursing Practice (DNP) graduate program. Faculty teaching in the graduate program participated in a TeamSTEPPS® curriculum at the University of Arkansas. Faculty were instructed to include elements of the TeamSTEPPS® program within each identified clinical course. Two surveys, attitudes of teamwork and perceptions of teamwork, were emailed to students at the end of each identified clinical course. A five point Likert scale was used for both surveys. A score of three was set as the threshold. The attitude survey had two questions in Mutual Support that was a reversed Likert Scale, but the threshold remained a three for that topic. Participation was voluntary and results were anonymous.

Results

Response rates varied between cohorts and courses, but the average response rate was 85% over the three-year period.

Team Structure. Attitudes on Team Structure noted an increase in all cohorts from the first clinical course to the final clinical course in all cohorts. Cohort 1 had a threshold mean > 4 for Team Structure noted an increased from the first course to the final course with an overall m = 4.6. Cohort 2 also noted a mean > 4 with an increase from first course to final course with overall m = 4.66. Cohort 3 also noted a threshold > 4 and an increase from first course to final course with overall m = 4.63. Cohort 4 reflected the other cohorts with an increase between first and final clinical course and maintaining a > 4 threshold and overall m = 4.68.

Perceptions of Team Structure noted an increase in cohorts 1, 2, & 4 from the first clinical course to the final clinical course in all cohorts. Cohort 1 had a threshold mean > 4 for Team Structure noted an increased from the first course to the final course with an overall m = 4.31. Cohort 2 also noted an increase from first course to final course with overall m = 4.20. Cohort 3 noted a decrease from first course to final course with overall m = 4.43. Cohort 4 maintained a threshold > 4 and noted an increase between first and final clinical course with an overall m = 4.54. Cohort 2 & 3 noted a threshold > 3 but under the average of > 4 in the same course for both cohorts.

<table>
<thead>
<tr>
<th>Team Structure</th>
<th>1st Clinical Course M</th>
<th>Final Clinical Course M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes of Team Work</td>
<td>Cohort 1 M = 4.48</td>
<td>Cohort 1 M = 4.73</td>
</tr>
<tr>
<td></td>
<td>Cohort 2 M = 4.72</td>
<td>Cohort 2 M = 4.85</td>
</tr>
<tr>
<td></td>
<td>Cohort 3 M = 4.6</td>
<td>Cohort 3 M = 4.75</td>
</tr>
<tr>
<td></td>
<td>Cohort 4 M = 4.56</td>
<td>Cohort 4 M = 4.74</td>
</tr>
<tr>
<td>Perceptions of Team Work</td>
<td>Cohort 1 M = 4.19</td>
<td>Cohort 1 M = 4.43</td>
</tr>
<tr>
<td></td>
<td>Cohort 2 M = 4.29</td>
<td>Cohort 2 M = 4.38</td>
</tr>
<tr>
<td></td>
<td>Cohort 3 M = 4.76</td>
<td>Cohort 3 M = 4.69</td>
</tr>
<tr>
<td></td>
<td>Cohort 4 M = 4.35</td>
<td>Cohort 4 M = 4.55</td>
</tr>
</tbody>
</table>

Leadership. Attitudes on Leadership maintained a threshold > 4 and there was an increase in leadership from the first clinical course to the final clinical course in cohorts 1,3,& 4. Cohort 1 noted an increased from the first course to the final course with an overall m = 4.74. Cohort 2 also noted a threshold > 4, but had a slight decrease from first course to final course with overall m = 4.76. Cohort 3 maintained a threshold > 4 with an increase from first course to final course with overall m = 4.68. Cohort 4 reflected the other cohorts with an increase between first
and final clinical course and maintaining a > 4 threshold and overall m = 4.76.

Perceptions of Leadership noted an increase in all cohorts from the first clinical course to the final clinical course in all cohorts. Cohort 1 had a threshold mean > 4 for Team Structure noted an increased from the first course to the final course with an overall m = 4.12. Cohort 2 also noted an increase from first course to final course with overall m = 4.03. Cohort 3 also noted an increase between first and final clinical course and maintaining a > 4 threshold and overall m = 4.55. As with team structure, leadership noted Cohort 2 & 3 noted a threshold > 3 but under the average threshold of > 4 in the same course as team structure. Cohorts 2 & 3 saw the lowest scores in several courses that were above the set threshold >3, but were below the overall average of 4.

Table 2

<table>
<thead>
<tr>
<th>Leadership</th>
<th>1st Clinical Course</th>
<th>Final Clinical Course</th>
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</thead>
<tbody>
<tr>
<td><strong>Attitudes of Leadership</strong></td>
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<tr>
<td>Cohort 1</td>
<td>M = 4.7</td>
<td>Cohort 1 M = 4.79</td>
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<td>Cohort 2</td>
<td>M = 4.78</td>
<td>Cohort 2 M = 4.77</td>
</tr>
<tr>
<td>Cohort 3</td>
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<td>Cohort 3 M = 4.83</td>
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<td>Cohort 4</td>
<td>M = 4.68</td>
<td>Cohort 4 M = 4.77</td>
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<td><strong>Perceptions of Leadership</strong></td>
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<td></td>
</tr>
<tr>
<td>Cohort 1</td>
<td>M = 4.11</td>
<td>Cohort 1 M = 4.13</td>
</tr>
<tr>
<td>Cohort 2</td>
<td>M = 4.09</td>
<td>Cohort 2 M = 4.38</td>
</tr>
<tr>
<td>Cohort 3</td>
<td>M = 4.39</td>
<td>Cohort 3 M = 4.6</td>
</tr>
<tr>
<td>Cohort 4</td>
<td>M = 4.35</td>
<td>Cohort 4 M = 4.58</td>
</tr>
</tbody>
</table>

**Situation Monitoring.** Attitudes on Situation Monitoring noted an increase in all cohorts from the first clinical course to the final clinical course in all cohorts. Cohort 1 had a threshold mean > 4 and noted an increase from the first course to the final course with an overall m = 4.64. Cohort 2 also noted a mean > 4 with an increase from first course to final course with overall m = 4.65. Cohort 3 also noted a threshold > 4 and an increase from first course to final course with overall m = 4.64. Cohort 4 reflected the other cohorts with an increase between first and final clinical course and maintaining a > 4 threshold and overall m = 4.7.

Perceptions on Situation Monitoring noted an increase in cohorts 2 and 3. Cohort 1 noted a slight decrease and cohort 4 remained the same. All cohorts maintained the mean threshold > 3 and all cohorts maintained an average mean >4 for the first and last course. Cohort 1 had overall m=4.39, Cohort 2 noted the lowest overall mean of 4.09. Cohort 3 had an overall m=4.52, and cohort 4 had overall m=4.58.

Table 3

<table>
<thead>
<tr>
<th>Situation Monitoring</th>
<th>1st Clinical Course</th>
<th>Final Clinical Course</th>
</tr>
</thead>
<tbody>
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<td><strong>Attitudes of Situation Monitoring</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cohort 1</td>
<td>M = 4.58</td>
<td>Cohort 1 M = 4.79</td>
</tr>
<tr>
<td>Cohort 2</td>
<td>M = 4.61</td>
<td>Cohort 2 M = 4.62</td>
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<tr>
<td>Cohort 3</td>
<td>M = 4.6</td>
<td>Cohort 3 M = 4.81</td>
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<td>M = 4.6</td>
<td>Cohort 4 M = 4.75</td>
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<td><strong>Perceptions of Situation Monitoring</strong></td>
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<td></td>
</tr>
<tr>
<td>Cohort 1</td>
<td>M = 4.3</td>
<td>Cohort 1 M = 4.25</td>
</tr>
<tr>
<td>Cohort 2</td>
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<td>Cohort 2 M = 4.43</td>
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<td>Cohort 3</td>
<td>M = 4.64</td>
<td>Cohort 3 M = 4.76</td>
</tr>
<tr>
<td>Cohort 4</td>
<td>M = 4.52</td>
<td>Cohort 4 M = 4.52</td>
</tr>
</tbody>
</table>

**Mutual Support.** Attitudes on Mutual Support have three questions that are reversed on the Likert scale, and with adjustment noted a threshold > 3. Scores were adjusted for accurate calculations of means. Mutual Support showed a
decrease in all four cohorts from the first clinical course to the final clinical course. Cohort 1 had an overall an adjusted mean = 3.75. Cohort 2 also noted a decrease from first course to final course with overall m = 3.91. Cohort 3 noted a decrease between first and final clinical course and maintaining a mean >3 threshold with an overall m = 3.65.

Perceptions of Mutual Support noted an increase in all cohorts from the first clinical course to the final clinical course. Cohort 1 had a threshold mean > 4 for Mutual Support and noted an increased from the first course to the final course with an overall m = 4.3. Cohort 2 also noted an increase from first course to final course with overall m = 4.06. Cohort 3 also noted an increase from first course to final course with overall m = 4.5. Cohort 4 noted an increase between first and final clinical course and maintained a > 4 threshold and overall m = 4.59. Cohorts 2 saw the lowest scores in several courses that were above the set threshold >3, but were below the overall average of 4.

Table 4

<table>
<thead>
<tr>
<th>Mutual Support</th>
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</tr>
</thead>
<tbody>
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</tr>
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<td></td>
<td>Cohort 2</td>
<td>M= 4.08</td>
</tr>
<tr>
<td></td>
<td>Cohort 3</td>
<td>M= 3.55</td>
</tr>
<tr>
<td></td>
<td>Cohort 4</td>
<td>M= 4</td>
</tr>
<tr>
<td>Perceptions of Mutual Support</td>
<td>Cohort 1</td>
<td>M= 4.27</td>
</tr>
<tr>
<td></td>
<td>Cohort 2</td>
<td>M= 3.94</td>
</tr>
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<td></td>
<td>Cohort 3</td>
<td>M= 4.54</td>
</tr>
<tr>
<td></td>
<td>Cohort 4</td>
<td>M= 4.44</td>
</tr>
</tbody>
</table>

**Communication.** Attitudes on Communication noted an increase in all cohorts from the first clinical course to the final clinical course in all cohorts and maintained an overall threshold > 4. Cohort 1 had a threshold mean > 4 for Communication and noted an increased from the first course to the final course with an overall m = 4.18. Cohort 2 also noted a mean > 4 with an increase from first course to final course with overall m = 4.26. Cohort 3 also noted a threshold > 4 and an increase from first course to final course with overall m = 4.28. Cohort 4 reflected the other cohorts with an increase between first and final clinical course and maintaining a > 4 threshold and overall m = 4.16.

Perceptions on Communication where somewhat mixed among cohorts first and last clinical course. While all courses maintained an overall threshold > 4, two cohorts dropped scores. Cohort 1 noted a decreased from the first course to the final course by .10, but had an overall mean of 4.3. Cohort 2 noted the largest increase between first and last course increasing by .26 with an overall m = 4.26. Cohort 3 noted a slight decrease by .01 with overall m = 4.55. Cohort 4 noted an increase between first and final clinical course and maintaining a > 4 threshold and overall m = 4.67.

Table 5

<table>
<thead>
<tr>
<th>Communication</th>
<th>1st Clinical Course</th>
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</thead>
<tbody>
<tr>
<td>Attitudes of Communication</td>
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<td>M= 4.12</td>
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</tr>
<tr>
<td></td>
<td>Cohort 3</td>
<td>M= 4.2</td>
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<td></td>
<td>Cohort 4</td>
<td>M= 4.04</td>
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<td>Perceptions of Communication</td>
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<td>Cohort</td>
<td>M</td>
<td>Cohort</td>
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<td>3</td>
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<tr>
<td>4</td>
<td>4.57</td>
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</tr>
</tbody>
</table>

**Discussion**

Overall attitude of teamwork scores remained constant over the three-year period and overall mean scores for each category increased in all four cohorts. Communication consistently scored the lowest consistently over the three-year period. At the first clinical course, all cohorts scored over the set mean threshold of 3 and most had a score above 4 for the first clinical course. See Figure 1

Overall perceptions of teamwork seemed to increase over the three-year period with the exception of cohort two. Cohort 2 had means that were reported lower than the other three cohorts in every categories throughout their educational program. Communication received the highest of the category scores in perceptions of teamwork. Leadership and Mutual Support received the lowest scores but always scored above the mean threshold of 3, but often dropping slightly below a mean of 4. See Figure 2

There appears to be a correlation between the scores in perceptions and scores in attitudes. Perceptions scored slightly lower than attitudes in all categories except for communication that noted a minimal elevated score in perceptions. Introducing TeamSTEPPS® into clinical courses did not seem to significantly improve as the cohort progressed through the DNP program. Future research should evaluate individual student scores as well as student cohorts to identify changes in scores. A survey given prior to starting the clinical courses would assist in evaluating changes in scores. Offering the TeamSTEPPS curriculum to the clinical sites could also assist in increasing attitudes and perceptions of teamwork.

**Conclusion**

Implementing teamwork in the healthcare setting can be a rewarding but difficult challenge. Working with professionals from other disciplines can provide quality care to patients to increase the safety and overall experience of a patient's visit to a clinic or hospital. Of the nine articles obtained for the literature review, all discussed facilitators and barriers of teamwork. Five major themes emerged: responsibilities and roles, work environment, communication, knowledge sharing, and positive relationships. Further recommendations for study include identifying healthcare providers’, specifically nursing students, and perception of teamwork in the clinical setting.
Figure 1. T-TAQ Cumulative Findings

Figure 2. T-TPQ Cumulative Findings
References


Title: Impact of Experiential Learning on Student Engagement, Confidence, and Engineering and Computer Science Knowledge Gain in Outreach Programs

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Abstract: The University of California, Irvine aims to increase the number of students from underrepresented ethnic and racial groups who receive baccalaureate degrees in engineering and computer science. Using experiential learning as the cornerstone for creating the Access Summer Program to Inspire Recruit and Enrich (ASPIRE) program, the objective of the research is to investigate the impact of experiential learning on student
engagement, confidence, and engineering and computer science knowledge gain. The research consists of a sample size of 120 high school juniors and seniors, who have participated in the ASPIRE program, which is a two-week outreach program focused on engineering and computer science. Results from a pre- and post-program survey will be reported sharing findings on student engagement, confidence, and engineering and computer science knowledge gain.
Title: The Affective of Threshold Concepts of Arrhenius, Bronsted-Lowry and Lewis Acids-Bases in Freshman’s Chemistry

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Abstract

The paper describes the affect of threshold concepts (TCs) as learning tool to teach and learn acid-base introductory chemistry by first-year university students. The idea is based on the challenges students face in general chemistry which seem to discourage them from studying chemistry, pursuing their studies in chemistry-linked professions, such as, medicine, engineering, agriculture, natural sciences and chemistry education or dropping out of the university completely, particularly in Zambia. The acid-base chemistry has been identified by chemistry scholars as one of the threshold concepts in chemistry (Furio-Mas, Calatayud, & Guisaselo Furio-Gomez, 2012) that seems to be the culprit. Acid-base is also cardinal to learning of other chemical reactions within the discipline and other science concepts in life.
sciences (biology) and physics (Cooper, Kouyoumdjian & Underwood, 2016). Mastering the TCs brings about real shift in the students’ understanding of a disciplinary knowledge. This process of mastering TCs can be stressful, confusing and troublesome (Cousin, 2006). To address this problem, we looked at the affective domain of TCs theory and apply it to acid-base, teaching and learning. The research objectives are: (i) to investigate the challenges that students face when learning threshold concepts of acid-base chemistry, (ii) to explore the challenges that lecturers experience when teaching TCs of acid-base chemistry to first-year students and ways of ameliorating them, (iii) to explore the causes of failure and dropout rate and how it can be ameliorated. The descriptive study uses interviews, survey questionnaires and lecture video-recordings. The responses provided will help determine whether chemistry lecturers have been introduced to TCs theory. Lecturers and students will identify TCs of acid-base chemistry and discuss their experiences of learning and teaching. Finally, we will discuss how to employ affective dimensions. The results are expected to improve chemistry pass rates and reduce dropout of first-year students.

Keywords: Threshold Concepts, Arrhenius, Bronstead-Lowry and Lewis, Dropout Rates, Teaching and Learning

Introduction:

The dropout rate among first-year chemistry students in higher institutions of learning in Zambia, particularly at my institution, is alarming. Dropout rates are much more in chemistry than in any other subjects, such as biology, mathematics, and social sciences. Hence, in 2016, few students graduated as engineers and less than ten (10) students in physics, mathematics, and biology graduated while there were no students graduated in chemistry as a major field of study. No students graduated in chemistry because most students changed their majors to purely biology or chemistry education (SMNS board of studies, 2016). The centrality of the huge dropout rates in general chemistry among first-year students seems to be focused on the teaching and learning of the concept of acids-bases. Research has shown that most lecturers in higher institutions of learning possess the content knowledge but lack the pedagogical knowledge needed to teach (Davidowitz & Rollnick, 2011).

The acids-bases chemistry has been identified by chemistry scholars as one of the threshold concepts in chemistry (Furio-Mas, Calatayud, Guisaselo & Furio-Gomez, 2012). It is also a cardinal concept to learning other chemical reactions. Other studies have shown that from
secondary school through graduate school, students have experienced difficulties understanding and applying acids-bases concepts (McClary & Bretz, 2015). Acid-base chemistry continues to present difficulties to university students in related courses such as biochemistry and organic chemistry. The prevalence of Arrhenius, Bronsted-Lowry and Lewis acids-bases in reactions highlights the need for students to gain mastery of acids-bases key concepts. If students fail to have a firm grasp of threshold concepts, they often fail to learn complex chemical reactions (ibid).

**Purpose Statement**

The motivation for this paper is to explore whether some of the problems associated with TCs of acids-bases can be addressed by utilizing cognitive and affective dimensions of teaching and learning. TCs are critical for basic competency because they are building blocks for more in-depth understanding. These cognitive constructs are explicit and available to conscious thought while others are implicit and influence reasoning without an individual’s awareness (Talanguer, 2015). When the lecturer is aware of the affective constraints of TCs, s/he could be mindful of the students’ attitudes, perspectives and emotions. Then s/he may use affective dimensions to intrinsically motivate the students to see the value of the learning process. The acid-base chemistry has been chosen because it is cardinal to many chemical reactions in chemistry and it is one of the threshold concepts in chemistry. It is also a topic which most students experience difficulties. The researcher hopes to find remediation for first-year chemistry high dropout rate by exploring the TCs affective dimensions. Learning is affective, cognitive and the assimilation of new knowledge.

**Literature Review**

**Threshold Concepts**

The TCs of acids-bases are very important in the teaching and learning of general chemistry. There seems to be key concepts that impede conceptual understandings of chemistry. These are fundamental threshold concepts for teaching and learning acids-bases (Tibell & Harms, 2017). A threshold concept represents a transformed way of understanding or interpreting or viewing something without which the learner cannot progress (Talanquer, 2015; Cousin 2006). According to Cousin (2006), threshold concepts are key ideas that are central to a discipline and could be difficult to grasp by most students. Mastering the threshold concepts brings about a transformed view in the students’ understanding of a disciplinary knowledge (Meyer & Land, 2003).
University Dropout

The terms used to describe university dropout include, departure, dropout, withdrawal, academic failure, non-continuance and non-completion (Larsen, Sommersel & Larsen, 2013) among others. Dropout can happen early or late in the year. ‘Leaky pipeline’ is also the term that describes the loss of students from science, technology and mathematics studies and other careers (Ulriksen et al., 2010). Empirical data, according to Heublein (2014), prove that the dropout rate of chemistry students is higher than the dropout rate of social science students.

Social Learning Theories

Vygotsky’s (1987) concept of zone of proximal development (ZPD) is collaborative learning with an able peer or more knowledgeable person can assist a learner to overcome difficulties in learning. Also, assimilation and accommodation as described by Piaget (1964) work simultaneously in the learning process. Accommodation involves changing existing knowledge schema while assimilation incorporates new information into the existing ideas. The Frère (2005)’s notion of Critical Pedagogy in which the absolute power of structure of the classroom is collapsed but authority still exists. In this context, people teach each other, mediated by the sociocultural, by the cognisable objects which in banking education are “owned” by the teacher. In this way, problem-posing education breaks the vertical patterns characteristics of banking-education.

Affective and Cognitive Dimensions of TCs

The theory of TCs directs a way to understand the learning of concepts that change the way a learner views a discipline (Sanders et. al., 2012). Threshold concepts are transformative, integrative, irreversible, troublesome and bounded (Baillie, Bowden & Meyer, 2013). The process of mastering threshold concepts requires the student to analyze both the old and new concepts in order to find meaning. Then, s/he has to integrate the processed ideas into existing schema and forsake the earlier thinking. If students internalized acid-base chemistry in all its pretexts, they would be able to connect and integrate diverse phenomena. This process can be stressful, confusing and troublesome (Cousin, 2006). Emotions are viewed as essential resources that both enable and constrain the learning experience of students and lecturers (Mazer, 2014). Although, many factors contribute to students’ academic risk but negative emotions could be a vital reason for students’ disengagement, withdrawal and failure.
When a student encounters a TC, cognitive and affective processes are involved. Transformative learning has a strong affective dimension which consists of an amount of anxiety and risk. These affective dimensions disturb the schema and lead the student to respond, which may change to a sense of new insight. Affective instability is a tendency to experience ambiguous conflicting or variable emotions, heightened inclination for becoming affected and heightened state of vulnerability. The liminal affectivity emerges when potentiality is at a maximum and actuality at a minimum. Liminal affectivity may be void and plenary. Furthermore, students may become aware of TCs and their interaction with TC of acid-base chemistry and may be temporarily get stuck (Cousin, 2008). Greco and Stenner (2017). call these positions where students seem to be stuck as “hotspots”. "Liminal hotspots” are where students are trapped between and simultaneously unbound from internalizing TCs. Liminal hotspots results in affective intensity which may lead to potential imagination and creativity or mimicry or quitting. Transitional phase is an ontological indeterminacy which is characterised by affective instability. Furthermore, the student tends to exist in unstable cognitive condition, which may lead to misconceptions and inability to master TCs and progress to access higher cognitive. However, where no emotional and cognitive investment results in a lot of frustration and stress leading to exhaustion and depression, and a student wants to quit (Land, 2016).

**Discussion and Implications**

As suggested earlier, acids-bases are one of the most important topics and threshold concepts of chemistry (Timofle, 2015). For example, an introductory definition of acidity in Arrhenius is a concrete model which focuses on matter and states that acids produce hydrogen ions in aqueous solutions. This definition is problematic when students apply it to classify a strong or weak acid. Many students struggle to understand the ionic nature of acids which may affect them to relate to electrochemical chemistry (Kelly & Akaygum, 2016). Hence, students experience difficulties to move from ionic nature to Bronsted-Lowry and Lewis reactions because there may be troublesome concepts at the junction between Arrhenius and Bronsted-Lowry; and between Brosted-Lowry and Lewis. These troublesome concepts are referred to as threshold concepts. Learning in progression requires integration of multiple TCs (Batzli et al., 2016). It is not in the new ideas, but in giving up of old skills and ideas, integrating new ideas into the prior knowledge schema and acquiring a new way of thinking which is difficult in mastering TCs (Land, 2016). Students to cross the TCs of acids-bases
have to navigate in their learning and creating opportunities for iterative, exposure and application of acids-bases reactions.

These multiple TCs which are present at the junctions of the three acid-base models could be identified by lecturers and students; and assessed how TCs can be mastered by students. Moreover, liminal stage is accessible by the student and the lecturer. Knowledge of affective dimension of acid-base chemistry TCs may inform lecturers to design learning opportunities and experiences for students that will motivate them to enter the liminal while those who are stuck to overcome the difficult and progress. A liminal space is required for iterative, exposure and feedback. Lecturers may learn how to learn from the student through formative assessment and being sensitive to the students’ emotions. A one-on-one discussion of the results with students may reveal the position of the student in the liminal, background, cognitive ability and level of affective experiences (Hagenauer & Volet, 2012). Lecturer’s mindfulness may inform decisions about teaching strategies and lesson planning. In some instances, lecturer behaves as a vicar (Bandura, 1977) and students as novices as they follow the lecturer’s instructions step-by-step. Every student experiences a ZPD (Vygotsky, 1987) at one stage and mediation assists the student to master difficult concepts. Students at any stage in the liminal learn from the more knowledgeable other until they become experts as well. However, this also means that great caution must be exercised in terms of providing adequate emotional and imaginative support structures to prevent too much disequilibrium that could work against transformative growth by causing extreme emotional and/or intellectual discomfort and distress (and, in extreme cases, risk-precipitating ‘‘travel-induced psychosis’’ (Morgan, 2011). Pierre (2005)’s problem-posing educator is to create, together with the students in which knowledge at the doxa level is superseded by true knowledge at logos level. In this way, students and teachers become problem-posers. Problem-posers ask “please, support us in our explorations of the world. The lecturer tends to listen to students’ fears, aspirations and expectations and together they construct the teaching and learning process. Hence, it is difficult for the lecturer to teach TCs without considering the cognitive and affective experiences of students.

**Conclusion**

The experience of the student and the emotional aspects involved are the key to understanding the resistances activated to achieve transformative learning (Malkki. & Green, 2014). TC influences what happens in the classroom. Cognitive and affective dimensions of
TCs, if used as a tool in teaching and learning, can reduce anxiety and increase confidence in both the lecturer and student. Teaching and learning are directly related to learn to teach, is to learn how to teach. The lecturer should be willing to learn how to teach students by understanding their background knowledge and ability in acid-base chemistry. This involves being sensitive to students’ attitudes, interests, feelings, motivation and how the internalizing process is being experienced. The struggle and interaction with new TCs of chemistry generate an enduring delight in. The TCs influences the affective and affective drives the cognitive demand. Employing the affective experienced in mastering TCs makes it feasible to students to adapt to the demands of transformation in order to get further learning (Meyer & Land, 2003). Hot spots are the learning points and students should be encouraged not to be ashamed of their confusion and desperation to master the multiple TCs of acids-bases. Acid-base reactions are so important in chemistry that they are discussed at length in all first-year chemistry courses but difficult to many students. Nonetheless, TCs are not a “one size fits all”, but integrated into appropriate pedagogies and social learning theories, can be a powerful tool.

References


Title: Impacts of Delivering Finance Education Using Online Videos

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Abstract:

Research indicates that online platforms are increasingly essential to reach new audiences and keep the Cooperative Extension service a viable resource for communities (Diem, Hino, Martin and Meisenbach, 2011). Cooperative Extension patrons prefer accessing research-based information digitally (Langworthy, 2017). Digital video content can facilitate behavior change according to previous research by Ramsay, Holyoke, Branen, and Fletcher (2012), and the auditory signals and visual images transmitted through video are favored for adult learning (Dev, D., Blitch K., Hatton-Bowers, H., Ramsay, S., & Garcia, A, 2018). Online videos reach more people than face-to-face classes (Kinsey, J., & Henneman, A., 2011). Previous use of educational videos in Extension programming has successfully reached larger audiences at lower costs compared to traditional classroom methods (Case, Cluskey, & Hino, 2011).

In response to the demand for online content, we created and shared 19 personal finance educational videos addressing the most common questions asked of the authors by Extension patrons during classes, over the phone, and in person. Prior to filming, content experts reviewed scripts submitted for peer review through an online program called FastTrack. Reviewers provided feedback and edited scripts were resubmitted for final approval. Peer review of the video scripts prior to filming ensured the quality of the research-based content in the video by allowing colleagues to weigh in similar to reviewing a fact sheet. This process guaranteed the integrity of the content and Cooperative Extension’s reputation as a trusted source for research-based information while filling the need for program delivery on digital platforms. Access a full family finance video playlist on Utah State University Extension’s YouTube channel.

Efforts to disseminate and share the videos resulted in 12,955 views (YouTube/Facebook) and 6,869 minutes watched in 50 states and 27 countries on our Extension’s YouTube Channel (11,563 subscribers). Survey results (n = 484) indicated a gain in financial knowledge and intended behavior change. T-tests were performed on each data set and all knowledge increases were shown to be statistically significant. Responding to a retrospective post-then-pre knowledge question, participants indicated a 23 percent increase in overall knowledge about finance topics (from an average score of 3.16 to 4.31 out of 5). 76 percent of respondents indicated motivation to make a positive change in their life after watching the videos. The videos inspired 85 percent of respondents to watch an additional finance video. When asked about the likelihood of participants sharing this content with their friends, responses averaged an 8/10 with 10 being the most likely and one being the least likely.

Future steps for continued research include embedding links in all YouTube videos for ongoing data collection, distributing six-month follow-up surveys to those who agreed to participate in the initial survey, and sharing this model with additional faculty. Modifying and collecting data for additional online endeavors such as live question and answer sessions or short, virtual presentations on social media sites, webinars, and so forth is also encouraged. Efforts to collect additional data on innovative programs will further improve online Extension programming.
Findings show the educational videos provided an increased knowledge of financial topics, motivation to make a positive financial change, desire to watch more personal finance videos, and desire to share videos with friends—further indicating the value of online educational materials. For the Cooperative Extension system to continue to show value to the public, our content must be timely, convenient, and accessible in a format that users seek. Peer-reviewed, online, educational videos are one successful way to reach the next generation of Cooperative Extension patrons.

REFERENCES:


EXPANDING BILINGUALISM AND BILITERACY THROUGH A STUDENT-CENTERED CULTURALLY RELEVANT PEDAGOGY IN SECONDARY SCHOOLS:
AN INNOVATION GAP ANALYSIS

by

Jamie M. Gebhard Lee

A Dissertation Presented to the FACULTY OF THE USC ROSSIER SCHOOL OF EDUCATION UNIVERSITY OF SOUTHERN CALIFORNIA In Partial Fulfillment of the Requirements for the Degree DOCTOR OF EDUCATION

August 2018

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ACKNOWLEDGEMENTS

From my weening years as a chess player in elementary school to my current role as a secondary administrator, there are so many people to thank for shaping who I am today, which has impacted my journey to and through the University of Southern California Global Executive Education doctoral program. First and foremost, I need to give thanks to an ever-present, relentless agape-giving, universe-creating King of all kings, the Lord Jesus Christ. I certainly could not have asked for or imagined the amazingly gracious steady and tumultuous experiences, relationships, supports, or invisibly inspiring gifts I have received throughout my lifetime that have compelled me to persist when I felt like giving up, inspired me when I felt like hope was unthinkable, and given me renewed energy and strength to read one more scholarly peer-reviewed journal article or check another APA formatting element.

Other laudable folks to whom I would like to issue gratitude are the countless children and domestic workers, teachers, coordinators, missionaries, and entrepreneurial people doing the good work in developing cities, towns, and nations who inspire me to continue persevering with a goal in mind, to develop and improve secondary education for all students globally. Special thanks to Oasis de Amor of Honduras for inspiring me to work with students with special needs; Heart to Heart International of Romania for inspiring me and provoking me to learn and understand culture in context of learning; Dakar public schools of Senegal who were introducing inclusive education for students with special needs in classrooms of 100 students; International China Concern who developed a wide variety of programs to support students with special needs live independent adult lives; Life Builders International of Nigeria who regularly provides education and healthcare to Nigerians experiencing a vast array of trials; girls all throughout the globe who do not have access to high quality equitable education; Chicago Public Schools
teachers and students for teaching me about diligence, dreams, and fighting for social justice; and many more individuals throughout the journey who never give up in spite of trials, challenges, and tribulations.

The amazing people at the University of Southern California have designed a world-class, cutting-edge global education doctorate program that invited the likes of some of the most intriguing people I have ever met who are equally as passionate about changing the world of education to promote greater equity, improve outcomes for all students, and seamlessly build a bridge to 21st-century teaching and learning. Thank you, Dr. Mark Robison and Dr. Rob Filback for setting up a solid infrastructure for us to learn more about policy, problem-solving, creativity and innovation, and the dissertation within early childhood through tertiary education and our own specializations. Thank you, Dr. Monique Datta for being an encouraging chair with timely and thoughtful feedback; there is no way I could have progressed through the multitude of revisions and data collection sentiments without your insight and keen eye for improving my writing. Thank you, Dr. Krop, Dr. Seli, Dr. Tambascia, Dr. Chung, Professor Wertman, Dr. Maddox, Dr. Adolph, Dr. Yates, Dr. Diamond, and Dr. Picus for spending countless hours organizing the curriculum, engaging us with new and challenging readings, contemplations, and technological tools and for providing us with usable feedback to improve our writing, thinking, and communication. You all enjoyed Los Angeles, Hong Kong, Qatar, and Finland with us, and we appreciate you for it. Thank you, Dr. Chong for coordinating our every need while we were on site during our synchronous in vivo sessions. Most importantly, thank you to my Cohort 5 confreres, for whom we affectionately developed hashtags, enjoyed each other’s companionship, and supported each other through a spectrum of career advancements, baby births, engagements, divorces, travel, natural disasters, and everything in between. We reassure and inspire each other
when we struggle, we care for one other through illness, and we are present for each other when we need encouragement. We are “ohana” for life: Cathy Atwell, Tadios Belay, Nancy Bjorkland, Brittany Deby Barker, Crissy Gayagas, Frank Gettridge, Kai-Li Hwang, Li Liu, Nefertiti Makeda, Michael McAlister, Will Pierros, Charles Prince, Emmanuel Reed, Emon Reyes, Paulo Rodrigues, Tim Smith, John Wilkerson, and YongFei Zhao. Cohort 4, you shared your wisdom with us. Cohort 6, you made us proud with your professional connections and advancements. Global Education alumni looks exorbitantly promising.

Thanks to my husband, Lundy Lee, for allowing me to explore the world with my global compadres, for listening to me describe the exertion required during a literature review, for always ensuring my technology was operational and adequate, and for helping me organize and discipline my time so I could still relish in life experiences. Thanks to my mom and dad, Karen and Rick Gebhard, for consistently loving me unconditionally and listening intently. They always wanted to have a college life, and now they are rightfully enjoying retirement among friends recreating in the land of gators and golf carts. I offer a special thanks to my grandmothers, Gertrude Dvorak and Celine Gebhard. Grandma Gert has always been an avid reader, walker, and sewer; she taught me about sacrifice and good stewardship, and I promised myself that if I ever constructed a library, I would name it after her. Grandma Celine took care of her family and always emphasizes her deep pride for what I am doing, the first and only child or grandchild to complete a doctorate. My dogs get a distinct kudos for unconditionally loving me, even though there were times when I just wanted them to politely and tranquilly sit, so I could work on the dissertation or read the multitude of resources; I love you, Maddie and Indy.
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ABSTRACT

Bilingualism and multilingualism prove efficacious for learners through a range of cognitive and academic benefits and affords an expansive breadth of economic opportunities. California pioneered recognizing students for attaining proficiency in two or more languages by awarding a State Seal of Biliteracy to secondary school graduates. The seal of biliteracy has since been established in 43 states, including the District of Columbia. Since 1997, teachers in California have been required to earn credentials to enhance English language acquisition. In 2017, California passed Proposition 58, the Education for a Global Economy Initiative, which is an impetus for igniting the value of and actionable efforts to incorporating dual and multilingual learning programs across California at increasing rates. Promoting the furtherance of bilingualism among all students entails a thorough analysis of knowledge, motivation, and organizational needs, which illuminate a trajectory for increasing a school's capacity to develop students as bilinguals and biliterates. Study findings are consistent with teachers’ need for factual, conceptual, procedural, and metacognitive knowledge about dual language acquisition and their self-efficacy in delivering a pedagogy that incorporated dual language learning. Additionally, along with resources, training, and policies, cultural models and settings are a demonstrated need among the district to further systematically develop dual language acquisition.
CHAPTER ONE: INTRODUCTION OF THE PROBLEM

The 21st century welcomed some of the most significant changes in global interconnectedness, access to information, and demands of the modern workforce. In the wake of the transformation 21st-century demands have had on the life, relationships, and the marketplace, these demands are logically transferred to the schools. The 21st century brought a nationwide set of near universal adoption of the common core standards for English language arts and mathematics. Additionally, alongside the myriad new pre-engineering, science, technology, and design courses infused with reliance on innovation, creativity, and entrepreneurship that are offered in schools, there is evidence that schools in the United States are not keeping up with many other industrialized nations in regard to skilled labor to meet the economic and employment demands (Friedman & Mandelbaum, 2011). Besides the United States, the growing epicenters of research and development among businesses subsist in Japan, Germany, and China (Advantage Business Media, 2013). The world has gotten smaller with the advent of instant communication, internet, and easily accessible air travel (Reimers, 2009). The need to speak and understand more than one language is increasingly evident and vacillates in the American school system between an ideology that fashions other language ability as an asset versus a deficit (California Department of Education, 2018; Haukás, 2016). In California, there are over two and a half million public-school students who speak a language other than English in the home (California Department of Education, 2016a). California recently developed a way to demonstrate to future employers and universities which individuals developed highly proficient bilingual and biliteracy skills during secondary school; the measure is the California State Seal of Biliteracy.
The State Seal of Biliteracy is a gold embossed seal which is placed on the secondary school diploma upon graduation for those who have proven proficiency in two or more languages. The State Seal of Biliteracy was developed as a mechanism for recognizing the significant assets that bilingualism contributes to a global society and economy within the 21st century. California was the first state to adopt a State Seal of Biliteracy in 2011; the seal is symbolic of a graduate’s proficiency in English and another world language. As of 2016, 21 states and Washington D.C. offered a seal of biliteracy to high school graduates (Rocque, Ferrin, Hite, & Randall, 2016). In 2017, 27 states approved a seal of biliteracy, and 14 additional states are progressing through development and approval of a seal of biliteracy (Californians Together, 2017). As of 2018, only seven states have not approved nor are in process of approving a seal of biliteracy, which is evidence that elevating the status of bilingualism is sweeping the nation (Californians Together, 2018). California is a marquee exemplar regarding bilingual education in the United States and leads the nation in dual immersion language programs at the primary school level (Kim, Hutchison, & Winsler, 2015).

Within College Prep High School District, all secondary schools offer at least one language other than English in order to meet the minimum 2-year language requirement within the A through G requirements for acceptance to a 4-year university (University of California, 2015). The selection of world languages taught in high schools is dependent on several variables, two of which are the demand for instruction in the language by the residents or enrollees in a school and teacher credentialing in the target language. When students do not express interest by selecting a world language course in their schedule, it may impact the overall quantity of sections the course is taught or whether the course is taught at all. Outside of dual immersion language instruction programs and mandatory English learner authorization, core
content subject area teachers are not required to possess world language credentials in addition to their content area.

There are five methods in which students earn the State Seal of Biliteracy, including demonstrating their proficiency through participating in 4 years of world language during high school with a 3.0 grade point average or higher in the world language courses, earning a score of three or higher in any Advanced Placement (AP) world language exam, earning a score at or above 600 on the Scholastic Assessment Test (SAT) II foreign language exam, earning a score of four or higher on an International Baccalaureate (IB) exam in a world language, or scoring proficient on an “Off-the-shelf” exam in a world language that does not offer any of the aforementioned options (California Department of Education, 2016b).

Section I: Eligibility Criteria for a Student Whose Primary Language is English

Each of these three academic requirements shall be fulfilled.

1. Students must have completed all English-language arts (ELA) requirements for graduation with an overall grade point average (GPA) of 2.0 or above in those classes.
2. Students must have passed the California Assessment of Student Performance and Progress (CAASPP) in ELA (administered in grade eleven), or any successor test, administered in grade eleven, at or above the “standard met” achievement level, or at the achievement level determined by the State Superintendent of Public Instruction (SSPI) for any successor test.
3. Students must demonstrate proficiency in one or more languages other than English through one of the following methods:
   a) Pass a foreign language Advanced Placement (AP) exam, including American Sign Language, with a score of three or higher.
   b) Pass an International Baccalaureate (IB) examination with a score of four or higher.
   c) Successfully complete a four-year high school course of study in a foreign language and attain an overall grade point average of 3.0 or above in that course of study, and demonstrate oral proficiency in the language comparable to that required to pass an AP or IB examination.
   d) If no AP examination or off-the-shelf language test exists and the district uses its own language examination, the school district must certify to the SSPI that the test meets the rigor of a four-year high school course of study in that foreign language and, at a minimum, assesses speaking, reading, and writing. If a student seeks to qualify for the SSPI through a language that is not characterized by listening, speaking, or reading, or for which there is no written system, the student must pass an assessment on the modalities that characterize communication in that language at the proficient level or higher.
   e) If a district offers a language examination in a language in which an AP examination or off-the-shelf examination exists, the district language examination must be approved by the SSPI.
   f) Pass the Scholastic Assessment Test (SAT) II foreign language exam with a score of 600 or higher.

Section II: Eligibility Criteria for a Student Whose Primary Language is not English

If the primary language of a pupil is other than English, the student shall also meet the following academic requirements:

1. Attain the level demonstrating English language proficiency on the English Language Proficiency Assessments for California (ELPAC), or any successor English language proficiency assessment, in transitional kindergarten or kindergarten through grade twelve, inclusive.
2. Meet the academic requirements 1, 2, and 3 as state above in Section I.

Figure 1. California State Seal of Biliteracy eligibility (California Department of Education, 2017b).
AP world language exams are offered in Chinese, French, German, Italian, Japanese, Latin, and Spanish; note that nearly all the languages are European languages. SAT-II foreign language subject exams are offered in Spanish, French, Chinese, Italian, German, Modern Hebrew, Latin, Japanese, and Korean. International Baccalaureate world language programs are offered in Latin, Classical Greek, Spanish, Mandarin Chinese, and French. “Off-the-shelf” exams must be approved by the state superintendent of public instruction; examples of languages in which students have attained proficiency are Russian, American Sign Language, Tagalog, and Vietnamese (California Department of Education, 2016b).

According to the California Department of Education in the 2015-2016 school year, English learners constituted 22.1% of the total enrollment in California public schools, over 85% of whom spoke and understood Spanish in the home (California Department of Education, 2016a). For students who are identified as English learners and demonstrate dominance in a language other than English, they must also prove proficiency in English through success in their English courses, meet or exceed the state standardized English assessment on the California Assessment of Student Performance and Progress (CAASPP), and score a minimum proficiency on the English Language Proficiency Assessment of California (California Department of Education, 2016b).

The problem addressed in this study is the gap between students who could be and those who are earning a seal of biliteracy. The district has a multitude of students and resources that embody language capital and assets in languages other than English, yet despite these assets, the quantity of students earning the seal are low comparatively, and native English speakers are not demonstrating bilingual proficiency at the same rate as their peers who have home languages other than English, which highlights the paradox about whether home or school is adding the
most language value. This study investigates whether there is a systematic approach from the district to enable all students to develop biliteracy and bilingual proficiency through a student-centered culturally relevant pedagogy.

**Background of the Problem**

Language is complex and personal; all people engage and participate in society with the resources and assets they possess to have meaningful and productive involvement. Integral to engagement and participation is the use of intelligible productive language, such as through speaking and writing, and astute levels of comprehension, such as through listening and reading. Those who possess the skills to communicate in the majority or dominant language can engage at a higher frequency and depth than those without that asset; therefore, in many contexts, to speak another language is a survival necessity (Blommaert, Collins, & Slembrouck, 2005; Riordan, 2014). For those who include themselves in the language majority, learning another language may not be a survival priority. However, there is a fluctuation between policies and philosophies regarding language dominance and respect for the assets of knowing other languages. In the United States, and particularly California, bilingualism and biliteracy surfaced throughout the past 30 years as an imperative for participation in a global economy. Though bilingualism and biliteracy are gaining momentum in the global economy today, the primary language medium, otherwise known as the lingua franca continues to be predominantly English, which is also the dominant language medium of instruction in schools in the United States, Australia, and United Kingdom (Blommaert et al., 2005; Gorman, 2015; Lindholm-Leary, 2000). As noted in Table F in the Appendix F, English is spoken as the primary language in 35 countries (Sousa, 2017). Moreover, English is the primary language of international commerce and trade globally (Blommaert et al., 2005).
When considering how to engage the secondary curriculum to support dual language literacy and bilingual development, the topic of culturally relevant pedagogy surfaces. Culturally relevant pedagogy is the notion that teacher becomes a pedagogue of curriculum and instruction that is focused on academic achievement of all learners, cultural competence in the heritage and dominant cultures, and sociopolitical consciousness for students to become active citizens who challenge the status quo of inequity and covert discrimination (Ladson-Billings, 1995; Ladson-Billings, 2014). When Ladson-Billings embarked on identification of the critical components of pedagogy that is characterized by respectful and inclusive of the diversity of African American students, she may not have predicted how these concepts would expand to all learners from a multitude of tribes, tongues, and nations who decorate classrooms from coast to coast. Because culture and language are intimately woven together within the identity of each person, they will inevitably accompany each student into the classroom environment (Du Bois, & Baumgarten, 2013; Wilson & Kamanā, 2009).

According to the Partnership for 21st-Century Learning, there are four general overarching student outcomes, the first of which is content knowledge and 21st-century themes (2016). The key components of the content knowledge include subjects such as English, mathematics, and world language. Additionally, they recommend expanding students’ understanding to topics related to global competence and civic literacy (Partnership for 21st Century Learning, 2016). Within the subcategory of global awareness is found the Framework for State Action on Global Education, which can serve as a blueprint for internationalizing K-12 schools in the United States. There are six elements to developing global awareness and proficiency within school, one of which includes a new approach to language acquisition (Partnership for 21st Century Learning, 2016). California hosted an inaugural California Global
Education Summit: Educating for Global Competence in 2016 to discuss the inclusion of global competence within 21st-century skills and standards (California Department of Education, 2016a).

There are divergent views about the importance and background of bilingualism and biliteracy (Luk & Bialystok, 2013; Souto-Manning, 2006). Notable is the notion that bilingualism may not be recognized as valuable despite cognitive and academic achievement benefits, economics of bilingualism in a changing global economy, and the systemic models of curriculum and instruction that promote optimal bilingual and biliteracy outcomes. Perceptions of learning and maintaining two or more languages have carried negative connotations among some parents and teachers. Learning and maintaining two or more languages was previously observed through a deficit perspective because some parents believed that learning languages sacrificed other crucial areas of content curriculum or that English learners were overidentified for special education services (Blommaert et al., 2005; Lindholm-Leary, 2000; Souto-Manning, 2006). Views that native language is an interference to learning English pervade the linguistic pedagogical landscape, which is the voice on behalf of the focus on monolingualism and English dominance in schools across the United States. In the sense that learning English as a second language holds linguistic capital given the pervasive status of English in the economic realm, unintentionally parents and teachers have corralled the curriculum and students into a one-size-fits-all linguistic repository. Parents have innocently removed the perceived barrier of the heritage or native language in order to effectively assimilate into the mainstream language and culture (Souto-Manning, 2006).

Students whose primary language is other than that used by most citizens in a society are identified as minority language speakers. For example, in the United States, English is the
majority language and all others are considered minority languages. Minority language speakers experience more than linguistic adjustments and acclimation when they adapt to a new country and culture. Concurrent with language acquisition is a sociocultural characteristic which is closely linked to each student’s identity and self-concept (de Jong & Bearse, 2014; Moreno Herrera & Wedin, 2010). Language plays a significant role as one views him or herself in relation to others and society (Clots-Figueras & Masella, 2013; Hornberger, 2007). This knitting together of language and culture imbues a compulsion to address culture within the curriculum and pedagogy concurrent to language instruction (Freire & Valdez, 2017).

For example, in Japan, minority languages are not given high levels of hierarchical value in terms of language capital; therefore, minority languages are not valued as contributing or engaging in the mainstream economy. Contrary to U.S. state compulsory education attendance policies, minority language speakers in Japan are not required to attend Japanese schools. However, if they choose to attend school, they are sequestered into Japanese language learning and only use their primary language to learn Japanese quicker (Riordan, 2014).

In Hawaii, the pendulum shifted each century regarding the importance of maintaining native Hawaiian language. The Hawaiian language diminished because English was the medium of language instruction for business and education throughout the early to mid-1900s (Wilson & Kamanā, 2009). There was a resurgence of speaking native Hawaiian in the late 20th century, which was evident by the origin of Hawaiian as the medium of instruction in Nawahi primary and secondary schools and the Ka Haka ‘Ula O Ke’elikolani College of Hawaiian Language of the University of Hawaii at Hilo (Wilson & Kamanā, 2009).

The lack of awareness of the cognitive benefits of dual language acquisition have imbued bilingualism and biliteracy as distracting from the mainstream core curriculum (de Jong &
Bearse, 2014; Souto-Manning, 2006). However, literature increasingly discusses the cognitive and long-term achievement benefits of dual language learners (Callahan & Gandara, 2014; Lindholm-Leary, 2000; Pokrivčáková, 2013; Souto-Manning, 2006). Some identified cognitive benefits of accruing two or more languages include creativity, flexibility of thought, and abstract thinking (Lindholm-Leary, 2000). Learning languages opens pathways in the mind and elicits new ways of thinking (Jasinska & Petitto, 2013). Additionally, when comparing first and second language structures, vocabulary, and grammar, the brain continually retrieves prior knowledge and makes cognitive connections to old and new knowledge (Surmont, Piet Van de Craen, Struys, & Somers, 2014). Students who actively engage in 6 or more years in dual language experiences find an inherent long-term benefit to the acquisition of more than one language for their overall intellectual capacity (Lindholm-Leary, 2000). According to Lindholm-Leary (2000), 65% of participating dual language immersion students felt they were at or above the achievement of their non-program peers and 15% felt they were “way ahead” of them. This represents a robust self-perception of cognitive functioning for the individuals who embarked on a dual language immersion experience.

Bilingualism and biliteracy are increasingly recognized as useful and beneficial for the global economy, which is evident by the notion that encountering non-English speakers is ubiquitous (Bandeira-De-Mello, Fleury, Aveline, & Gama, 2016; Callahan & Gandara, 2014; Pokrivčáková, 2013); therefore, developing and demonstrating the skills of bilingualism and biliteracy is growing in demand. Some parents and students recognize the economic benefits of having a capacity to read, write, speak, and listen in another language for future employment and career options (de Jong & Bearse, 2014; Gorman, 2015). Language acquisition and usage is highly dependent on proximity to other language speakers; having the language capital of a
language that is not highly utilized nor valued in a region, such as a minority language or tribal dialect, may lack validity. Meanwhile, a predominant hierarchical economic language, such as English or Japanese will be beneficial for economic value (Blommaert et al., 2005). For those with hierarchical value, opportunities to capitalize on these skills is cited with growing evidence that employment opportunities abound for qualified bilingual candidates, but only a small percentage of candidates are qualified for such jobs (Damari et al., 2017; Lo Bianco, 2001). Moreover, despite the growing demand for bilingual and biliterate communicators, English speakers are most likely to rely on their first and, in some cases, only language because others who learn English as a second language are proficient enough or prefer to communicate in the *lingua franca* of English (Lindholm-Leary, 2000).

The curriculum and instruction of bilingualism is perceived as any system providing instruction in two languages, and that may encompass an isolated target language instruction class, transitional bilingual class, or class with equitable time spent instructing in two languages (Aiello, Di Martino, & Di Sabato, 2015; Cahnmann & Varghese, 2005; Kim et al., 2015; Montanari, 2014; O'Rourke, Zhou, & Rottman, 2016; Pokrivčáková, 2013). Two paramount methods for instilling the value for building the capacity of bilingualism and biliteracy among school-aged children are through dual language immersion and two-way immersion programs (de Jong & Bearse, 2014; Gorman, 2015; Lindholm-Leary, 2000). Dual language programs capitalize on the linguistic resources that all learners bring to the experience (de Jong & Bearse, 2014). The terms dual language and two-way immersion are often interchanged. However, dual language immersion is the canopic term to describe all dual language and transitional bilingual programs, while the two-way immersion is dedicated to an equal balance of instruction in English and a target language. Dual language programs are intended to build language and
academic proficiency in two languages through a structured curriculum with an emphasis on cultural competence (de Jong & Bearse, 2014; Lindholm-Leary, 2000). Most of the dual language programs exist within schools or as entire entities of dual language ideology (de Jong & Bearse, 2014; Lindholm-Leary, 2000). In cases of effective dual language instruction, the target and native languages of the students are both hierarchically validated as important languages, and instruction and social communication is utilized in both languages systematically and equitably throughout the entire program (de Jong & Bearse, 2014; Lindholm-Leary, 2000).

Without dual language proficient teachers, the accessibility of promoting dual language learning in a coordinated manner may appear impossible. This study will study the gap between the goal of higher student attainment of the State Seal of Biliteracy and the present performance. The study will especially address the innovative nature of remediating a gap in dual language learning and culturally relevant pedagogy within all secondary content area classrooms, despite the low number of core content area teachers who possess credentials that prove proficiency in two or more languages. Teachers have inconsistent second language proficiency in U.S. classrooms, despite the high numbers of students who often bring more than one language with them to school in California (California Department of Education, 2016a). Culturally relevant pedagogy approaches the cultural and linguistic capital of the ethnically diverse student population as an advantage and as added value for all students (Gay, 2002). Therefore, teachers will need to be skilled in developing student-centered and student-led language instruction within the content area instruction to promote cultural relevance and dual or multilingual acquisition.

**Importance of Addressing the Problem**

Graduates are expected to engage in post-secondary education or employment in a globalized society. The number of students attaining proficiency in two or more languages
represents a bifurcation of language capital in homes and schools, which impacts subsequent generations of human capital in the United States. Despite the 2-year world language requirements for college and university admissions and the newfound acknowledgement of the seal of biliteracy veiling over most of the state secondary school diplomas, systematic preparation of secondary students for participation as bilingual and biliterate citizens before graduating from high schools represents a gap. The recognition of and evaluation on schools’ abilities to produce earners of the State Seal of Biliteracy in 33 states and the progress toward it in another 10 signifies a systematic move toward producing more bilingual and biliterate graduates (Californians Together, 2017). The initiation of the State Seal of Biliteracy fossilizes the momentum toward a more globalized preparedness for secondary students in language and cultural proficiency. However, it is not enough to simply develop a metric without a systematic organized initiative empowered to help students progress in that direction.

Low bilingualism and biliteracy among secondary students also represents a larger national impediment in the United States of reliance upon English among native English speakers despite an increasingly globalized society and evidence of the myriad cognitive, academic, economic, and cultural benefits of learning two or more languages. Though English continues to be a language of international commerce, trade, and entertainment, English speakers often rely on translation to be active and engaged citizens when in a context where English is not the language of medium. According to the European Union (EU), multilingualism is positively viewed and encouraged, such that all members of the EU must provide students with instruction in two languages in addition to their majority language, so as to build toward a continental culture of multilingualism (Aiello et al., 2015; Pokrivčáková, 2013).
By exploring and addressing the gap in achievement of students to prove proficiency in two or more languages through culturally relevant pedagogy at the secondary level, it may illuminate and potentially resolve aspects of the resounding and persisting achievement gap that exists between ethnic minorities and English Only students. Students engaging in a culturally relevant pedagogy that solicits the assets of each students’ primary language and culture and promote bilingualism and biculturalism are suspected to exemplify higher levels of motivation, school engagement, and efficacy among students.

Organizational Context and Mission

College Prep High School District (CPHSD) is situated in a southern California suburb consisting of rural and urban landscapes, with access to livestock and agriculture and metropolitan living, dining, and entertainment. Enrollment for the 2015-2016 school year within CPHSD was 7,291 students, which is the total number of days of school attendance per students divided by total number of school days (Ed-Data, 2017). The district consists of three comprehensive high schools, one magnet high school, and one continuation high school for students with low credits aged 15 years 6 months to 18 years old. The district also sponsors two charter high schools, but they are not included in the study, nor are they obligated to the district curriculum adoptions or Local Control Accountability Plan (LCAP) goals. Each comprehensive high school contains an independent study online learning center option for students who prefer course schedules that are a hybrid of online and live courses, to accelerate through secondary courses more quickly, and to provide an option for credit recovery. For this study, only the three comprehensive high schools and the one magnet high school will be utilized because they are college preparatory high schools with core alignment to college and career readiness.
Demographic data from 2015-2016 indicate that the district consists of diverse student enrollment, including 61.7% Latino, 28.7% White, 2.9% Asian, 2.3% African American, 2.2% Filipino, 0.4% Pacific Islander, 0.4% American Indian or Alaska Native, and 1.5% reported None or Two or More (Ed-Data, 2017). Languages represented through the Ed-Data (2017) reflect home languages of Arabic, Farsi, Tagalog, Vietnamese, and Spanish, which is the majority home language, yet the informal list of languages that students indicate on their home language survey include Ma’m and Q’anjob’al (Guatemala), Ilocano (Philippines), Japanese, Russian, and German in addition to the aforementioned languages. All district students are classified as English Only (EO), signifying that the student does not speak or hear another language at home or with immediate family; Initial Fluent English Proficient (IFEP), signifying that the student does engage in usage of another language, but their English proficiency is adequate for school based on the California English Language Development Test (CELDT) or English Language Proficiency Assessment of California (ELPAC) assessment; Reclassified Fluent English Proficient (RFEP), signifying that the student was classified as an English learner but met the minimum proficiency requirements to reclassify; and English learner (EL), signifying that the student has not demonstrated proficiency in English, and he or she maintains dominance in the first language and still receives support to learn English. As it relates to language proficiency, the district does not currently formally examine or measure other language proficiency other than English. It is evident that all students enter secondary school with a broad range of language proficiency and linguistic assets, due to previous formal and informal language learner, differing durations and magnitudes of language learning, or no language learning aside from primary language. This heterogeneity in language proficiency upon arrival
CULTURALLY RELEVANT BILINGUAL SECONDARY EDUCATION

has the potential to impact trajectory of instruction to guide students toward gaining proficiency over the course of the years prior to graduation.

Graduation requirements within CPHSD are 230 total credits and incorporate 40 English credits, 30 mathematics credits, 30 social sciences credits, 20 fine arts or world language credits, 20 physical education credits, and 70 electives credits. Additionally, for college or university seeking students, there are minimum requirements for application to the California university systems: University of California (UC) and California State University (CSU). The minimum requirements are called the A-G requirements, and they describe the fundamental courses required for entrance into one of those universities. The following describe the courses required in A-G: (a) 2 years of history or social science, including at least 1 year of world cultures and 1 year of U.S. history; (b) 4 years of college preparatory English; (c) 3 years of college preparatory mathematics, including advanced algebra and two- and three-dimensional geometry; (d) 2 years of laboratory science, including at least two of the three disciplines of biology, chemistry, or physics; (e) 2 years of a world language other than English; (f) 1 year of a visual or performing art; and (g) 1 year of a college preparatory elective, of which there is a wide selection (University of California, 2015). Note the difference between the graduation requirements and the A-G requirements regarding world language; non-college going students have the option to not take a world language at all, while college going students need only take 2 years.

California developed a new accountability system since the cessation of the No Child Left Behind federal education accountability guidelines in 2014. The new Smarter Balanced Assessment Consortium performance-based online assessments were piloted in 2013 and field tested in 2014 (Smarter Balanced Assessment Consortium, 2016). The LCAP was developed in response to the new Local Control Funding Formula (LCFF) and the distribution of funds, which
CULTURALLY RELEVANT BILINGUAL SECONDARY EDUCATION

was enacted in 2013 (California Department of Education, 2017b). The LCFF allocates an equitable sum of money to districts per unduplicated count of students with additional subsidies provided for those students identified within one or more of the following categories: English Language Learner (ELL), Socioeconomically Disadvantaged (SED), and Foster Youth. The LCAP requires local stakeholder input in alignment with eight state priorities: student achievement, student engagement, course access, implementation of common core standards, school climate, basic services, parent involvement, and other student outcomes (California Department of Education, 2017b). Each school is also required to create a Single Plan for Student Achievement, which aligns with the LCAP goals and determined how Federal Title I money will be spent; Title I money is restricted to provide supplementary services for Els and SEDs as well. CPHSD developed goals in alignment with the eight LCAP priorities to address a range of needs for the district to improve outcomes.

In alignment with the LCAP goals, particularly those of student academic achievement, the mission of CPHSD is to provide high quality educational programs to promote the success of all students through high expectations, highly skilled and committed staff members, facilities and an environment that promotes teaching and learning, community connections, and organizational alignment. The district mission and LCAP goals are distilled to reflect an instructional focus to help students to communicate their thinking and ideas through written, oral, and nonverbal expression.

**Organizational Performance Status**

Among those earning the seal of biliteracy, most earners of the seal were native Spanish speakers who initially placed out of English learner status or were reclassified as fluent English proficient later in their school tenure. These individuals arrived at school with the asset of
speaking one or more languages other than English at home. A small percentage of earners were native English speakers who had pursued and completed one of two seal pathways in Spanish at school. The pathways completed were 4-year language program or passing the AP exam in Spanish.

The quantity of students earning the seal of biliteracy at each site is displayed in Table 1. The columns represent the total quantity of graduates who earned the seal of biliteracy per school year since the origin of the seal in the 2013-2014 school year. Each high school is listed with the total number per year broken down into those who are classified as EO, IFEP, and RFEP. Notably, the seal of biliteracy has gained momentum and interest leading to an increase since it was first proposed to graduating seniors, but the total percentage of students earning the seal of biliteracy remains low as compared to the quantity of graduates not earning the seal.

Not achieving 100% achievement of the California State Seal of Biliteracy earners represents the gap in the organization’s mission to prepare all students to become college and career ready in the 21st century. Therefore, it may indicate that students will need to supplement their participation for later participation in a global society as persons who demonstrate bilingual and biliterate proficiency. As seen in Table 1, the quantity of achievement each year since 2014 represents an increase, yet the number of seal earners who are predominantly EO, the percent has mostly decreased. In the class of 2014, 33 of 161 seal earners (20.5%) were native English second language learners. In 2015, 23 of 183 seal earners (12.6%) were native English second language learners. In 2016, 44 of 235 seal earners (18.7%) were native English second language learners. In 2017, 26 of 308 seal earners (8.4%) were native English second language learners. In one site, over the course of 4 years, only two students who earned the seal were native English
speakers. Given that in 2015-2016 the Latino enrollment is 61.7%, the numbers of students earning the seal is significantly skewed toward native Spanish speakers who have reclassified.

A question of how much value the schools are adding to second language development surfaces. Generally, it is assumed that the growth has more to do with students with existing language strengths gaining more awareness of how to earn the seal for rather than a systemic change in district priorities or policies to prepare all students to become bilingual and biliterate. Students with existing language assets derived from native language development at home demonstrate proficiency in two languages at a significantly greater rate than those who do not bring any home language assets or who are not afforded assessments for earning the seal in languages other than Spanish, French, or American Sign Language (See Table 4 in Chapter 2).

### Table 1

**CPHSD Seal of Biliteracy recipients 2014-2017**

<table>
<thead>
<tr>
<th>School Site</th>
<th>2014 Quantity</th>
<th>2015 Quantity</th>
<th>2016 Quantity</th>
<th>2017 Quantity</th>
<th>2018 Quantity*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Berkelium</strong></td>
<td>NA</td>
<td>NA</td>
<td>22</td>
<td>59</td>
<td>51</td>
</tr>
<tr>
<td>EO</td>
<td>NA</td>
<td>NA</td>
<td>10</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>IFEP</td>
<td>NA</td>
<td>NA</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>RFEP</td>
<td>NA</td>
<td>NA</td>
<td>11</td>
<td>48</td>
<td>39</td>
</tr>
<tr>
<td><strong>Antimony</strong></td>
<td>39</td>
<td>41</td>
<td>59</td>
<td>73</td>
<td>87</td>
</tr>
<tr>
<td>EO</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>IFEP</td>
<td>11</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>RFEP</td>
<td>26</td>
<td>38</td>
<td>51</td>
<td>68</td>
<td>78</td>
</tr>
<tr>
<td><strong>Indium</strong></td>
<td>58</td>
<td>67</td>
<td>75</td>
<td>106</td>
<td>87</td>
</tr>
<tr>
<td>EO</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>IFEP</td>
<td>5</td>
<td>4</td>
<td>10</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>RFEP</td>
<td>53</td>
<td>63</td>
<td>63</td>
<td>103</td>
<td>86</td>
</tr>
<tr>
<td><strong>Titanium</strong></td>
<td>65</td>
<td>75</td>
<td>79</td>
<td>69</td>
<td>76</td>
</tr>
<tr>
<td>EO</td>
<td>31</td>
<td>22</td>
<td>31</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>IFEP</td>
<td>14</td>
<td>1</td>
<td>10</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>RFEP</td>
<td>20</td>
<td>52</td>
<td>38</td>
<td>45</td>
<td>46</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>161</td>
<td>183</td>
<td>235</td>
<td>307</td>
<td>301</td>
</tr>
</tbody>
</table>

EO = English Only; IFEP = Initial Fluent English Proficient; RFEP = Redesignated Fluent English Proficient. *Pending 2018 AP scores and final GPAs
Since the California State Seal of Biliteracy originated in 2011, it is still relatively new and unknown to many people in schools and the community. Despite some school community members’ lack of understanding of the seal, CPHSD currently has identified the seal as a priority within the LCAP. World language teachers recently requested that information about how students can earn the seal be posted in their classrooms. Additionally, world language teachers asked that information about the seal be available in the school counseling office and the main school office so that students, counselors, administrators, and parents will have immediate and clear knowledge about the expectations for earning the seal. World language teachers and counselors can poignantly share about the benefits of earning the seal and reinforce students to follow the pathway to earning it. The world language teachers have indicated that they feel nearly 90% of the student body could qualify and become amply prepared to easily pursue and earn the seal, but there are roadblocks that dissuade or prevent them from pursuing the seal. Some of the roadblocks anecdotally noted were student schedule limitations, variance in teacher grading among world language classes, and lack of knowledge among students about how to earn the seal. There are assumed knowledge, motivation, and organizational root causes that impede progress toward achieving a significant districtwide increase in seal earners; these will be explored and validated, partially validated, or invalidated based on research findings.

Potential consequences for not achieving the organizational and LCAP goal for biliteracy represents an underperformance of human capital and an underutilization of student assets. This type of underutilization is indicative of broader societal beliefs or ideals about the community and students with the linguistic capability of becoming proficient in two or more languages. Because the district continues to make earning the seal of biliteracy a priority, the professional learning and student support systems and instructional foci should reflect these new priorities.
The research about cognitive and economic benefits of bilingualism reverberate within this school district because many students have potential to further capitalize on the strengths they possess by having the ability to traverse multiple languages.

**Organizational Performance Goal**

One of the 15 sub-goals throughout the CPHSD LCAP Academic Achievement Goal 1 was to increase the quantity of students earning the State Seal of Biliteracy by 2% each year. Though the percentage of students expected to earn the seal was small considering the assets and potential of the students, for the purpose of this study, the goal will be set to 100% attainment.

Upon completion of the LCAP plan, the CPHSD Board of Education and the County Office of Education was required to provide assistance with aligning the goals with the eight state priorities and ultimately provide approval of the district plan. Various stakeholders, such as teachers, parents, students, community members, and administrators contributed feedback regarding goal development and the allocation of supports. Each LCAP goal was developed for implementation within a 3-year cycle per LCAP plan, with understanding that each 4-year graduation cycle will involve new students because each prior graduating class moves on to post-secondary. The target of increasing the goal attainment is dependent on a moving target of students who matriculate through secondary school, while the LCAP plan remains in place for 3 years. Given that the seal is earned through one of the previously mentioned methods of 4-year language program, AP, SAT-II exam, IB, or “off-the-shelf” assessment, increases in seal earners based on programmatic or pedagogical changes made within the district in 1 year may not be reflected in outcomes until 3 or 4 years later.
Description of Stakeholder Groups

Those involved in the creation of LCAP, which contained the academic achievement goal to increase the quantity of students earning the California Seal of Biliteracy, include students, parents, teachers, administrators, other school personnel, district office personnel, community members, the Board of Education, and the County Office of Education. However, this study identifies teachers, administrators, and parents as the most intimately linked stakeholders for this performance problem because they will have the most direct impact in achieving a positive outcome.

Teachers are pivotal stakeholders in the acquisition of two or more languages for students, as they are responsible for planning lessons in alignment with state common core standards, delivering and facilitating the instruction, and facilitating the students’ classroom-based learning experiences. Teachers can impact the outcome of the performance goal because they directly influence the information to which the students have access. Specifically, world language and English language development teachers are involved in preparing students to increase fluency in their second languages. Additionally, AP teachers are involved in the recruitment of students to their AP programs, by which AP World Languages is one of the capstones for earning the California State Seal of Biliteracy.

Administrators represent a gateway for prioritizing organizational impacts on students obtaining the California State Seal of Biliteracy. Administrators are held accountable and their schools are assessed on a range of outcome measures, one of which is the quantity of students who earn the seal, and they can impact processes, policies, and priorities. Moreover, administrators relay information about the goals of the state, county, district, and school to all other stakeholders.
Parents are the students’ first teachers, and though they may not be directly involved with curriculum and instruction, they can be enforcers of and contributors to a student’s first and second language learning. Based on current data, most students who currently earn the seal speak another language socially or within their own families. Parents are directly involved in the early years of literacy development and implement the values of which or how many languages they use to communicate with their children.

**Stakeholder Groups’ Performance Goals**

Table 2

*Organizational Mission, Organizational Performance Goal, and Stakeholder Performance Goals*

**Organizational Mission**

The College Prep High School District is committed to providing high quality educational programs that maximize the success of each and every student. Foundational to our success is the continued focus on the development and completion of district goals that are in concert with the following beliefs:

We, the College Prep High School District, believe that it is our responsibility to:

Hold high expectations for and improve the academic achievement of all students within College Prep High School District.

- Provide a highly skilled, caring, and committed staff that collaborates to positively support and affect instruction and learning.
- Provide the appropriate educational facilities that create an environment supportive of both teaching and learning within a safe and orderly setting.
- Promote, foster, and develop community connections through strong and effective communication and partnerships, as well as opportunities for shared input.
- Support organizational alignment that maximizes student academic success.

**Organizational Performance Goal**

By May 2019, 100% of graduating seniors will earn the California State Seal of Biliteracy by demonstrating proficiency in a second language by:

1. Demonstrating proficiency on English language arts CAASPP state assessment and obtain 2.0 in English language arts courses,
2. Demonstrating minimum English proficiency as an English learner on the ELPAC, and
Table 2, continued

Organizational Performance Goal

3. Meeting one of the following language requirements in a language other than English:
   a. Complete 4 years of a world language with 3.0 or better,
   b. Pass an Advanced Placement (AP) world language Exam with three (3) or higher,
   c. Pass the SAT-II Foreign Language sub-test with a 600 or higher,
   d. Complete an International Baccalaureate (IB) world language Program with a score of three (3) or higher, or
   e. Pass an Off-the-Shelf Language Assessment that was approved by the superintendent of public instruction.

<table>
<thead>
<tr>
<th>Teachers</th>
<th>Administrators</th>
<th>Parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Spring 2019, all teachers will promote bilingualism and biliteracy through culturally relevant and sustaining pedagogy and student-centered dual language instruction to improve proficiency in two or more languages.</td>
<td>By Fall 2018, administrators will coordinate the master plan for executing a system to support the incorporation of culturally relevant pedagogy and student-centered dual language instruction.</td>
<td>By Fall 2019, parents will provide meaningful feedback to students, teachers, and administrators regarding their child’s progress within the culturally relevant pedagogy and support dual language acquisition.</td>
</tr>
</tbody>
</table>

Currently, students within CPHSD have earned the seal of biliteracy through a 4-year world language program or AP exam. Students have not earned the seal through IB because the district does not offer any IB programming, nor have students earned the seal through SAT-II subject test or “off-the-shelf” language assessment.

Stakeholder Group for the Study

In a typical gap analysis study, all stakeholders’ contributions would be thoroughly investigated and researched. However, for this study, teachers have the greatest impact on delivering culturally relevant pedagogy and curriculum, mediating information about the seal, and advocating for what will produce the best outcomes for students in order to accomplish the
stakeholder goal to promote bilingualism and biliteracy through incorporation of dual language instruction and culturally relevant and sustaining pedagogy so that students increase their cultural engagement and increased proficiency in both languages. Teachers are responsible for planning lessons, contributing to the development of the curriculum, delivering instruction, and using best practices in language and learning pedagogy. They possess immediate and direct influence over student performance through their daily interaction.

Combined with the notion that all highlighted stakeholders share in the responsibility of enhancing and achieving performance objectives, teachers are most imperative to the achievement of the organizational performance goal of increasing the quantity of California State Seal of Biliteracy earners, which leads to more language proficient and culturally engaged learners. Therefore, teachers are the primary stakeholders to understand progress toward achieving the overarching goal of increasing the number of students who earn the seal of biliteracy.

**Purpose of the Study and Research Questions**

The purpose of this project is to conduct a gap analysis, with emphasis on innovating a school-wide effort to promote and advance bilingualism and biliteracy despite a low quantity of teachers possessing bilingual credential, to examine the knowledge, motivation and organizational influences that affect the CPHSD’s ability to achieve 100% student attainment of earning the California State Seal of Biliteracy. The analysis will begin by generating a list of possible or assumed influences based on observation, review of literature, and learning and motivational theory that will be examined systematically to identify actual or validated influences. While a complete gap analysis would develop and collect data on all the influences of
all stakeholders associated with the goal, for practical purposes the stakeholder to be focused on in this analysis is teachers. The research questions addressed in this study include:

1. What is the teachers’ knowledge and motivation related to promoting bilingualism and biliteracy through culturally relevant and sustaining pedagogy and student-centered dual language instruction to improve proficiency in two or more languages?

2. What is the interaction between the organizational culture and context and teachers’ knowledge and motivation?

3. What are the recommended knowledge and skills, motivation, and organizational solutions needed to accomplish the goal of promoting bilingualism and biliteracy through culturally relevant and sustaining pedagogy and student-centered dual language instruction to improve proficiency in two or more languages?

Conceptual and Methodological Framework

The conceptual framework for this study is a gap analysis, which is a systematic and analytical method that helps to clarify organizational goals and identifies root causes that influence the actual performance level from achieving the preferred performance level within an organization (Clark & Estes, 2008). The methodological framework is a mixed methods study with quantitative and qualitative data collected and descriptive statistics. Assumed knowledge, motivation, and organizational influences that affect organizational goal achievement will be generated based on informal anecdotal observation, learning and motivation theory, and review of literature surrounding the topic of bilingualism and biliteracy proficiency, along with culturally relevant and sustaining pedagogy. These influences will be assessed by using literature review, surveys, interviews, classroom observations, and document analyses. To understand the overall context, a variety of district data will be reviewed and compared to state,
national, and international metrics. New quantitative and qualitative data will be obtained through surveys and interviews of teachers and classroom observations. The inquiry is a case study of CPHSD and will loosely follow an explanatory model with evidence from the quantitative results substantiated and developed further by the qualitative data results. Research-based solutions will be recommended and evaluated in a comprehensive manner.

Definitions

Bilingualism: Ability to engage and communicate using two languages; use of and proficiency in two languages may change depending on the opportunities to use the languages and exposure to other users of the languages (Bono & Stratilaki, 2009).

Biliteracy: Ability to read and write in two languages.

California State Seal of Biliteracy: Program recognizing high school graduates who have attained a high level of proficiency in speaking, listening, reading, and writing in one or more languages in addition to English (California Department of Education, 2016b).

Culturally Relevant Pedagogy: Pedagogy that embodies cultural knowledge of ethnically diverse groups that is used to redesign teaching and learning, incorporating academic achievement, cultural competence, and sociopolitical consciousness (Gay, 2002; Ladson-Billings, 1995).


Dual Language Immersion: Foreign language immersion for native English speakers, transitional bilingual programs for native speakers with a native language other than English, two-way immersion programs that combine these two populations, and heritage language programs (Center for Applied Linguistics, 2016).
Global Competence: Acquisition of in-depth knowledge and understanding of global and intercultural issues; the ability to learn from and live with people from diverse backgrounds; and the attitudes and values necessary to interact respectfully with others (Office of Education and Cultural Development, 2016).

Global Citizenship: Building a sense of belonging to a common humanity and helping learners become responsible and active members of a global society.

Lingua Franca: Medium of communication most frequently used across various contexts.

Two-way Immersion: Bilingual program with a balance of use in English and another language.

Organization of the Study

The study is organized into five chapters, which include the problem of practice, literature review, methodology for collecting data, data analysis of accumulated research, and recommendations given based on research findings. Chapter One includes the problem of practice, a description of the problem, background information about and importance of the problem and its surrounding variables, the organizations goals and stakeholders, and key vocabulary for understanding the topic. Chapter Two outlines the literature review, which takes the reader on a journey through the history of bilingualism and biliteracy and how the problem impacts students presently. Chapter Three is the methods section and presents a description of how the data will be collected regarding variables in knowledge, motivation, and organization that impact the problem. Chapter Four outlines the data analysis, which will generalize themes and validate or invalidate the claims about the assumed knowledge, motivation, and organizational influences and needs. The final chapter, Chapter Five, will evaluate the findings and identify recommendations, highlighting key strategies for the organization to consider in order that they may focus on improving upon their current results and outcomes.
CHAPTER TWO: REVIEW OF THE LITERATURE

This literature review will identify and discuss crucial elements regarding current and perspective levels of attainment of students progressing toward earning the California State Seal of Biliteracy, a symbol of comprehensive bilingualism and biliteracy attainment upon graduation from secondary school in California. The review begins with a look at the diverse and changing demands of students, teachers, and schools in the globally interconnected 21st century, which includes notions about globalization and immigration and their impacts on instruction within schools worldwide. The review continues by including in-depth scientific research findings regarding cognitive, academic achievement, economic and cultural assets, benefits, and advantages of bilingualism.

The literature embraces a description of the history, policies, and current state of bilingual education, describing various forms of bilingual instructional models, requisite and effective teacher preparation, credentialing, and training, and curriculum and instruction to support bilingualism and biliteracy by and through culturally relevant and sustaining pedagogy. The relevance of culturally relevant and sustaining pedagogy is explored as it relates to curriculum and instruction and juxtaposes against students gaining bilingualism and biliteracy across all content areas of instruction. The literature will look at how bilingualism and biliteracy is defined and the efficacy of how it is assessed. The literature review will delve into the origin and development of the State Seals of Biliteracy, primarily the California State Seal of Biliteracy, which is described and reviewed for native and non-native English speakers. In the final section of the literature review, a summary of assumed influences and needs in teacher knowledge, motivation, and organization is scripted surrounding learning and motivation theory.
and the specific influences that predominate the specific pathways to earning the California State Seal of Biliteracy.

The knowledge and skills section are composed of factual, conceptual, procedural, and metacognitive elements that are essential to informing the gap in attaining the seal of biliteracy. Motivation reviewed will describe how choice, persistence, and mental effort are impacted by beliefs, values, teacher self-efficacy, and goal-orientation (Clark & Estes, 2008; Krathwohl, 2002; Rueda, 2011). Organizational elements covered regarding the gap will include resources, cultural models, cultural settings, training, and policies and procedures (Gallimore & Goldenberg, 2001; Rueda, 2011). Finally, the knowledge, motivation, and organizational influences and needs gathered will capture the essence of how these variables are expressed in the literature and directly impact the goal of increasing bilingualism and biliteracy of all students and earning the seal of biliteracy, which will complete the literature review.

21st-Century Language Learning in a Global Context

Education in the 21st century affords a newfound opportunity to create globally engaging experiences. Through international competition, the role of language teaching and learning may continue to burgeon as educational institutions develop the capacity of future employees to meet the economic demands (Reimers, 2013; Lo Bianco, 2001). There is growing consensus among researchers that to be prepared to participate in a global economy, language proficiency is one of the key variables to a solid foundation and introduction into global engagement (Reimers, 2009). An increasing number of global citizens are engaging in communication in more than one language with consistency for personal reasons, employment, healthcare, or otherwise. This ability to be able to communicate in more than one language may become an access barrier for individuals who do not prepare to engage in language learning.
Global corporations surfaced their lack of confidence that U.S. high schools and universities prepare graduates to be prepared for cross-cultural communication and multilingual skills (Reimers, 2009). Only seven states and Washington D.C. require 2 years of world language credit to earn a high school diploma (Davin & Heineke, 2017). As of 2001, only 8% of college students in the United States prioritized language learning during undergraduate studies, contrary to the EU, which enrolls upwards of 78% of elementary and 61% of lower secondary students were learning two or more languages in school (O'Rourke et al., 2016).

In a globalized knowledge economy that depends on intellectual capital and resources rather than natural resources, such as is prevalent in the 21st century in most industrialized nations, the individual is capitalized in terms of developed skills and intellectual capacity. Despite the nexus of globalization nudging nations to intermingle with other languages and cultures, many local minority or heritage cultures assume the need to assert their identity in response (Lo Bianco, 2001). These language minority statuses provoke some multiethnic and multilingual nations to preserve their multilingual tapestry because of the richness of cultural value and heritage and positive effects of students maintaining their heritage languages (Lo Bianco, 2001; Wilson & Kamanä, 2009).

The necessity of language as a medium of interaction across cultures and continents remains essential for participation in the global economy. An estimated three billion people on the planet engage in bilingualism daily (Noack & Gamio, 2015). In 1992, according to UNESCO, 90% of the 6000 languages spoken in the world would be extinct within two generations (Lo Bianco, 2001). Over 20 years later, UNESCO predicts that of the remaining 7,102 living languages remaining, 50% will be extinct by the end of the 21st century, most of which are located in sub-Saharan Africa, Oceania, Southeast Asia, and within the Amazon.
rainforest (Noack & Gamio, 2015). Chinese, which consists of all Chinese dialects, has more speakers than any other language with 1.39 billion, followed by Hindu-Urdu at 588 million speakers, English at 527 million speakers, Arabic at 467 million speakers, and Spanish at 389 million speakers (Noack & Gamio, 2015).

Language is highly personal and powerful and often represents or pervades status among those who speak or do not speak the dominant language (Medvedeva & Portes, 2016; Wilson & Kamanà, 2009). Nelson Mandela once said, “If you speak to a man in a language he understands, that goes to his head. If you talk to him in his language, that goes to his heart.”

According to the Central Intelligence Agency Factbook (2017), 4.83% of the world’s population speaks English and 4.85% of the world’s population speaks Spanish as a first language. Though rather infinitesimal in comparison to the world’s population, English is often learned as a second or third language and is the lingua franca for international commerce and trade. Having a common language medium across a wide range of industries and nations is aided by a common denominator in language. Despite the widespread use of English, the EU additionally marks French and German as working languages (Medvedeva & Portes, 2016). In the many contexts in which bilingualism is promoted, a common fear is that whichever instructional model is utilized, the heritage or primary language will be subtracted while the new language is acquired, yet there are bilingual instructional models that attempt to remedy the malady of subtractive language learning and promote additive bilingual learning (Cahnmann & Varghese, 2005; Kim et al., 2015; Younes, 2016).

The 21st century invited an era of new technologies to the language navigation landscape, such as online or application-based translation or interpretation products like Google Translate and Google Pixel Buds. Additionally, there are language learning virtual software tools, such as
Pimsleur Language Learning, Babbel, Duolingo, Berlitz, and Rosetta Stone to name only a few. Informal learning often overlaps with, supplements, or supplants formal language learning (Coroama, 2011). With these advances in technology, interpersonal communication is functionally accessible, but it may lack the nuanced cultural infusion of inference, history, and passion.

Global Marketplace

Increasingly, adults engaging in employment within the 21st century changing demands find themselves intertwined with companies, agencies, or institutions embedded in global enterprise. 21st century learning is often identified as requiring the four “C” elements, such as critical thinking, communication, collaboration, and creativity (DeLeon, 2014). As it pertains to language learning and usage, those elements resound throughout the notion and importance; those who can communicate in another language are able to collaborate across cultures and contexts. This expansion toward global cooperation and competition through a network of technology-supported interconnectedness is a marquee exemplar of the necessity for graduating students to become prepared to engage in this evolving economic landscape. O’Rourke et al. (2016) found that there are 80 federal agencies that need language proficiency among the array of employees in approximately 100 languages due to the requisites of the work required within those agencies. In a study conducted to examine the hiring processes for a spectrum of industry sectors, such as government, public administration, education services, health care, real estate, finance, and science, bilingual language skills were found to be critical or essential for hiring most frequently in government, administration, education services, and health care (Damari et al., 2017).
Employment opportunities are increasingly unlocked as employment competition from the global marketplace persists. Employees are expected to engage in understanding cultural and linguistic diversity, and businesses are engaging in the economies of emerging markets. With the advent of the seal of biliteracy, Callahan and Gandara (2014) studied the impact that evidential bilingualism has on employability, and they found that most of businesses prefer employees that are bilingual in order to appeal to and communicate with their diverse clientele.

**Immigration**

The trajectory of human movement within the 21st century due to globalization is continuing to dilate as more people move into large urban metropolises, seek higher wages, and evade corrupt governments and vapid wastelands. The increasing migration enumerates opportunities for languages and cultures to interface and integrate. In Spain, between 2001 and 2011, 60% of the growth in population consisted of immigrants, one third of whom were from Latin America (Medvedeva & Portes, 2016). Japan historically engaged in providing bilingual education for minority cultures and languages, such as Ainu and Korean, and retrieved the Japanese diaspora, or otherwise known as the Nikkei, back to Japan despite their lack of Japanese language (Riordan, 2014). When immigrants or ethnically displaced people move into a locale where their language and culture are not dominant, they will ultimately decide whether to maintain their heritage language or work toward assimilating into the mainstream language and culture. In some cases, their only option for language maintenance is within their own homes and ethnic communities, while in other cases, the educational institutions in which they participate are prepared to provide them with language maintenance additive bilingual education.

For first generation immigrants, the memories surrounding immigration are encoded into the minds of the learners more significantly as compared to memories more distant from the
immigration experience (Esposito & Baker-Ward, 2016). Additionally, the experiences and events become more fossilized in the memories of the immigrant in the dominant language of the environment (Esposito & Baker-Ward, 2016). Immigrant children are required to acquire enormous quantities of vocabulary and conversational fluency to succeed in the school setting (Haim, 2015; Scheele, Leseman, & Mayo, 2010). Consequently, the memories would be dependent on language proficiency (Esposito & Baker-Ward, 2016).

**Culturally Relevant and Sustaining Pedagogy in the 21st Century**

Global competence, issues of global significance, and global identity penetrate the classroom in the same way that they circulate the communities throughout the planet during the era of globalization (Damari et al., 2017; Ladson-Billings, 2014). Global competence is recognized as expertise and savvy in language proficiency, knowledge of geography, international, and regional travel, perspective-taking, mediating former cultural or ideological barriers, and activity for improving global conditions (Damari et al., 2017).

Along with global competence comes the demand for a pedagogy that embodies the identities of students whose heritages provide a panorama of the diversity from which they and their families originate. Pedagogy that typifies cultural competence, academic achievement, and sociopolitical, or otherwise stated as critical consciousness belaying social action can be identified through the cornerstone research of Ladson-Billings throughout the 1970s and 1980s, which became popularly known as culturally relevant pedagogy; however, contextually within United States history in the 1960s and 1970s, the notion of needing to be culturally relevant or responsive was approached through a deficit ideology, which was inherently subtractive of the heritage culture and focused on assimilation (Ladson-Billings, 1995; Paris, 2012).
Several researchers identified the significance of culturally relevant pedagogy as the purpose or goal of education (K. Allen, Jackson, & Knight, 2012; Freire & Valdez, 2017; Ladson-Billings, 1995). Three fundamental features of culturally relevant pedagogy emerged and remain ubiquitous across references to culturally relevant, culturally sustaining, or culturally sensitive pedagogy; they are the uncompromising elements of academic achievement, cultural competence, and sociopolitical or critical consciousness (Howard, 2003; Howard & Rodriguez-Scheel, 2017; Ladson-Billings, 1995; Ladson-Billings, 2014; Paris, 2012). Academic achievement embodies high expectations for learning and attainment of academic prowess. Cultural competence strives to grapple with the assimilation influences; therefore, the goal would be for students to maintain their heritage culture while learning to adapt to the dominant mainstream culture. Critical consciousness is the socially active notion of questioning the presuppositions and societal norms that may or may not be inclusive of diverse cultures and languages. In light of these notions, culturally relevant pedagogy shifted from an emphasis on making pedagogy, curriculum, and instruction relevant to ensuring the heritage cultures of students are sustained, known as culturally sustaining pedagogy because multilingualism and multiculturalism are becoming university accepted and expected (Paris, 2012).

**History of Bilingualism and Biliteracy in the United States**

Researchers have documented a rich history of bilingual education throughout the world, in Europe, in the United States, and especially in California (Baker, 1996; DeLeon, 2014; Gorman, 2015; Holstein, 1999; Kim et al., 2015; Lo Bianco, 2001; Pokrivčáková, 2013; Wiley & García, 2016; Wilson & Kamanā, 2009). Baker (1996) describes the periods of bilingualism throughout United States as passing through various interwoven periods of permissive, restrictive, opportunistic, and dismissive approaches to language learning. Wiley and García
(2016) highlighted policy pendulum swings oriented toward promotion, expediency, tolerance, restriction, repression, erasing, and null. Regardless of the time or age in American history, language policies can be influenced by notions of politics, power, control, collegiality, and competition.

As outlined in Table 3, it is noted that the 1800s presented a range of pivotal practices in bilingual education. Notably, Puerto Rico and the American Samoa, both territories of the United States have official bilingual policies (DeLeon, 2014). Throughout the 1800s in the eastern and midwestern parts of the United States, German Catholic settlers developed bilingual parochial schools that served up to 165,000 students in 1886 (DeLeon, 2014). In 1881, the Illinois Supreme Court ruled to permit foreign language courses in the elementary schools (DeLeon, 2014). In 1822, California became land owned by Mexico; however, in 1946, ownership returned to the United States, thus changing the language trajectory of the state (DeLeon, 2014). From the 1860s to 1900, Native Americans provided instruction to the European traders in language and survival, and many Native Americans learned English to operate as mediators between the old and new residents (Spack, 2002).

In the early 20th century, American immigrants maintained their native languages within their communities and soon thereafter, the schools (Holstein, 1999). Bilingual education is influenced by federal, state, and local legislation, all of which have seen a pendulum shift markedly since 1964, though the history of bilingualism in the United States spans centuries (Gorman, 2015; Holstein, 1999; Kim et al., 2015). Since early European immigration to the United States, the immigrant members from Germany, Spain, Italy, Poland, and England retained their native languages within their own communities or developed bilingual schools. It was during the 1920s to 1950s surrounding the two world wars that value of bilingualism was
diminished in favor of nationalistic unification around the English language. During the 1950s and 1960s, English as a second language gained newfound predominance within schools (Holstein, 1999).

Soon thereafter, Title VI of the Civil Rights Act of 1964 and Title VII of the Elementary and Secondary Education Act (ESEA) of 1965 and allocated funding to bilingual education through a federal injunction known as the Bilingual Education Act in 1968, which would encourage schools to impart instruction in two or more languages, one of which needed to be English (Gorman, 2015; Holstein, 1999; Kim et al., 2015). Following the federal pivot toward funding bilingual education, within San Francisco’s Chinese immigrant population emerged the Lau v. Nichols lawsuit in 1974, which is known as the case regarding schools’ requirement to meet the language needs of students by delivering instruction in the students’ native language with the intention of providing equitable opportunities to learn (Gorman, 2015; Holstein, 1999; Kim et al., 2015; Pokrivčáková, 2013; Wiley & García, 2016). The Lau Remedies were parameters for improving equal access and succor for students in schools from non-English-speaking communities; they persisted from 1974 through 1981 until President Reagan determined that the expense was unnecessarily funded by the federal government and could not be sustained (DeLeon, 2014). In 1978, the Bilingual Education Act was reauthorized to include more English learner supports (DeLeon, 2014). Though the origin of Lau v. Nichols was in California in 1974, an amendment to the California constitution made English the official language in California in 1988 (Kim et al., 2015).

Following the tumultuous policy changes and adaptations occurring in the United States, the education and cultural arm of the United Nations, UNESCO initiated an “Endangered Languages Project” in 1993, which was followed by the establishment of the International
Clearinghouse on Endangered Languages (DeLeon, 2014; Lo Bianco, 2001). These efforts from UNESCO were founded on the notion that minority languages were diminishing globally. This reduction in minority languages could impact the heritage cultures and histories of a multitude of communities and reinforces the predominance of power brokerage that coincides with language.


Another shift occurred during the advent of No Child Left Behind Act of 2001, when Title III of NCLB allocated federal funding to support English language development for students who spoke another language at home (Cahnmann & Varghese, 2005; Kim et al., 2015). The act deprioritized the primary or heritage languages of the students and emphasized an attainment of English as the primary objective. Though it did not seek to eliminate bilingual education outright, the following action of the federal government illuminated the intent. Following the inauguration of NCLB in 2001, the federal government repealed the Bilingual Education Act in 2002 (Cahnmann & Varghese, 2005). The former Office of Bilingual Education and Language Minority Affairs became the Office of English Language Acquisition (Wiley & García, 2016). Bilingual advocates in California, such as those from Glendale Unified School District’s extensive bilingual dual immersion programs, advocated for a seal of biliteracy to provide high school graduates with proof of their bilingualism and biliteracy skills (DeLeon, 2014; Montanari, 2014). Declined in its inaugural attempt in 2006, the Assembly Bill (AB) 815 passed in 2011 in California, which took effect in January of 2012 (California Department of
AB 815 was the pioneering bill to adopt and substantiate a State Seal of Biliteracy (SSB). California became the trailblazing state for development of the biliteracy seal. Since then, 27 additional states joined in creation of the SSB and 14 states are progressing toward the creation and passage of this type of bilingual verification process for their high school graduates (California Department of Education, 2016b; Californians Together, 2017; O’Rourke et al., 2016). The seal may have contributed to or been the impetus for voters to approve Proposition 58, known as the California Education for a Global Economy Initiative, would repeal the statewide limitations on bilingual education of Proposition 227 and enliven pathways toward heritage language maintenance and proficiency in two or more languages (California Department of Education, 2017a).

Europe has been chiseling out a path for multilingual education for centuries thanks to the unification of the EU, which originated as a conglomerate of six member-nations in 1951 up to 27 member-nations in 2017 (Central Intelligence Agency, 2017). In 2001, there was evidence of the adoption of a “M+2 rule,” which required that all member countries of the EU are expected to provide instruction in the students’ mother tongue, otherwise known as the primary language, and include two additional languages into instruction (Aiello et al., 2015; Holstein, 1999; Sylven, 2013). Finland, who has been the forerunner in the multilingualism of Europe, Sweden, Germany, Slovakia, Italy, and Spain are among those nations who continue to develop their systems of trilingual schools.

Where there is a need for bilingual education, there is a value on preparing students for inclusion in a multilingual society nearby or abroad, building a workforce that is competitive with the world nations, and uniting together for a common cause or against others with
conflicting causes. The chart below displays a timeline traversing global, federal, and state policies surrounding bilingualism and bilingual education.

Table 3

*History of Bilingual Education (DeLeon, 2014; Gorman, 2015; Holstein, 1999; Kim et al., 2015; Lo Bianco, 2001; Pokrivčáková, 2013; Spack, 2002; Wiley & García, 2016)*

<table>
<thead>
<tr>
<th>Years</th>
<th>Global, Federal, and State Policies</th>
<th>Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1700-1900*</td>
<td>U.S. Federal</td>
<td>New immigrants from Germany, Spain, Italy, Poland, and England initiated primary language instruction and bilingual education Native Americans teach and learn language from European traders</td>
</tr>
<tr>
<td>1920-1950*</td>
<td>U.S. Federal</td>
<td>Rise of “Americanism” during world wars reduced bilingual education in schools</td>
</tr>
<tr>
<td>1950-1960*</td>
<td>U.S. Federal</td>
<td>Increase in immigrants; ESL presence in schools continued to grow</td>
</tr>
<tr>
<td>1951</td>
<td>European Union</td>
<td>Six original member-nations join the European Union</td>
</tr>
<tr>
<td>1958</td>
<td>U.S. Federal</td>
<td>National Defense Education Act</td>
</tr>
<tr>
<td>1964</td>
<td>U.S. Federal</td>
<td>Title VI of Civil Rights Act</td>
</tr>
<tr>
<td>1965</td>
<td>U.S. Federal</td>
<td>Title VII of Elementary and Secondary Education Act (ESEA) Bilingual Education Act (BEA)</td>
</tr>
<tr>
<td>1974</td>
<td>U.S. Federal</td>
<td><em>Lau v. Nichols</em>; Lau Remedies proposed, which included ESL, English tutoring, and bilingual education</td>
</tr>
<tr>
<td>1978</td>
<td>U.S. Federal</td>
<td>Reauthorization of BEA, expanded English learner category</td>
</tr>
<tr>
<td>1981</td>
<td>U.S. Federal</td>
<td>Lau Remedies were withdrawn by President Reagan because they were too costly</td>
</tr>
<tr>
<td>1988</td>
<td>State: California</td>
<td>Constitutional amendment made English the official language in California</td>
</tr>
<tr>
<td>1993</td>
<td>UNESCO Global</td>
<td>Initiated the “Endangered Languages Project”</td>
</tr>
<tr>
<td>1995</td>
<td>UNESCO Global</td>
<td>Established the International Clearinghouse on Endangered Languages</td>
</tr>
<tr>
<td>1996</td>
<td>U.S. Federal</td>
<td>House Resolution 123 failed to pass; this bill would have made English the official language in the United States</td>
</tr>
</tbody>
</table>
Table 3, continued

<table>
<thead>
<tr>
<th>Years</th>
<th>Global, Federal, and State Policies</th>
<th>Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>State: California</td>
<td>Proposition 227 passed: Eliminating Bilingual Education for English Only instruction</td>
</tr>
<tr>
<td>2001</td>
<td>European Union</td>
<td>“M+2 rule” in European Union (EU) Multilingual Education Requirement; All EU members must provide language learning in mother language plus two additional. Ethnic minorities have the right to be educated in their mother language</td>
</tr>
<tr>
<td>2001</td>
<td>U.S. Federal</td>
<td>No Child Left Behind signed into law; high-stakes testing in English language arts and mathematics; Title III allocates funding to schools to develop English proficiency</td>
</tr>
<tr>
<td>2002</td>
<td>U.S. Federal</td>
<td>Repeal of BEA; former Office of Bilingual Education and Language Minority Affairs renamed Office of English Language Acquisition</td>
</tr>
<tr>
<td>2006</td>
<td>State: California</td>
<td>Assembly Bill (AB) 2445 proposed to initiate the California State Seal of Biliteracy (SSB), but it is vetoed by the governor</td>
</tr>
<tr>
<td>2011</td>
<td>State: California</td>
<td>AB 815 California SSB passed; funds were allocated from AB 3488 to establish the SSB; California is the 1st State to initiate a seal of biliteracy</td>
</tr>
<tr>
<td>2014</td>
<td>U.S. Federal</td>
<td>No Child Left Behind ceased; ESSA proposed</td>
</tr>
<tr>
<td>2016</td>
<td>State: California</td>
<td>Proposition 58 passed; Known as the California Education for a Global Economy Initiative; reinstated bilingual education in California</td>
</tr>
<tr>
<td>2016</td>
<td>States: Various</td>
<td>SSB passed in 21 states</td>
</tr>
<tr>
<td>2017</td>
<td>States: Various</td>
<td>SSB passed in 27 states, in progress in 14 additional states</td>
</tr>
<tr>
<td>2018</td>
<td>States: Various</td>
<td>SSB passed in 41 states, in progress in 2 additional states</td>
</tr>
</tbody>
</table>

*Estimated date ranges

The rapid expansion of the seal of biliteracy is evident from its inception in California in 2011 to the adoption of the seal in 41 states and progression in two more. The remaining states yet to develop a seal include Idaho, Maine, Mississippi, Montana, North Dakota, South Dakota, and Wyoming.

Advantages of Attaining Bilingualism and Biliteracy

Cognizant of the growing English learner population within the United States, many who are living under the poverty minimum, language instruction carries a significant consequence in
the future of learners. English learners chronically underscore on standardized state assessments as compared to their native English-speaking peers due to a lack of early English literacy support and low parental education (Kim et al., 2015). In light of these known challenges, there is growing evidence that bilingualism and biliteracy produce a plethora of cognitive, academic, cultural, and economic assets for individuals who can become proficient in two or more languages (Bono & Stratilaki, 2009; DeLeon, 2014; Esposito & Baker-Ward, 2016; Haim, 2015; Iluz-Cohen & Armon-Lotem, 2013; Jasinska & Petitto, 2013; Kim et al., 2015; Lindholm-Leary, 2000; Luk & Bialystok, 2013; Medvedeva & Portes, 2016; Nair, Biedermann, & Nickels, 2016; Pokrivčáková, 2013; Souto-Manning, 2006; Surmont et al., 2014; van Hell & Tanner, 2012).

Haim (2015) suggests that bilingualism or multilingualism ought not be measured separately per language, but bilingual competence should rather be comprehensive of the whole mind and linguistic repertoire.

Historically, some parents and teachers adhered to the philosophy that maintaining an heritage or home language would inhibit a student from achievement in English due to an idea named “competition hypothesis,” especially under circumstances where English language learning programs may conclude, which would leave students vulnerable to remedial programs that are deficient of rigorous learning expectations (Scheele et al., 2010; Souto-Manning, 2006). Despite preconceived trepidation about concurrent bilingual education, the literature regarding the acquisition of two or more languages simultaneously contradicts this notion and highlights the distinct advantages of gaining proficiency in two or more languages. Conversely, there are other adherents to the philosophy that learning English supplants pride in and cultural capital reminiscent of their heritage language and culture (Macleod & Abou-El-Kheir, 2017). Bilingual education is not inherently subtractive of the heritage language and culture, but rather
bilingualism is additive and has potential to add value and advantage to the learners in the areas of verbal and non-verbal cognitive functioning, academic achievement, economic engagement and opportunity, and cultural prevalence (Haim, 2015; Hornberger, 2003; Scheele et al., 2010; Surmont et al., 2014).

**Cognitive advantages.** Studies of general cognitive function identify some advantages accrued through bilingualism, such as thinking that is more creative, greater flexibility in mental processing, ability to think abstractly, and concept formation that is superior to monolinguals (Jasinska & Petitto, 2013; Lindholm-Leary, 2000; Medvedeva & Portes, 2016), better communicative and cognitive skills which improve learning outcomes and resulted in higher self-perception of academic advancement (Lindholm-Leary, 2000; Pokrivčáková, 2013), stronger nonverbal executive control (Luk & Bialystok, 2013), higher ability to filter out distracting or irrelevant information within working memory and a greater ability to shift attention between processes (Iluz-Cohen & Armon-Lotem, 2013; Medvedeva & Portes, 2016; van Hell & Tanner, 2012), stronger coping and adaptation skills (Medvedeva & Portes, 2016), and strong metalinguistic skills (Haim, 2015; Haukás, 2016; Surmont et al., 2014). Research suggests that early bilingual exposure may have potential to change structural components of the brain, particularly in the left hemisphere (Jasinska & Petitto, 2013). This type of exposure to two languages increases the capacity of the mind to capture a wider range of vocabulary and knowledge that span two different lexicon and syntax. Activation is evident in the dorsolateral prefrontal cortex, anterior cingulated cortex, and supplementary motor area of the brain for students who engage in dual language activation (Rodriguez-Fornells, De Diego Balaguer, & Münte, 2006).
Causality of bilingualism and intelligence could be bidirectional or unidirectionally causal in either direction; therefore, there is a correlation between linguistic proficiency and generic executive functioning (Haim, 2015; Iluz-Cohen & Armon-Lotem, 2013; Medvedeva & Portes, 2016; Surmont et al., 2014). Metalinguistic access and application are imperative to the proficiency of language learning because students with high metalinguistic analyses can make comparisons between languages and reflect on and control their language choices (Haukås, 2016). Additionally, students who understand their language or languages more adequately can transfer these metacognitive processes to other abstract concepts (Surmont et al., 2014).

Regardless of language acquisition age, bilinguals were noted to have more profound neural activation than their monolingual counterparts (Jasinska & Petitto, 2013).

However, it should be noted that not all bilingual language learners are highly proficient. Research found that high language proficient learners performed above average, while low language proficient learners performed well below average in the areas of inhibition and shifting between languages (Iluz-Cohen & Armon-Lotem, 2013). Though retrieval trailed monolinguals, high proficiency bilingual students were more astute to respond correctly, implicating that speed is not necessarily superior in language reception and production (Jasinska & Petitto, 2013). High proficient bilinguals are more skilled at teasing out ambiguities and competition of language interference than monolinguals, which can provoke higher automaticity in the long-term (van Hell & Tanner, 2012).

Academic advantages. Though not controlled for socioeconomics, native English-speaking and native Spanish-speaking students in bilingual dual immersion maintenance programs perform at higher academic levels longitudinally than monolingual students or students in other forms of bilingual education (Chiat & Poličenská, 2016; Kim et al., 2015; Nair et al.,
In Spain, bilinguals were found to have higher aspirations, personal expectations, and parental support, and no other language group outperformed bilinguals (Medvedeva & Portes, 2016). Learning more than one language simultaneously lends to cross-linguistic transfer, which utilizes the resources of a language to support learning of the additional new languages (Haim, 2015; Montanari, 2014; Surmont et al., 2014). Students who learned to read and write in their mother language obtained higher levels of achievement in both the native and target languages (Montanari, 2014; Surmont et al., 2014). Reading proficiency in the first language becomes a reliable resource for learning a second language, and such early literacy skills as phonemic awareness, letter identification, and word reading can transfer seamlessly to a commonly rooted language system (Montanari, 2014). For studies conducted to measure novel word learning, naming, and identification, there were distinct advantages for early bilingual learners compared to late bilingual learners; however, both groups outperformed monolinguals (Nair et al., 2016).

Students in content and language integrated learning (CLIL) programs outperformed their non-CLIL peers in vocabulary, fluency, and creativity (Surmont et al., 2014; Younes, 2016). Finland has a long history of bilingual education, and they consistently score among the top performers on the international Program for International Student Assessment exams as compared to other industrialized Organization of Economic and Cultural Development (OECD) nations (Sylven, 2013). Dual language programs are noted to close the achievement gap between English learners and native speakers and outperformed monolingual students and maintenance programs, such as two-way or dual immersion exhibit higher academic proficiency overall (Kim et al., 2015; Montanari, 2014). For learners of English who speak other romance languages, such as Italian, Portuguese, or Spanish, phonemic awareness, letter identification, vocabulary, and decoding transfer easily between languages (Kim et al., 2015; Montanari, 2014). Students in
both 50:50 programs, which are 50% instruction in native language and 50% instruction in target language and 90:10 programs, which are taught 10% in English in year one and increase 10% in English each year, showed exceptional growth in their primary and secondary languages (Kim et al., 2015).

**Economic engagement and opportunity.** The cosmopolitan notion of possessing global knowledge and awareness combined with a propensity to be able to communicate throughout specific domains in more than one language is increasingly valued within the global marketplace due to the globalization and the rising economies of developed and emerging markets (de Jong & Bearse, 2014; Hornberger, 2007; Lindholm-Leary, 2000; Medvedeva & Portes, 2016; Pokrivčáková, 2013). English is often the lingua franca, or otherwise known as the commonly adopted language of medium for most intercultural exchanges, within international business, trade, and policy; however, within the EU, the English is accompanied by French and German as the main working languages despite the 24 official languages and various minority or heritage languages throughout Europe (Medvedeva & Portes, 2016; Younes, 2016).

For secondary schools, the notion of college and career readiness pervades all tiers of policy and goal-setting within the organization. Schools and districts are tasked with cranking out students who are either college or career, or college and career ready. Secondary schools are tasked with the responsibility of developing and guiding students on pursuing their post-secondary goals through either college or career. Given the climate of 21st-century learning expectations and the genesis of the SSBs, language is a significant element in said college and career readiness (DeLeon, 2014). For many individuals, having an ability to traverse two or more languages is a gateway to participating in a lucrative economy. In many contexts, speaking
English is often associated with elite socioeconomic status, while those not speaking English may be viewed as less valuable (Medvedeva & Portes, 2016).

According to recent research by Damari et al. (2017), there exists a significant demand for employees who are proficient in two or more languages as evidenced by the responses of the companies, and most especially the small organizations. Entities that expressed the greatest need for bilingual or multilingual employees are the industries of education services, government and administration, and health care (Damari et al., 2017). Although various skills, such as technical and interpersonal, are more substantially sought by industries over language and global competencies, the benefits of language are not negated because the majority of companies desire employees who can interact positively with colleagues and clients of different languages and cultures (Reimers, 2009). Employees who can possess highly technical skills with strengths in interpersonal communication may also have linguistic diversity and range, which will enable a broader range of interaction for whichever company or industry (Damari et al., 2017). The 21st century has engaged new levels of language accessibility through technology; though despite the increasing technological tools for aiding in communication cross-linguistically, the field of translation and interpretation increased at a quicker rate than other sectors in the global marketplace (Damari et al., 2017). There continues to be a gap in qualified candidates who can fulfill the required jobs to keep up with the 40-billion-dollar industry (Damari et al., 2017).

Cultural advantages. People who are bilingual have cultural nuances and extended experiences that are unique to being raised bilingual, which is advantageous to them in life in various manners (Medvedeva & Portes, 2016). Individuals with assets to speak more than one language and broker more than one culture have greater opportunities to relate to an expansive network of potential friends, colleagues, and life and work experiences. In Medvedeva and
Portes’ (2016) research, though not accounting for socioeconomics, bilinguals exhibited higher aspirations than monolinguals. Their parents portrayed higher ambition for their bilingual children, they got along better with their parents, and demonstrated strong family identification than their monocultural and monolingual peers.

The metalinguistic nature of bilingual or multilinguals adds value to their propensity to think abstractly and be reflective (Haim, 2015; Surmont et al., 2014). Metalinguistic thinking correlates to metacognition, which can be advantageous to bilinguals and multilinguals as they traverse various cultural nuances and adapt to each change. Language and culture are often interwoven so significantly, so the more assets an individual has linguistically, the more he or she will possess and exemplify culturally.

**Bilingualism and Biliteracy in California**

Bordering both Mexico and the Pacific Ocean, California adorns itself as a border state with a multiplicity of ethnic and linguistic diversity. Considering that California was historically a region occupied by Mexico, the predominant status-allocated languages during the early 1900s were French and German (DeLeon, 2014). Presently, Spanish is the predominant second language spoken in home and studied in schools statewide wherein 90% of two-way immersion schools are taught in English and Spanish (de Jong & Bearse, 2014). California voters recently presented their affirmative confirmation to reinvigorate bilingual education into the curricular fold of K-12 education programs statewide through the passage of Proposition 58 (California Department of Education, 2017b). Since the 1998 passage of Proposition 227, California K-12 public schools were not permitted to engage in bilingual or transitional bilingual educational programs. Instead, if interested in continuing to operate dual immersion schools, districts were required to obtain waivers of approval from parents who planned to attend the dual immersion
school that offered bilingual education services (DeLeon, 2014; Gorman, 2015; Kim et al., 2015; Lo Bianco, 2001).

Dual immersion programs are a long-standing tradition of California schools as compared to other states nationally and have been offered in Spanish, French, Korean, Japanese, Chinese, and German (Kim et al., 2015). In 1994, California was home to 47 dual immersion schools statewide; however, in 2010, that number had grown to 233 (DeLeon, 2014). Put into perspective, in 2010, there were 372 two-way immersion programs total across 28 states (Kim et al., 2015). California is home to the only Italian-English dual immersion program in the United States (Montanari, 2014).

**Advancing Bilingualism and Biliteracy Within Secondary Schools**

While the United States may lack examples of secondary schools and programs that reinforce bilingualism and biliteracy outside of the English or world language courses, throughout Europe CLIL is much more common at all levels, especially in secondary school (Aiello et al., 2015; Cabezuelo Gutierrez & Fernández Fernández, 2014; Surmont et al., 2014; Younes, 2016). Finland has a centuries-long emphasis on bilingualism and is home to the CLIL research institute (Sylven, 2013). Belgium, Luxemburg, and Malta operate all schools through CLIL and Sweden, Italy, and Spain continue to research and refine their CLIL programs (Aiello et al., 2015; Sylven, 2013).

An example of a secondary bilingual model in the United States is having a select content course taught in another language other than English; however, in most instances, these content courses are taught in the native language of many of the students in the class, such as is prevalent in high immigrant communities (de Jong & Bearse, 2014). Hawaii experienced a unique revolution of native Hawaiian language. As an example, the Nawahi School provides
kindergarten through twelfth grade instruction fully in Hawaiian and English as a new language, Chinese, and Japanese; however, English is not permitted to be used for instruction until after sixth grade, which is the start of lower secondary school (Wilson & Kamanā, 2009). Hawaii also operates a fully Hawaiian speaking university, Ka Haka ‘Ula O Ke’elikolani College of Hawaiian Language of the University of Hawaii at Hilo into which Hawaiian speakers can matriculate upon secondary school graduation (Wilson & Kamanā, 2009).

Culturally relevant and sustaining pedagogy within secondary schools. Repeatedly researchers support the notion that additive language and cultural instruction is beneficial to the learner for a range of reasons (Freire & Valdez, 2017; Lindsey, Kearney, Estrada, Terrell, & Lindsey, 2015; Saint-Hilaire, 2014). Despite unique programs, such as CLIL and dual immersion, generating ubiquitous pedagogy within all classrooms that envelopes, honors, and reinforces mastery of the heritage languages for improved learning and proficiency is gaining momentum. Nearly all models of bilingual education emphasize a cultural component to ensure cultural and cross-cultural competence (Freire & Valdez, 2017). The California and American Council for the Teachers of Foreign Languages (ACTFL) standards each address a cultural strand to be addressed within the world language course curriculum.

Bilingual program models. The expanse of bilingual, dual language, language maintenance, or target language instruction can be described as having weak and strong forms of bilingual education for promoting bilingualism and biliteracy (Baker, 1996). Dual language programs are immersing as the most effective methodology for providing balanced and equitable instruction in both the native and target languages (Aiello et al., 2015; Luk & Bialystok, 2013; Pokrivčáková, 2013; Riordan, 2014); however, since the 1990s in Europe, CLIL are gaining momentum as a dominant model for instructing toward bilingualism and multilingualism,
especially at the secondary school level (Aiello et al., 2015; Cabezuelo Gutierrez & Fernández Fernández, 2014; Surmont et al., 2014; Sylven, 2013; Younes, 2016). Baker (1996) identifies the strong forms of bilingual education as immersion, heritage maintenance, two-way or dual immersion, and mainstream bilingual (Baker, 1996). The weak models described include transitional bilingual and mainstream with separate and isolated world language teaching (Baker, 1996). The sections below will further elaborate on the stronger forms of CLIL, immersion, heritage maintenance, and two-way or dual immersion.

**Content and language integrated learning (CLIL).** CLIL is widely recognized in Europe as a pervasive and potent model for promoting bilingualism and biliteracy in schools because it integrates language learning into content classes, such as mathematics and science (Aiello et al., 2015; Pokrivčáková, 2013; Surmont et al., 2014; Sylven, 2013; Younes, 2016). The purpose and goal of CLIL is to build proficiency in two languages, study content through a target language for growth in content comprehension and content specific vocabulary, improve communication, improve cognitive skills, and increase motivation, and develop intercultural and international competence for future employment opportunities (Cabezuelo Gutierrez & Fernández Fernández, 2014; Huttner, Dalton-Puffer, & Smit, 2013; Pokrivčáková, 2013; Surmont et al., 2014). CLIL, found almost exclusively in secondary settings throughout Europe, involves content, communication, cognition, and culture (Sylven, 2013). Through CLIL, the language instruction becomes a tool for learning rather than the sole instructional focus, wherein the primary language behaves as a useful resource (Younes, 2016). A byproduct of integrating languages within the content is the opportunity to develop exchanges with other schools who speak the target language or where teachers proficient in the target language can be obtained (Sylven, 2013).
CLIL beckons for equitable weight shared among the representative languages and cultures of the student body (Blommaert et al., 2005; Hornberger, 2007; Lindholm-Leary, 2000). CLIL models and definitions vary per EU nation, yet English is predominantly used as the target language (Sylven, 2013). Though German CLIL may focus more on intercultural learning, United Arab Emirates CLIL is focused on second language learning (Sylven, 2013; Younes, 2016). Successful CLIL implementation encompasses balanced influence and usage of the primary and secondary languages (Younes, 2016). In Italy, CLIL requires one course in a subject area taught in a target language, namely English (Aiello et al., 2015). In Slovakia, 50% of the instruction is in the mother language while the other 50% is in the target language (Pokrivčáková, 2013). In Spain, learning content in a language other than Spanish is controversial, yet they are working on mimicking the models of other EU nations (Sylven, 2013). In Germany, CLIL focuses more on reading and writing, yet there is inconsistency among schools on the implementation of CLIL (Sylven, 2013). In Sweden, CLIL is growing in schools, yet still most students obtain English outside of the classroom (Sylven, 2013).

In the CLIL model, researchers noted that language structures are stimulated, vocabulary is develops expeditiously in the target language, and intercultural learning is enhanced, which benefits all language learning (Surmont et al., 2014; Sylven, 2013). CLIL was noted to benefit struggling learners and enhance cognitive capacity (Pokrivčáková, 2013).

**Immersion.** Immersion and mainstreaming are often conflated due to the connotation that students who are immersed into a classroom are also within the mainstream educational settings. These two terms are not necessarily interchangeable based on the notion of what curriculum and instruction is intended to look like in each setting. Immersive experiences are common when the native languages of the students are different and the immersed student has a
first language that is a minority language (Gallagher & Leahy, 2014). Immersion research indicates that the learners are enriched more than their monolingual peers, and the intentionality of immersion is supported by the teachers and leadership (Gallagher & Leahy, 2014). Value is attributed to all learners as language learners (Gallagher & Leahy, 2014).

**Heritage maintenance.** This model differentiates the native speakers from the non-native speakers of a specific language, therefore clustering homogenous language groups together, and much like dual immersion, the heritage maintenance seeks to enable the students to maintain and improve their primary native language while also gaining proficiency in a second language (Beaudrie, 2011). This emphasis on mastery of second language as necessity is predicated on the notion of assimilation, superior status, and linguistic usefulness within society and the economy (Cahnmann & Varghese, 2005). In the secondary setting, this could be a world language course for native speakers.

One example of a heritage maintenance model is alternating years of instruction in the target and heritage languages, such as exemplified within the model of Dhahran Ahliyya Schools, wherein students receive Arabic instruction from kindergarten through third grade with English as a second language, then alternate between English and Arabic in core content classes until secondary school (S. Alturki, personal communication, April 18, 2018). In another example, Finland adapts a unique model of heritage language maintenance due to the country’s bilingual national policy of official languages of Finnish and Swedish. There are Finnish language dominant and Swedish language dominant schools, each accustomed for the native language of the students, wherein Finnish students learn Swedish and Swedish students learn Finnish, among other languages in lower and upper secondary school (K. Torsell, personal communication, April 18, 2018). Finnish and Swedish students learn English from grades four
through nine, at which point learning English is optional (J. Pippo, personal communication, April 18, 2018).

**Two-way or dual immersion.** Two-way immersion and dual language immersion programs are often synonymous because they both emphasize equal language learning in two languages, taking an additive bilingual and biliterate approach (de Jong & Bearse, 2014; Kim et al., 2015; Lindholm-Leary, 2000; Montanari, 2014). The majority of bilingual or dual immersion programs substantiate at the K-8 level, while less models persist at the secondary level in the United States. Dual immersion programs are popular among kindergarten through fifth, sixth, or eighth grades due to the language delivery models. Students in the dual language programs are generally 50% native speakers of the language of instruction and 50% non-native speakers of the language of instruction (Kim et al., 2015; Rocque et al., 2016).

In various studies, it was noted that dual immersion programs often operate as programs within the mainstream school, not the entire school (de Jong & Bearse, 2014; Rocque et al., 2016). Dual immersion takes shape as either fifty/fifty (50/50) or ninety/ten (90/10) models. 50/50 models, which are used by approximately 33% of the dual immersion programs, generate and deliver instruction that is 50% in the native language and 50% in the target language for each grade level. 90/10 models, which are employed by 42% of all dual immersion programs, develop and deliver instruction that is 90% in the target language in kindergarten, the reduces by 10% each year until middle school (Kim et al., 2015). Regardless of which model is utilized, 50/50 or 90/10, students demonstrated academic gains and proficiency in both languages at higher rates than their monolingual peers (de Jong & Bearse, 2014; Kim et al., 2015; Rocque et al., 2016).
Although researchers have noted an array of benefits to the dual immersion programs, it is to be noted that they are not as preeminent of a sociocultural equalizing force that eliminates status. Elevation of the dominant language was noted to persist despite efforts to elevate the status of the minority languages (Cahnmann & Varghese, 2005).

**Curriculum and instruction.** In a 21st-century world whose networks overlap city, state, nation, and continent, curriculum for an international curriculum must consist of activity, competency, cultural sensitivity and understanding, and diverse processes that are embedded into all aspects of the curriculum (Tudball, 2005). A marque indication of an internationalized curriculum is integration of diverse cultural, ethnic, traditional, and religious instructional materials within core content areas, especially language arts and social sciences (Lindholm-Leary, 2000; Riordan, 2014; Wilson & Kamanā, 2009; Yemini, 2014). There are positive outcomes for bilingual or multilingual language learners when language, cognition, sociocultural, and academic achievement are integrated (Freire & Valdez, 2017; Kim et al., 2015). Curriculum is also inclusive of world languages, usually taught as separate courses, but is often relegated to upper secondary school or high school (O'Rourke et al., 2016; Yemini, 2014).

A bilingual program should embed the equitable acquisition of the primary and secondary languages (Olivos & Sarmiento, 2006). The language component must contain grammar, morphology, syntax, and interactional skills, and it is especially important for learners to have access to speakers of that language for authentic communication (Bono & Stratilaki, 2009). In California, world language teachers are obligated to teach to the national and state world language standards for public schools. However, teachers in core content are not obligated to utilize, encourage, or include world language standards into the mainstream courses. This notion
continues to maintain world language exclusivity and dedicated instruction in a separate setting (Ong, 2009).

For curriculum to be decorated with the inclusive notions of multiple languages and cultures to promote culturally relevant and sustaining pedagogy, teachers also need appropriate curriculum mapping, physical resources, textbooks and novels, and other materials that support and reinforce these notions (Cahnmann & Varghese, 2005; Kim et al., 2015). Though times have changed since Ladson-Billings first proposed culturally relevant pedagogy, teachers are still often tasked with generating their own resources, translations, and adaptations to the curriculum to accommodate the ethnicities, languages, and cultures represented throughout the classrooms (Cahnmann & Varghese, 2005).

Cultural relevance within the pedagogy is manifested through an emphasis on academic achievement, cultural competence, and sociopolitical or critical consciousness (A. Allen, Hancock, Starker-Glass, & Lewis, 2017; K. Allen et al., 2012; Howard, 2003; Ladson-Billings, 1995; Paris, 2012). These elements are more a way of thinking about pedagogy and curriculum and a state of being for teachers than a prescribed, lock-step curriculum map of diverse materials (Borrero, Flores, & de la Cruz, 2016; Young, 2010).

**Challenges.** State assessments and prescribed curricula can be impediments to the globalization of school-wide efforts (de Jong & Bearse, 2014). Though California has collectively fluctuated on their beliefs about the efficacy of bilingual education, the voters concurred with a majority vote to reinstate bilingual education in 2017 through Proposition 58 (California Department of Education, 2017b). However, despite the desire to elevate the notion that there are substantial benefits to bilingualism, state assessments are still designed to support English speakers, readers, writers, and listeners. It is implicit in the academic demands of today
that students should take advantage of all elements of instruction that could enhance their
cognitive synapses, but there is no evidence in outcomes as to whether state assessments and
measures have correlated bilingualism or cultural relevance.

**Leadership for Advancing Bilingual Education and Culturally Relevant Pedagogy**

Providing a structurally sound, linguistically balanced valuable model for promoting
bilingualism and biliteracy in the secondary school setting encompasses enabling strong
leadership personnel who possess a vision and ideal for equitable bilingual curriculum and
instruction, hire and inspire teachers who are highly trained in content and language acquisition,
and value and believe in the assets of both or all languages spoken by the students (Aiello et al.,
2015; Luk & Bialystok, 2013; Pokrivčaková, 2013; Riordan, 2014; Wilson & Kamanā, 2009). In
Utah, principals of language immersion programs were identified into various roles in those
immersion schools, such as immersion guru, immersion proponent, immersion overseer, and
cultural unifier (Rocque et al., 2016).

Administrative, instructional, and organizational support are imperative for bilingual and
biliteracy education to become whole school sustainable (Lindholm-Leary, 2000).
Administration needs to prioritize the development of knowledge, skills, and competencies of
teachers to become pedagogues who are culturally relevant and sustaining and who promote high
quality bilingual education (Blommaert et al., 2005). Leadership also entails unifying support
among the stakeholders, which includes district staff, parents, community members, teachers,
and legislators (Rocque et al., 2016).

Rocque et al. (2016) described the responsibilities that are evidenced to produce
improved student outcomes, which include involvement in and knowledge of curriculum,
instruction, and assessment, beliefs, affirmation, outreach, and being a change agent. As it
pertains to leading schools to achieve high rates of bilingualism, biliteracy, and culturally inclusive relevance, leaders must employ these characteristics. Leaders are expected to model desired behavior; therefore, regarding language skills of leaders within the dual language immersion programs researched in Utah, 56% of the two-way immersion principals spoke both languages of instruction, while only 25% of one-way immersion programs had leaders who spoke both languages (Rocque et al., 2016).

**Teacher Pre-Service and In-Service Training for Bilingual Education**

The importance of teachers cannot be understated as it relates to student outcomes, namely within bilingual programs. Numerous studies identify the qualifications and training of the teachers as the most influential and pivotal persons to impact in the development and progression of high quality acquisition and production of two languages through bilingual programs (Aiello et al., 2015; Bedore, Peña, Joyner, & Macken, 2011; Blommaert et al., 2005; Cabezuelo Gutierrez & Fernández Fernández, 2014; Cahnmann & Varghese, 2005; de Jong & Bearse, 2014; Gorman, 2015; Lindholm-Leary, 2000; Nguyen, 2015; Olivos & Sarmiento, 2006; Pokrivčáková, 2013; Riordan, 2014; Souto-Manning, 2006; Sylven, 2013). Teachers are imperative in the curriculum design and development, instructional delivery, and direct influence over the performance and outcomes of students in demonstrating proficiency in language learning and cultural competence. The most important variable for student success is a teacher’s pedagogical knowledge and their understanding of the student’s needs (Olivos & Sarmiento, 2006).

The wide variety of nuances and subtleties necessary to promote a culturally inclusive and equitable status to both or all languages known and spoken by the students will positively impact student achievement and engagement. According to various researchers, an essential
element that teachers must possess is belief in the value that multilingualism is beneficial and essential (Bono & Stratilaki, 2009; Cahnmann & Varghese, 2005; de Jong & Bease, 2014; Hornberger, 2007; Lindholm-Leary, 2000; Wilson & Kamanā, 2009). One teacher profiled had visual representation that was promptly elevated to her walls indicating phrases such as “La lengua es el espíritu del alma” (language is the spirit of the soul), “Ser bilingue es nuestro orgullo,” (To be bilingual is our pride), and “Quien sabe dos lenguas vale por dos,” (Whoever knows two languages is worth two) (Cahnmann & Varghese, 2005).

Teacher language proficiency throughout the credentialing process is complex and endures a parade of challenges, such as time, fluency, acquisition time, modeling of native speakers, and assessment of minimum language proficiency for instruction (Kim et al., 2015; Nguyen, 2015). Assessing teachers’ language abilities is also complex; questions and prompts that are generalized or relevant to the position impact fluency levels (Aiello et al., 2015). In the United States, each state demands different minimum proficiency levels in a target language for teachers to obtain beyond their pedagogy coursework; this requirement is often a deterrent for teacher candidates (Kim et al., 2015). The following sections will discuss the essential pre-service and in-service teaching training and professional development requirements.

Pre-service teacher training. Bilingual teachers require a plethora of knowledge and expertise in language pedagogy and subject specific content. In most cases internationally and in the United States, bilingual teachers are required to earn credentials that validate their qualification to teach in a bilingual context (Aiello et al., 2015). Teachers internationally desiring to teach in the heritage language and English must prove proficiency in English, while in many cases, they overestimate their abilities in English. In Vietnam, Hawaii, and throughout Europe, teachers are often undertrained and minimally proficient in the target language, yet they
are tasked with providing bilingual instruction to students seeking to learn the additional target language (Aiello et al., 2015; Nguyen, 2015; Wilson & Kamanä, 2009). Linguistically, teachers need to possess at least minimum fluency in the languages through which they will teach content (Aiello et al., 2015; Cabezuelo Gutierrez & Fernández Fernández, 2014; Nguyen, 2015). Aiello et al. (2015) points out that teacher qualification guidelines for CLIL are rare, but he notes that Italy, Cyprus, Netherlands, and Romania require compulsory CLIL coursework. Various pre-service training components that teachers need to know, including knowledge of research about second language development, instructional strategies for second language learners, multicultural learning, best practices in teaching and learning, such as collaboration and equity (Aiello et al., 2015; Lindholm-Leary, 2000).

California credentialing requirements have changed over the past several decades. Various examinations that teaching candidates must pass include the California Basic Education Skills Test, Reading Instruction Competence Assessment, Teacher Performance Assessment, and an additional language examination (Olivos & Sarmiento, 2006). Senate Bill (SB) 2042 outlined the preparation that teachers must receive to earn their single subject (upper secondary) or multiple subject (elementary and lower secondary) teaching credential. Though SB 2042 does contain language about teaching diverse populations and English learners, it does not speak to bilingual education (Olivos & Sarmiento, 2006). Since 1994, the California Commission on Teacher Credentialing developed a two-tiered system for proving proficiency to work with English learners or provide instruction in a language other than English; the two-tiered system includes the Bilingual, Cross-cultural, Language and Academic Development (BCLAD) and Cross-Cultural, Language and Academic Development (CLAD) authorizations (California Commission on Teacher Credentialing, 2013).
One avenue to earn the BCLAD or CLAD is through the passage of language and culture domain exams related to English learners. The exams are “Test 1: Language Structure and First- and Second-Language Development,” “Test 2: Methodology of Bilingual Instruction, English Language Development and Content Instruction,” “Test 3: Culture and Cultural Diversity,” “Test 4: Methodology for Primary-Language Instruction,” “Test 5: The Culture of Emphasis,” and “Test 6: The Language of Emphasis (listening, reading, speaking, and writing)” (California Commission on Teacher Credentialing, 2013).

Given that all teachers in California are required to possess either the BCLAD, CLAD, or SB 2042 English learner authorizations to deliver adequate and informed pedagogy and instruction to students who are learning English as an additional language, the essential characteristics learned through these authorization is important to teacher’s ability to deliver culturally relevant pedagogy for encouraging dual language learning in English and in maintenance of students’ first languages. The BCLAD certifies teachers to provide instruction in a language other than English. However, for those teachers who do not possess evidence of proficiency in another language through the BCLAD, they are required to obtain the CLAD or SB 2042 to meet the minimum proficiency mandated through the California Education Code Section 44001, Section 44830(a), Section 44831, and particularly Section 44253.1, which reads:

For these pupils to have access to quality education, their special needs must be met by teachers who have essential skills and knowledge related to English language development, specially designed content instruction delivered in English, and content instruction delivered in the pupils' primary languages […]

(Commission on Teacher Credentialing, 2017)
Teachers desiring to earn bilingual certification must pursue the BCLAD certificate, which requires teachers to pass all six exams. By earning the BCLAD, teachers are issued the right to be able to provide instruction for English language development (ELD), primary language development, specially design academic instruction delivered in English (SDAIE), and content instruction delivered in primary language (California Commission on Teacher Credentialing, 2017). Teachers may also provide evidence of their verified language proficiency by passing the California Subject Examination for Teachers in a world language or by completing a commission-approved bilingual education program (California Commission on Teacher Credentialing, 2017). Teachers may earn the CLAD authorization by passing the first three exams on the aforementioned list. Teachers earning their preliminary single subject teaching credential should automatically earn the CLAD certificate to accompany said credential (California Commission on Teacher Credentialing, 2017). In 2001, the Commission on Teacher Credentialing adopted “SB 2042 Standards of Quality and Effectiveness for […] Single Subject Teacher Preparation Programs (Swofford, 2002). All teachers participating in single subject credentialing programs with approval through SB 2042 will automatically hold the minimum requirement for providing pedagogy to English learners (Swofford, 2002). SB 2042 authorization indicates that the teacher candidate is one domain short of the CLAD authorization (Swofford, 2002).

**In-service teacher professional development.** Teachers already engaged in the field of teaching desiring to join the realms of bilingual education or continuing in providing bilingual education have demonstrated a need for ongoing professional development to ensure students are afforded a high quality bilingual education experience (Aiello et al., 2015; Cabezuelo Gutierrez & Fernández Fernández, 2014; Montanari, 2014; Pérez Cañado, 2016). In one study, as many as
40% of teachers self-reported that they did not possess bilingual teaching methodologies (Pérez Cañado, 2016). In this and other studies, teachers noted that they did not have sufficient materials to adequately provide instruction in another language, which is why Glendale Unified School District’s Italian program secured a large quantity of materials in Italian (Montanari, 2014; Pérez Cañado, 2016). In instances where teachers believe they are highly familiar with the materials or curriculum, they still may find insufficient time or training to adapt or design supplemental materials (Pérez Cañado, 2016). Universities are teaching methodological courses in alignment with CLIL for teachers who already possess a credential. For language proficiency of teachers in Europe, credentials are recognized from the national ministry of education or the nation from which that language originated (Aiello et al., 2015). While this seems self-evident, teachers are often not equipped with sufficient expertise in the native languages of their students, which makes the inclusion of linguistic pedagogies challenging for teachers (Nguyen, 2015).

**Teacher efficacy in language instruction.** Teachers who desire to attune themselves and the curriculum to the identities, histories, and cultures of the students face inept published curricula and materials and are often subjected to develop or adapt their own unique curricular scope and sequence landscapes in alignment with standards (Cahnmann & Varghese, 2005). Each of the core content and world language teachers are obligated to plan and deliver lessons in accordance with the California core content standards. World language teachers are especially obligated to the world language content standards for California public schools (Ong, 2009).

**Teacher Preparation for Culturally Relevant and Sustaining Pedagogy**

Teachers prepared in credentialing programs through colleges and universities after 1995 may have received exposure through the research of Gloria Ladson-Billings concerning culturally relevant pedagogy (Howard, 2003; Ladson-Billings, 1995; Ladson-Billings, 2014;
Though the literature proliferated teacher education programs for over 20 years, there continues to be gaps in teacher preparation programs regarding the practical application and implementation of culturally relevant pedagogy (Howard & Rodriguez-Scheel, 2017).

**Impact of culturally relevant and sustaining pedagogy on bilingual education.** The notion of sustaining and asserting value on the native languages and cultures of students is to be embedded in culturally aligned pedagogies (Paris, 2012). Teachers are responsible for shaping the curriculum design and classroom culture to connect students and their unique linguistic and culturally experiences to an interesting and intriguing curriculum that validates and honors their heritage while adding nuanced instruction about the dominant language and culture (Ladson-Billings, 2014; Paris, 2012).

**The California State Seal of Biliteracy**

The California SSB was passed within Assembly Bill 815 in 2011 to provide high school graduates with an additional achievement to reflect their dual or multilingualistic prowess (DeLeon, 2014; O'Rourke et al., 2016). California was the first state to initiate such a seal honoring the linguistically proficient graduates; however, as of 2017, 27 states and the District of Columbia have a confirmed program for recognition of bilingual and biliterate graduates, while 14 additional states are in process of approving similar programs and recognition (California Department of Education, 2016b; O'Rourke et al., 2016; Wiley & García, 2016). The seal symbolizes to prospective colleges, universities, and employers that the graduate demonstrated a substantial level of proficiency in two or more language through secondary school coursework or a college level examination.
Assessing Bilingualism and Biliteracy

Acquisition and development of two or more languages concurrently is not simply a singular categorical variable, but instead is an intimate connection among various aspects of personhood and identity, such as social interaction, interpersonal communication, and cognitive processes (Bedore et al., 2011; Iluz-Cohen & Armon-Lotem, 2013; Luk & Bialystok, 2013). In accordance with the seal requirements, students must demonstrate their proficiency through the academic institution or examination agencies; however, measurement of proficiency can be much more complex. According to the ACTFL, Intermediate Mid level of proficiency is sufficient for workplace communication and corresponds to the Common European Framework level A2 and B1, respectively, for receptive and productive skills and at least a level three on the College Board AP language exam (Davin & Heineke, 2017).

As via the methods for earning the seal in California, it is assumed that proficiency through a rigorous curriculum or summative examination of reading comprehension, writing, speaking, and listening anecdotes is sufficient evidence of valid communication fluency and comprehension (California Department of Education, 2016b). However, each state possesses different assessments and thresholds for demonstrating proficiency in a target language (Davin & Heineke, 2017). In Figure 2, there is a description of the language proficiency level attainment needed to earn the seal of biliteracy across different states.
Demonstrating proficiency and fluency. Language and communication consists of a range of variables including verbal and non-verbal, visual and auditory, and social and contextual. Given the range of components to language, measuring fluency as a categorical variable is challenging and under-representative of the holistic assembly of language (Luk & Bialystok, 2013). Fundamentally, language can be assessed through reading fluency and comprehension, written expression, aural communication or speaking, and receptive understanding or listening. Highly proficient bilingual students have demonstrated the ability to more quickly resolve language ambiguity and can distinguish between first and second language more readily than less proficient bilinguals (van Hell & Tanner, 2012). Gaining proficiency is the ideal, but not all bilingual language learners are able to demonstrate the same degrees of proficiency and fluency. Hornberger (2003) describes a continuum of biliteracy for each of the areas of context, development, content, and media of biliteracy. The California world language
standards spread over the notions of content, communication, cultures, structures, and settings (Ong, 2009).

**Literacy and written communication.** Literacy contains the essential elements of communicating through written language, which encompasses reading and writing. For bilinguals or multilinguals, age of acquisition and native language proficiency impact second or third language learning and proficiency (Haim, 2015). There is strong evidence to support the notion that cross-lingual transfer occurs via grammar, syntax, reading, and writing (Haim, 2015). From early literacy, reading requires phonemic awareness, phonetics, letter and word identification, word and sentence fluency, and comprehension. As students age, they transition from learning to read to reading to learn information and gain new knowledge. Whether students have surpassed early literacy learning to read in their first language before engaging in learning to read in their second language will impact second language acquisition (Haim, 2015). Cross-lingual transfer was found between reading in primary language to reading in secondary language, and it was also noted across reading in primary language to writing in secondary language (Haim, 2015).

Writing engages learners in retrieval of long-term memory, genre, and linguistic knowledge. It requires students to process information and translate thoughts into written or typed text (Haim, 2015). When learning to write in a second language, depending on age of acquisition or instruction in primary language, students are expected to grapple with these unique demands of conveying meaning to an audience or recipient.

**Oral Communication.** Effective oral communication is essential to communicate needs and wants within the personal lives of all people, conduct employment in nearly all contexts, relay feelings and emotions, and recount stories and experiences. Speaking in a second language
enables the transmission of unmediated oral communication between two parties who might otherwise not be able to connect (Aiello et al., 2015). Speaking in a second language presents nuanced challenges as compared to first language communication in the emotional component. Speaking in a second language often requires courage to take risks despite the lack of a sense of mastery (Aiello et al., 2015).

Listening requires a unique set of invisible skills in order for there to be a successful exchange of communication. In oral communication exchanges, the listener must hear what is said through the speaker’s tone or intonation as compared to their own, grasp the meaning of the words used in the exchange, and formulate a concept in their mind to comprehend and use the information to provide a response. Listening is dependent on comprehensible input, contextualized content, and structured or unstructured receptive and expressive usage (Lindholm-Leary, 2000).

The Process for Earning the California State Seal of Biliteracy

Secondary school graduating seniors eligible for the seal of biliteracy must achieve a minimum proficiency in English and at least one other world language (California Department of Education, 2016a). There is a bifurcated evaluation system for assessing language proficiency in native and non-native English learners, wherein the English learners must also demonstrate proficiency of English through an additional English language assessment. Aside from the various methods for demonstrating world language proficiency and the English minimum grade point average requirement, English learners must also demonstrate a minimum proficiency in English formerly on the CELDT, and currently the ELPAC, which is in alignment with the integrated and designated English ELD standards (California Department of Education, 2016a).
Native English speakers. The seal of biliteracy is approachable and attainable for all types of language speakers; native English speakers who do not communicate in or utilize another language at home are strictly reliant on classroom instruction or supplemental tools for language learning. Though some students may have friends or relatives that speak another language at home, they may not have any formal introduction or instruction in that language; therefore, they may also be introduced to a second language through school-based instruction. Native English speakers originate their language learning journey from a purely introductory level and are expected to earn the seal of biliteracy by the time they complete secondary school in one of the following ways. Table 4 lists the district offerings of developing second language proficiency, and the following guidelines for earning the seal can be found on the California Department of Education (2017a) website.

Four-year language program. Students must participate in and receive credit for 4 years of a foreign or world language. Throughout the duration of the 4 years of foreign or world language, the student must maintain a 3.0 grade point average within those language courses.

Advanced placement. Students are required to complete and pass the AP World Languages and Cultures exam in one of the allowable world languages, including Chinese language and culture, French language and culture, German language and culture, Italian language and culture, Japanese language and culture, Latin, Spanish language and culture, or Spanish literature and culture (College Board, 2017). The acceptable passing scores to earn the seal of biliteracy are 3, 4, or 5. With a score of three or higher on the AP exam, students must demonstrate proficiency at the minimum of level Intermediate Mid (Davin & Heineke, 2017).

SAT-II foreign language. Students may also opt to complete the foreign language exam through the Scholastic Achievement Test (SAT) II Subject Test in language, such as Spanish,
French, Chinese, Italian, German, Modern Hebrew, Latin, Japanese, or Korean (College Board, 2016). Students are required to earn a 600 or higher on the subject test to be eligible to earn the seal of biliteracy.

**International baccalaureate.** Students earning the seal through IB must fully participate in an IB program and meet the minimum proficiency of three or better on the IB world language exam in Latin, Classical Greek, Spanish, Mandarin Chinese, and French (International Baccalaureate, 2017).

**Approved off-the-shelf foreign language exam.** If a student speaks and understands a language that is not represented through a 4-year course offering, IB, AP, or SAT-II Subject Test option, he or she may seek out an opportunity to take an off-the-shelf foreign language exam, which must be approved by the state superintendent of schools.

**Non-native English speakers.** In addition to all the avenues for measuring proficiency in a second language, students who remain classified as English learners must also demonstrate proficiency on the state ELD assessment. Until 2017, California used the CELDT to annually measure the ELD progress of all English learners. The assessment disaggregated students based on their reading, writing, listening, and speaking. In 2018, California will begin to assess English learners using the ELPAC to align more accurately with the new common core standards within the general curriculum for designated and integrated ELD standards (California Department of Education, 2016b). For the English learners, they must meet the minimum requirements listed in the previous section and have a minimum proficiency score on the CELDT, now ELPAC. CELDT passing was level four or five on a five-point scale. ELPAC proficiency is still in process of being normed (California Department of Education, 2016a; California Department of Education, 2016b).
Table 4

Seal of Biliteracy Pathways of Completion in College Prep High School District

<table>
<thead>
<tr>
<th>School</th>
<th>Native Speaker Pathway</th>
<th>Native Speaker Pathway</th>
<th>Target Pathway</th>
<th>Target Pathway</th>
<th>American Sign Language (ASL) Pathway</th>
<th>French Pathway</th>
<th>Exam Pathway</th>
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<tbody>
<tr>
<td>Four Year Course List</td>
<td>Speakers 1**</td>
<td>Speakers 2**</td>
<td>Target 1*</td>
<td>Target 2*</td>
<td>ASL 1*</td>
<td>French 1*</td>
<td>ELD 1/2/3</td>
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<td>Speakers 2</td>
<td>AP</td>
<td>Target 2*</td>
<td>Target 3*</td>
<td>ASL 2*</td>
<td>French 2*</td>
<td>ELD 1/2/3</td>
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<td></td>
<td>AP</td>
<td>AP</td>
<td>Target 3</td>
<td>AP</td>
<td>ASL 3</td>
<td>French 3</td>
<td>English 10 / ELD 4</td>
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<td>ASL 4</td>
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<td>English 11 / ELD 4</td>
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*Signifies the minimum requirement for A-G requirements. UC and CSU institutions require a minimum of 2 years of world language.
**Signifies that the 1-year program meets the 2-year minimum for the A-G requirement.
***Signifies the Off-the-shelf languages that are being explored; certainty about approved exams is still to be determined (Avant Assessments, 2018; Riverside County Office of Education, 2018).
Stakeholder Knowledge, Motivation, and Organizational Influences

Teachers are integral to the education trajectory and mobility of students toward achieving independent post-secondary success, especially as it relates to language acquisition and access to culturally relevant and sustaining pedagogy (Howard, 2003; Paris, 2012). In the following section, knowledge and skills, motivation, and organizational influences will be reviewed considering existing literature about best practices on improving organizational performance.

Knowledge and Skills

Paramount aspects to the knowledge realm of assumed influences on achieving the goal of bilingualism and biliteracy within culturally relevant pedagogy, teachers must have fundamental understanding of factual and conceptual knowledge, application of procedural knowledge, and reflective metacognitive knowledge, which is a dissection and reorienting of Bloom’s Taxonomy between the knowledge domain and the cognitive processes (Krathwohl, 2002; Rueda, 2011). Additionally, Clark and Estes (2008) identify four levels of training that can be provided to employees to improve upon their outcomes, information, job aids, training, and education; any of these elements that is inadequate may result in the same or worse outcomes. Because nearly 90% of all knowledge is automated, it is imperative that teachers grow in their knowledge of best practices in bilingual and culturally relevant and sustaining pedagogy through factual, conceptual, procedural, and metacognitive knowledge (Clark & Estes, 2008).

Declarative factual knowledge influences. Teachers must comprehend the seal of biliteracy and its requisite component pathways for obtaining it (DeLeon, 2014; O'Rourke et al., 2016). Definitions of bilingualism and biliteracy vary, but teachers must definitively know

**Declarative conceptual influences.** Once teachers definitively understand each aspect of bilingualism and biliteracy, second language acquisition, and culturally relevant pedagogy, they must integrate and organize the knowledge into meaningful components in preparation for application within the classroom context (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010). Conceptual knowledge that teachers must embrace for full implementation of dual language learning within core content classes includes instructional strategies and their application to unique learning contexts, service delivery models for dual language acquisition or two-way immersion in the secondary setting, and lesson planning for effective use of the language and cultural capital within the core content courses (Cahnmann & Varghese, 2005; de Jong & Bearse, 2014; Hornberger, 2007; Lindholm-Leary, 2000; Liu & Liu, 2016; Pokrivčáková, 2013; Riordan, 2014; Surmont et al., 2014; Sylven, 2013). For culturally relevant pedagogy, teacher must conceptually understand the central tenants of academic achievement, cultural competence, sociopolitical consciousness (Howard, 2003; Ladson-Billings, 1995; Ladson-Billings, 2014; Paris, 2012).

**Procedural knowledge influences.** After grasping the terms and concepts associated with bilingualism and biliteracy, second language acquisition, and culturally relevant and
sustaining pedagogy, teachers must execute development of curriculum, delivery of instruction, and professionally grow through opportunities to enhance their performance toward improved student outcomes (Lindholm-Leary, 2000; Liu & Liu, 2016; Nguyen, 2015; Riordan, 2014; van Hell & Tanner, 2012). Teachers must efficaciously execute lesson plans that incorporate best practices in dual language acquisition and culturally relevant and sustaining pedagogy; it is the delivery of the instruction and facilitation of learning that will yield examples of teachers’ procedural knowledge (A. Allen et al., 2017; K. Allen et al., 2012; Freire & Valdez, 2017; Gay, 2002; Howard, 2003; Ladson-Billings, 1995).

**Metacognitive knowledge influences.** Highly impactful teachers and learners exercise autonomy, develop automaticity, and embed reflection into their practices (Ambrose et al., 2010; Mayer, 2011). Equally important, teachers need to become metacognitive about their own biases, beliefs, and values regarding bilingualism and biliteracy, second language learners, and culturally relevant and sustaining pedagogy (Blommaert et al., 2005; Bono & Stratilaki, 2009; de Jong & Bearse, 2014; Freire & Valdez, 2017; Ladson-Billings, 1995).

**Motivation**

As Clark and Estes (2008) articulate, “Belief is (Almost) Everything” (p. 79). There are three fundamental components of motivation, known as motivation indices, that interplay to produce outcomes within individual or organizational performance; they are choice, persistence, and mental effort (Clark & Estes, 2008). Motivational factors impacting these indices are belief, value, self-efficacy, mood and emotions, control ideology, and goal-orientation (Ambrose et al., 2010; Clark & Estes, 2008; Mayer, 2011; Rueda, 2011). Critical to motivation, as displayed in Figure 1, the environment must be supportive for teachers, they must see the value in the learning, and they must believe they have a high level of efficacy that they can accomplish the
required tasks (Ambrose et al., 2010). Teachers experience varying levels on a continuum of these triangular traits.

![Figure 3. Motivation through efficacy, value, and support (Ambrose et al., 2010).](image)

Motivation indices. A critical imperative to improving organization performance, motivation lies at the heart of advancing for organizational change (Ambrose et al., 2010; Clark & Estes, 2008; Rueda, 2011).

Choice. The ideals of culturally relevant and sustaining pedagogy to provide additive value to the heritage languages and cultures of students in classrooms are dependent upon the choices that district, schools, administrators, and especially teachers make in designing curriculum, delivering instruction, and participating in ongoing training to refine and improve the capacity to teach learners from culturally and linguistically diverse backgrounds (Paris, 2012). There is a multitude of exemplary teachers who have engaged in culturally relevant pedagogy and have seen tremendous results in student progress (Gay, 2002). Teachers and administrators learning the languages of the students and electing to incorporate the languages into the classroom can contribute to an inclusive environment (Rocque et al., 2016).
Persistence. Teacher requires a vast array of skills and talents with which they engage daily for informing instructional decisions and delivery. To meet the goals of increasing bilingual and biliterate proficiency in students, teachers must implement the critical behaviors of using and revising effective practices in culturally relevant pedagogy and dual language acquisition. Some barriers to persistence may be related to beliefs, values, teacher efficacy, and feelings experienced throughout the training, planning, instruction, and reflection processes (Popkewitz & Fendler, 1999).

Mental effort. If a teacher wants to engage in improved proficiency to develop bilingual and culturally sustaining pedagogy, he or she is required to engage in high levels of mental effort. Mental effort is a complex responsibility that is multi-faceted and continually shifting based on student need, native languages and levels of proficiency, and other variables extraneous to teacher control (Clark & Estes, 2008).

Motivation factors. Various invisible traits that involve beliefs, values, self-perception of efficacy and confidence, and mood influence the inherent motivation to work toward a predetermined goal of increasing bilingualism and biliteracy in a culturally relevant and sustaining pedagogical manner among all students (Ambrose et al., 2010; Clark & Estes, 2008; Mayer, 2011; Rueda, 2011). Motivational beliefs, values, and self-efficacy vary per individual and within context and over time; what a teacher may believe before a training session may differ than after the training session (Rueda, 2011). Beliefs, values, self-efficacy, expectancy-value, mood, attributions, and goal-orientation synergistically demand attention in order to move an organization forward in achieving its goals; each is described in relation to learning and motivation theory and the influences upon teachers as stakeholders to attaining the organizational goals.
Beliefs. Teachers must first believe that enhancing bilingualism and biliteracy is essential and that instructing through culturally relevant and sustaining mechanisms will provoke the most student motivation and engagement. There are teachers from every nation who have positive beliefs about multilingualism, but the beliefs are not often manifested in action within the classrooms of these same teachers (Haukás, 2016; Nguyen, 2015). Freire and Valdez (2017) points out that the organizational culture influences teacher beliefs, yet teachers have the potential to reflect upon their new experiences in the bilingual context, learn, and adjust their beliefs. This component identifies the beliefs that teachers possess about bilingualism, biliteracy, second language learners and learning, and cultural relevance within pedagogy.

Values. For students to become increasingly bilingual and biliterate and to develop a flourishing bilingual and culturally relevant context, teachers must value the notion of bilingualism, biliteracy, culture, and the long-term benefits of learning and communicating in more than one language (Blommaert et al., 2005; Bono & Stratilaki, 2009; de Jong & Bearse, 2014; Freire & Valdez, 2017; Wilson & Kamanā, 2009). It is critically important that there is value attributed to the primary or heritage language of students because of the inherent assets that the language brings to language learning and that both the primary and secondary languages are valued in the learning process to an equitable measure (Blommaert et al., 2005; de Jong & Bearse, 2014; Hornberger, 2007; Wilson & Kamanā, 2009).

Self-efficacy. Teachers are often expected to perform based on predetermined expectations, but self-efficacy often goes unnoticed or unexplored as a variable for increasing motivation (Rueda, 2011). The greater the self-efficacy for a teacher, the more likely he or she is to persist with a task related to bilingual or second language instruction and culturally relevant or sustaining pedagogy (Rueda, 2011). Teachers in a variety of contexts, researchers, or education
organizations indicated that teachers were self-aware that they needed more training in pedagogy, language, or content language integrated learning (Aiello et al., 2015; Bedore et al., 2011; Cahnmann & Varghese, 2005; Curdt-Christiansen & Sun, 2016; Nguyen, 2015; Souto-Manning, 2006; Sylven, 2013). In some cases, teachers overestimated their language or pedagogical skills, but the research provided insight into their gaps in preparation (Nguyen, 2015). In other cases, teachers who were aware of the demands of the bilingual and culturally relevant curriculum and their present levels of performance desired further training (Cabezuelo Gutierrez & Fernández Fernández, 2014; Pérez Cañado, 2016).

**Expectancy-value theory.** In coordination with the motivation indices and factors to progress toward a goal, organization members, those individuals who make up the organization, each operate at different positions on the spectrum of expectancy and value for the range of tasks required to move and sustain organizational change in a positive trajectory (Ambrose et al., 2010; Clark & Estes, 2008; Rueda, 2011; Wigfield & Eccles, 2000). Expectancy theory identifies the degree to which a person feels they will have success with the given task; in other words, what they expect to be able to produce or contribute (Ambrose et al., 2010; Wigfield & Eccles, 2000). The two elements of expectancy-value outline the capacity of investment that an individual will bring to the task. The higher the expectancy-value, the more likely the individual will persist in completing the task or activity because there is perceived success and value (Wigfield & Cambria, 2010). As is common with human behavior, teachers need to feel they belong to a group and have autonomy in accomplishing their goals (Sinek, 2009).

Second language teachers must value the second language and believe that they are competent in providing instruction in one or both languages (Cabezuelo Gutierrez & Fernández Fernández, 2014; Nguyen, 2015). Accompanying value, teachers must expect to be successful in
comprehending, planning for, and delivering instruction that is culturally relevant and sustaining (Gay, 2002; Ladson-Billings, 1995).

**Attributions.** Individuals and organizations each have influences internally and externally that impact outcomes; these are known as attributions (Clark & Estes, 2008; Rueda, 2011). The more control an individual within the organization has over his or her variables, the more pliable the outcomes. In order to be proficient pedagogues of cultural relevance, teachers must take ownership of the notions of academic achievement for all students, develop cultural competence, and take responsibility for instilling sociopolitical awareness in students (Gay, 2002; Howard, 2003; Ladson-Billings, 2014). Though these are imperative to resolving gaps in organizational performance goals, they are not explicitly identified through data collection.

**Goal-orientation.** Two predominant schemas exist regarding goal-orientation, mastery versus performance (Rueda, 2011). Mastery implies effort is exerted to reach maximum achievement in an aspect of knowledge or performance, while performance implies that effort is directed to meet the minimum standards of achievement. Mastery and performance manifest themselves through the output of the individual who is striving to attain the goal. The organizational goals, though they may be made known to all stakeholders, may not be the motivating variable for each stakeholder (Rueda, 2011).

In an era of high-stakes testing, teachers are in a quandary about teaching to the test, which is performance-oriented, or focusing on whole student achievement and development, which is mastery-oriented. Because language is a lifelong skill and each level of development is dependent on the previous level of growth, language acquisition follows a more mastery-oriented persuasion. As was evident with the Vietnamese teachers who believed they had attained a
higher proficiency than was acceptable to instruct their students, performance orientation could impede students to achieve proficiency (Nguyen, 2015).

Organization

The organizational elements that influence teacher performance and progress toward achievement of the goal of promoting bilingualism and biliteracy through a culturally relevant curriculum include cultural models, cultural settings, policies and procedures, resources, and training (Clark & Estes, 2008; Gallimore & Goldenberg, 2001; Rueda, 2011). Administrative and organizational support are imperative for bilingual education and culturally relevant pedagogy to flourish (Lindholm-Leary, 2000; Rocque et al., 2016).

Cultural models. Organizations consist of a collection of individual employees, each with their own motivations, aspirations, or intentions regarding what they hope to accomplish within the organization. Cultural models are invisible characteristics that permeate individuals, teams, departments, groups, and the organization as an entire entity (Clark & Estes, 2008; Gallimore & Goldenberg, 2001; Rueda, 2011). Because inclusivity of diverse cultures of students is so integral to the success of promoting bilingualism and culturally sustaining pedagogy, teacher culture and interactions with staff and students is paramount (Freire & Valdez, 2017; Saint-Hilaire, 2014).

Cultural setting. Facilities and physical spaces impact the operations of an organization, especially a school. The cultural settings are the physical settings where activities, instruction, and various interactions occur to support the operations and can impact achievement of unique goals (Clark & Estes, 2008; Gallimore & Goldenberg, 2001; Rueda, 2011).

In 2015, the United States Department of Education measured 83% of the public-school teachers in the United States were European American despite the 49% of students enrolled were
not of the same ethnic heritage (Souto-Manning, 2006). To minimize the gap between teacher and student cultural heritage, teachers need to be provided spaces for collaboration with one another within content and across content and language and assistance in developing environments that promote bilingualism and cross-cultural inclusivity (Cahnmann & Varghese, 2005). Organizationally, recruitment and preparation of teachers who more closely match the ethnicities of the students is an important topic, yet will not be explored directly in this study.

Policies and procedures. Each organization has regulations, expectations, rules, structures, policies, and procedures to provide and promote predictability, consistency, and fairness. The policies and procedures within an organization could have deleterious effects on productivity, such as too much paperwork to accomplish simple tasks, and provide checks and balances to promote onward trajectory, such as mandatory attendance to meetings that discuss student work and commonly plan subsequent lessons (Rueda, 2011).

Teachers may or may not have influence over federal and state policies that influence what they are required to teach and how money can be spent; however, in California, the LCFF and LCAP were recently developed to bring decision-making about spending and goal-setting around state priorities to the local stakeholders of each local education agency (LEA), of whom teachers are included (California Department of Education, 2016b).

Resources. Equipment, material, and tools to accomplish a task are essential to the success of accomplishment. However, the misunderstood belief that money can resolve all inequities in education or improve outcomes is unsubstantiated. Despite the lack of evidence to support high quality instruction’s reliance on incredible amounts of wealth, teachers do need essential tools, such as textbooks, technology, furniture, equipment, supplies, and environmental
materials to enhance the learning experiences of each student (de Jong & Bearse, 2014; Kim et al., 2015; Lindholm-Leary, 2000).

Training. Training can be perceived as obtaining knowledge through information combined with practice (Clark & Estes, 2008; Rueda, 2011). Teachers need pre-service and in-service training in areas such as second language acquisition, culturally relevant and sustaining pedagogy, and language instruction in the primary and secondary language (Aiello et al., 2015; A. Allen et al., 2017; Borrero et al., 2016; Nguyen, 2015; Olivos & Sarmiento, 2006).

Conclusion

The notion that bilingual education is imperative for all through a culturally relevant and sustaining pedagogy with infusion of bilingual and second language strategies will sustain this research. The literature outlined the various essential components, models, and curricula of bilingual education across content areas and grade levels. The research examples regarding bilingualism from Sweden, Italy, Finland, Spain, Germany, Singapore, Vietnam, Canada, United Arab Emirates, Slovakia, and various states throughout the United States, such as Utah, Hawaii, and California shine a light of insight into the expectations and essentials for fulfilling the organizational goals of the district (Aiello et al., 2015; Cahnmann & Varghese, 2005; Pokrivčáková, 2013; Sylven, 2013; Wilson & Kamanā, 2009; Younes, 2016).

Learning and motivational theories were outlined alongside the teachers’ requisites and essential influences of knowledge, motivation, and organization to engage bilingualism, second language acquisition, and culturally relevant and sustaining pedagogy in all classrooms across California. The research has created a framework to influence the data collection in Chapter Three.
CHAPTER THREE: METHODOLOGY

The methodology chapter addresses the methods in which data will be collected through a triangulation of surveys, interviews, classroom observations, and document analysis to work toward answering the research questions. The stakeholder goal and critical behaviors of the stakeholder will drive the knowledge, motivation, and organizational assumed root causes and propel the data collection methods. The methodological framework reviews the genesis of this problem-solving analysis and is predicated on the notion of a gap between a desired performance outcome and present performance. The assumed influences are captured through assumptions based on informal observation, learning and motivation theory, and review of the literature. The target population for data collection and analysis is reviewed and outlined in this chapter. A description of the triangulation utilized describes the trustworthy nature of the methods of collecting and analyzing valid data, and the role of investigator is described in context of the research study. Finally, the limitations and delimitations are described, which foretells potential future research and means for gathering comprehensive data with expanded time and range of participants.

Purpose of the Analysis and Research Questions

The purpose of this study was to conduct a single stakeholder gap analysis to examine the knowledge, motivation and organizational influences that affect the ability of the CPHSD to achieve 100% attainment of graduating students who demonstrate proficiency in two or more languages as evidenced by earning the California SSB. This goal is despite the lack of teacher’s credentialing in second language proficiency, culturally relevant and sustaining pedagogy, or current language standards around core content instruction that is presented in two or more languages. The analysis began by generating a list of possible or assumed influences and needs
that were examined systematically to focus on actual or validated influences and needs. While a complete gap analysis would focus on all stakeholders, for practical purposes the primary stakeholder in this analysis was teachers. The research questions addressed in this study included:

1. What is the teachers’ knowledge and motivation related to promoting bilingualism and biliteracy through culturally relevant and sustaining pedagogy and student-centered dual language instruction to improve proficiency in two or more languages?
2. What is the interaction between the organizational culture and context and teachers’ knowledge and motivation?
3. What are the recommended knowledge and skills, motivation, and organizational solutions needed to accomplish the goal of promoting bilingualism and biliteracy through culturally relevant and sustaining pedagogy and student-centered dual language instruction to improve proficiency in two or more languages?

**Stakeholder of Focus Goal and Critical Behaviors**

For the secondary teachers to accomplish their goal, all teachers will need to promote bilingualism and biliteracy through culturally relevant and sustaining pedagogy, and student-led and student-centered dual language instruction to improve proficiency in two or more languages. They needed to exhibit a variety of essential observable behaviors. As evidence of attainment of their goal, they should have demonstrated the following behaviors simultaneously throughout instruction:

1. Use bilingual or second language acquisition strategies within core content areas,
2. Use culturally relevant pedagogy within core content areas, and
3. Facilitate student-led bilingual language acquisition within core content areas.
Methodological Framework

The research methodology undertaken in this study was a mixed methods case study single stakeholder gap analysis (Clark & Estes, 2008). As shown in Figure 4, the framework embarked on a systematic analysis of knowledge, motivation, and organizational influences that revealed the root causes of the gap between the actual performance outcomes and the desired performance outcomes and goals (Clark & Estes, 2008). The initial step in the gap analysis method was to identify the organizational goals and compare the present level of performance of the organization against those goals that have not been achieved or attained. The range of root cause influences for the perceived gap were attributed to incomplete knowledge and skills, deterred motivation, and complex and interdependent organizational factors. To investigate among the teachers as stakeholders and throughout the organization, the investigator employed various techniques for collecting quantitative data through surveys and qualitative data such as through interviews, observations, and document analyses. Once data were collected, the identified influences and needs were validated, partially validated, or invalidated based on the findings in the data. The influences were validated if they continued to demonstrate a need for the organization based on the findings. They were partially validated if they presented a low priority need for the organization based on teacher responses. They were invalidated if they were not currently a need for the organization pertaining to the innovation. The final stage in the gap analysis was to review and analyze the results of each measure and recommend solutions or implementations based on whether they were related to knowledge and skills, motivation, or organization.
Figure 4. Gap analysis process (Clark & Estes, 2008).

Due to the integration of culturally relevant and sustaining pedagogy and bilingual education at the secondary level, the innovation model was utilized in this study. An innovation model is a gap analysis which is defined by a 100% gap between the goal and the current level of performance. The integration of the instruction that incorporates and promotes bilingualism and biliteracy through usage of culturally relevant and sustaining pedagogy as an effort to increase the quantity of students earning the seal of biliteracy with teachers who do not possess bilingual credentials is an important distinction to qualify this study as an innovation model within the gap analysis framework. The innovation model seeks to develop a new program or system for expected implementation, one expected outcome of which will rely on the students’ assets for dual language opportunities to promote bilingualism and biliteracy through a student-centered culturally relevant pedagogy across the content areas. However, teachers can persist in behaving as culturally relevant pedagogues in their planning and inclusivity of students from various cultures and languages.

The seal of biliteracy was the select metric because it is easily measurable. An exact quantity of seal earners was obtained by collecting the data of the quantity of recipients of the
CULTURALLY RELEVANT BILINGUAL SECONDARY EDUCATION

seal from the previous year’s graduating classes at each of the comprehensive high schools and one magnet school. Each year, data is collected and indicates the concrete quantity of graduating seniors from the previous graduating classes who earned the seal of biliteracy. Though the district demonstrated an increase in seal earners within the years 2013 to 2017, there was a decrease in 2018. There is a gap in the coordinated systematic supports for students to attain the seal through given interplay of teacher credentialing and training, the diverse language levels and prior programs of student’s exposure in elementary and middle school, past or current student-centered pedagogical practices, and promotion of bilingualism and biliteracy at the secondary level in all core content classes. Additionally, there is currently a limited number of world language course offerings and exam options as pathways for demonstrating proficiency in a second language. The lack of teachers credentialed to provide content and language integrated bilingual education impacted the organization’s ability to implement culturally relevant and sustaining pedagogy that provokes increased bilingualism and biliteracy across all core content areas. Through the innovation study, the best practices for guiding more students to develop biliteracy were identified and recommended for implementation within the organization.

Assumed Influences of the Performance Gap

Assumed knowledge and skills, motivation, and organizational influences were deduced based on preliminary scanning data, such as the investigator’s personal experience and oversight within the district, critical observation within the organization, learning and motivation theory, and a brief overview of literature with research relevant to bilingualism, biliteracy, dual language learning, culturally relevant and sustaining pedagogy, or a combination. Measures were established to validate or invalidate the assumed causes.
Knowledge, Motivation, and Organization Theory and Observation of Teacher Needs

The first section reviews the assumed knowledge and skills influences that impact the ability of the teachers to meet the stakeholder goal. Knowledge and skills are composed of factual, conceptual, procedural, and metacognitive knowledge (Krathwohl, 2002). Factual knowledge is the static information and the ability to retrieve a definitive recollection of the terms associated with the influences (Clark & Estes, 2008; Krathwohl, 2002). Conceptual knowledge is the ability to recollect or retell the underlying concepts beyond the definition (Krathwohl, 2002). Procedural knowledge requires the teacher to demonstrate or describe how they are familiar with the process of accomplishing a step, series of steps, or component of the required skill (Krathwohl, 2002). Metacognitive knowledge is the ability to reflect upon the information, concepts, and procedure, and adjust to improve the outcomes (Krathwohl, 2002).

The second section reviews the assumed motivation influences that impact the ability of teachers to attain the stakeholder goal. Motivation indices are qualified by choice, persistence, and mental effort. Choice is the intentional determination to make a selection to partake in an activity or utilize a specific resource, and it engages the beliefs and values of a person (Clark & Estes, 2008). Persistence is the ability to continue striving for the goal, even in spite of any potential difficulties, challenges, or distractions; it is influenced also by the goal-orientation and attributions of the individual (Clark & Estes, 2008; Rueda, 2011). Mental effort requires intellectual investment in accomplishing the goal without over or underestimating the requirements to complete the job; it often engages the expectancy-value and self-efficacy of an individual (Clark & Estes, 2008; Rueda, 2011). The third section reviews the assumed organizational influences that impact the teachers’ ability to achieve the stakeholder goal. Organizational culture consists of the individual culture, group culture, and the interplay between
all the individuals and groups within the broad organization; these contribute to the cultural settings and cultural models that exist within organizations (Clark & Estes, 2008; Rueda, 2011). Other organizational influences include policies and procedures, resources, and training.

**Knowledge and Skills.** Assessing the knowledge assumed causes will entail utilizing research literature, survey data from teachers, qualitative data collected through teacher interviews, classroom observations, and document analysis of lesson plans and professional learning community meeting minutes. Recommendations for remediating the knowledge gaps will be informed by the learning framework referenced in Krathwohl’s revised Bloom’s Taxonomy of learning, which includes factual learning, executed by remembering; conceptual learning, evidenced through understanding and analyzing; procedural learning, such as applying and creating the steps to execute the pedagogy; and metacognition, which involves analyzing and evaluating (Anderson et al., 2001; Krathwohl, 2002).

**Factual knowledge.** Teachers are required to understand basic definitions about dual language acquisition and models for secondary schools, bilingualism and biliteracy, culturally relevant and sustaining pedagogy, and the California SSB.

**Conceptual knowledge.** Teachers need to understand dual language models and culturally relevant and sustaining pedagogy. They must understand how dual language instruction can improve student outcomes and build on student assets. Teachers need to understand culturally relevant and sustaining pedagogy and how it is delivered within core content areas and pedagogical strategies that elucidate more than one language and culture.

**Procedural knowledge.** Teachers need to be able to demonstrate an ability to plan lessons and units and deliver and facilitate student-led and student-centered dual language learning and culturally relevant and sustaining pedagogy. Teachers are not immediately
equipped with dual language capabilities, so they will need to rely on student linguistic and cultural assets; they must know how and when to elicit student-led dual language learning.

**Metacognitive knowledge.** Teachers need to reflect on their lesson development and instructional delivery. Reflections about lesson development and instructional delivery must be paired against learned prior knowledge and generate questions for further research that can be shared within collaboration with professional learning communities and across language and core content teachers.

**Motivation indices.** Motivation is multidimensional and includes elements of active choice, persistence, and mental effort on the part of the teacher contributing to the student outcomes (Clark & Estes, 2008). Clark and Estes’ (2008) and Rueda’s (2011) application of motivation principles in the areas of self-efficacy and competence, beliefs and attributions, high interest and intrinsic motivation, high levels of value, and goal-orientation that positively contribute to higher achievement will be the epicenter of motivation theory for this study. Choice, persistence, and mental effort are essential for goal achievement.

Optimally, expectancy or self-efficacy, value, and support are high for effective change efforts and persistence to endure the challenges associated with engaging a dual language curriculum within core content areas with culturally relevant pedagogy (Ambrose et al., 2010; Rueda, 2011). Goal-orientation impacts the choice and persistence arms of motivation because teachers’ performance outcomes are either performance-oriented or mastery-oriented and are required for accomplishment. Mastery orientation propels teachers into exploring the rationale and adopting habits of securing dominion over topics rather than simply accomplishing them (Rueda, 2011).
**Motivation needs.** Motivation is instrumental in the execution of tasks. Motivation is the paramount element of the KMO framework to influence the assumed root causes (Clark & Estes, 2008). Motivation involves active choice, persistence, and mental effort (Ambrose et al., 2010). The motivation needs that will be addressed regarding the teacher’s progress toward attaining the goal are expectancy-value, beliefs, values, self-efficacy, goal-orientation, and attributions.

**Beliefs and values.** Individual teachers must make the choice to learn and commit to delivering dual language and culturally relevant pedagogies concurrently. Choice is dependent upon beliefs and values that the individual holds, and learning new information about a topic or experiencing something meaningful relevant to dual language acquisition and cultural relevance may have potential to sway beliefs or values. Teachers need to believe that bilingualism and biliteracy is important and embed it within core content instruction, culturally relevant pedagogy can and should be implemented within the core curriculum, and that students’ primary languages are an asset for learning and bilingual language development. Additionally, they need to understand the cognitive, economic, and cultural benefits of teaching and learning in two or more languages.

**Self-efficacy.** Self-efficacy, the confidence that one can succeed or achieve a given task, is integral to making instructional choices and persisting (Ambrose et al., 2010; Rueda, 2011). Self-efficacy is like expectancy theory because individual beliefs about his or her ability to conduct a task or experience success with an activity depends upon what the individual expects of him or herself (Rueda, 2011). Teachers need to be confident they will be able to develop and adapt lessons that incorporate dual language learning, whether it be through student-led opportunities or culturally relevant pedagogy.
**Expectancy-value.** Expectancy-value is the belief that an individual has in his or her own capabilities and desire to work toward the goal (Rueda, 2011; Wigfield & Eccles, 2000). Teachers need to prioritize and be confident that they can provide successful second language learning and dual language instruction within their core content classes, engage student-led language instruction, and embed culturally relevant pedagogy to reinforce language and cultural development.

**Goal-orientation.** The dichotomous goal-orientation structure identifies performance and mastery as the two orientations in which individuals align as they pursue goals (Rueda, 2011). Performance orientation concentrates on task completion, while mastery orientation is determination to achieve successful operationalizing of the learning information. Mastery orientation infers a desire for inferential learning and application to generalized contexts after learning the concept (Rueda, 2011).

**Attributions.** Teachers can demonstrate attribution by taking ownership of their actions within the curriculum and instruction that they believe has a direct impact on student performance and outcomes related to the goal. Teachers will take ownership of producing opportunities for students to capitalize on their language assets and learn two or more languages through their area of core content instruction. They will take ownership of developing lessons and units that engage students through culturally relevant and sustaining pedagogy.

**Organization needs.** Organizations are complex systems that weave a tapestry of intertwined and inter-related individuals who operate toward a common goal. All organizations, including secondary schools, exemplify cultural models and settings. Cultural models are often automated and invisible for the insiders within the organization to unfold (Gallimore & Goldenberg, 2001). Though values and beliefs are invisible, behavior can be observed and
measured. Some observable behaviors include group norms, language, rituals, and celebrations can be observed (Gallimore & Goldenberg, 2001). Regarding the cultural models, teachers need to belong and feel a sense of community or contribution to the organization (Rocque et al., 2016). Cultural settings are locations in which the organizational demands take place, such as the school setting, district office, or department meetings. Cultural models can shift between the cultural settings within the organization due to the values within the large and small groups.

**Resources.** Resources are essential for teachers to progress on their individual and collective organizational goals. Schools need to provide teachers with instructional materials, curricula, tools for providing instruction that is culturally relevant and sustaining and toward dual languages in all content areas, ongoing professional development in dual language instruction and culturally relevant and sustaining pedagogy, and dedicated materials to promoting the pathways toward earning the seal of biliteracy.

**Cultural models.** Though often invisible and automatic to members of the organization, the cultural models influence and persuade the district and school in decision-making, interpersonal relationships, and values. Schools need to embrace and support all teachers in progressing toward the LCAP goal of attaining more bilingual proficient students and the organizational mission. Moreover, schools need to celebrate growth in dual language acquisition and engagement through culturally relevant and sustaining pedagogy.

**Cultural settings.** Location and locale significantly influence the operations, proximity, and collegiality that impacts goal attainment. Schools need to provide teachers with professional learning and growth opportunities, along with collaboration time within their content areas and across core content and language courses to emphasize bilingualism and cultural relevance.
Training. Training models and evaluating training are imperatives for reinforcing dynamic and high-performance outcomes. Schools need to commit to providing a range of tools for teachers to achieve the standards for meeting their stakeholder goal and the organizational mission.

Policies and procedures. Ordered ethical and legal requirements often precede organizational decision-making; these requirements result in policies and procedures within the organization. Schools need to communicate policies and procedures for scheduling 4-year plans to ensure maximum pedagogy that embodies cultural relevance, bilingualism and biliteracy across the curriculum, and completion of seal of biliteracy requirements.

Population and Sample

The population of the study was English, mathematics, physical and biological science, social science, special education, visual and performing arts, and world language secondary high school teachers at three comprehensive and one magnet high schools in CPHSD who deliver instruction to diverse learners within their classes. Among these four school sites, there were 259 total eligible participating teachers among the aforementioned departments. Among them, there were 63 English teachers, 43 mathematics teachers, 36 physical and biological science teachers, 44 social science teachers, eight of whom are also English teachers and operate within an integrated humanities curriculum, 38 special education teachers, 21 visual and performing arts teachers, and 22 world language teachers. All teachers were required to possess the CLAD authorization, BCLAD authorization, or Senate Bill 2042 English learner approval in California since the passage of Proposition 227 in 1998. As of 2017, 90 total teachers possess the CLAD, 19 teachers possess BCLAD, 104 teachers possess SB 2042 authorization, and 44 do not possess any of those three authorizations (See Table 4). Of the 19 teachers that possess the BCLAD, 12
of them are world language teachers which means only seven teachers of 259 possess bilingual credentials. Given the move toward more inclusive practices of English learners in mainstream instruction, all secondary high school teachers in the CPHSD should interface with English learners and diverse learning profiles within the college preparatory classes.

With the subsequent redirection toward approved bilingual education programs in California public schools through the passage of Proposition 58 in 2017, districts will increasingly be employing bilingualism and biliteracy across curriculum at all instructional levels, not in isolated classrooms. All teacher input will help unfold the assumed knowledge, motivation, and organizational causes for the gap identified in this study.

Table 5

*CLAD, BCLAD, and SB 2042 Authorizations 2016-2017*

<table>
<thead>
<tr>
<th>Site</th>
<th>School Type</th>
<th>Department</th>
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<th>BCLAD</th>
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The sample for the study was a stratified random sample of teachers from each of the academic departments at each high school in the CPHSD that deliver core, standards-aligned college or career preparatory curriculum. The teachers were coded by the department in which they teach and listed by number up to the total number of teachers in that department at each site. The teacher selected for each interview was randomly selected through a randomization website, Random.org by inputting the minimum and maximum numbers within that selection.

The teachers instruct in content areas including English, mathematics, physical and biological science, social science, special education, visual and performing arts, and world languages. Physical education, counseling, and online learning center teachers were not included in the core academic college preparatory content areas because they are not involved in developing curriculum in core college preparatory subjects, nor do they deliver traditional core classroom instruction to utilize culturally relevant and sustaining pedagogy or second language learning strategies. These secondary teachers, in the identified content areas, deliver instruction that address all required Common Core State Standards for college and career readiness. Moreover, these teachers influence the design and content of the curriculum and the pedagogical delivery of instruction. The stratified random sample provided a range of representation across content areas and school sites.
The intended goal for the qualitative data collection through interviews was to have at least one teacher per department at each high school be part of the sample, but that was not achieved. Instead, one teacher per core content area district-wide was interviewed. An interview from one teacher per core content area district-wide provided a degree of reliability and enabled identification of themes across the district and throughout content areas. Moreover, utilizing one teacher from each department in the district helped identify trends across the sites and departments in the assumed knowledge, motivation, and organizational causes in the achievement of closing the gap.

**Data Collection**

To collect data using human subjects such as teachers, the data collection proposal was sent to the Institutional Review Board (IRB) for review and approval. Upon approval, data was collected by a range of measures, such as surveys, interviews, and document analyses.

At least one teacher from each department district-wide participated in the quantitative survey, which was presented through electronic mail as a link to the Qualtrics data collection platform in October and November of 2017. Due to initial low response rate, the survey was then distributed to each secondary site in paper copy version for administrators to distribute. The survey was provided to the teachers while the interviews were conducted. The results of the survey were stored and maintained as confidential through the Qualtrics data collection platform and within the secure possession of the principal investigator. The data was stored in a password-protected database within a password-protected computer, which remained in the possession of the principal investigator. There was participation from at least one person from every department at every site through the surveys with the exception of visual and performing arts and world language at two sites.
The investigator was an administrator within the district at one of the school sites and is supervisor to various teachers. Therefore, according to IRB, the principal investigator was unable to conduct the interviews and observations at the supervisory site because the results and responses obtained through the interview may have been impacted and the responses may have been modified by the interviewees due to supervisory pressure. A third-party IRB approved investigator attempted to contact participants at the principal investigator’s site, but no willing participants were interviewed. The principal investigator conducted the interviews at the sites at which she is not a supervisor to the teachers. Therefore, all seven interviews among all content areas were conducted at two comprehensive sites and one magnet site, wherein one comprehensive site did not participate in interviews. All interviews were conducted in person, audio recorded with interviewee approval, and transcribed verbatim. All participants were able to meet in person for interviews. The information gathered through the interviews and the identities of the interviewees will remain confidential.

Because data could not be collected through observation of at least one classroom per content area, the principal investigator used the information teachers provided during the interview to quantify the data on the classroom observation tool, which included items about the inclusion of dual language instruction and the components of culturally relevant and sustaining pedagogy. One form was completed for each interviewee. This was determined as sufficient because the district teachers are expected to follow the same board-approved curriculum, and the responses could be generalized as a reflective sample across the district.

Document analysis was necessary for triangulation because it contained the sources of various pieces of data and evidence of existing organizational assumed influences. The documents reviewed included district board policies, the professional development calendar,
professional development agendas, and student performance data. The documents provided written documentation of district initiatives, priorities, and accepted policies.

All survey and interview questions were produced and conveyed in English, though one interviewee indicated that English is not her first language. Documents used for the analysis were printed or written in English.

**Instrumentation**

An innovative model gap analysis was utilized for outlining the knowledge, motivation, and organizational variables that contribute to an existing gap in performance (Clark & Estes, 2008). To generate a comprehensive gap analysis for a single stakeholder group, the study was a case study analysis of one district; however, mixed methods were utilized within the methodology for this study due to the quantitative and qualitative data collected. The instruments used to gather data to investigate the knowledge, motivation, and organization included a quantitative survey to teachers and quantification of classroom pedagogy through the classroom observation tool, qualitative semi-structured interviews with select teachers, and document analysis. The data collected through these various avenues will be used to triangulate for recognition of patterns and validation of the knowledge, motivation, and organization variables.

**Quantitative surveys.** The survey was issued to all teachers in CPHSD who met the department criteria at the three comprehensive schools and one magnet school. The sample size desired for the study included at least two teachers per department at each comprehensive school site. The survey consists of questions related to knowledge, motivation, and organizational factors within the performance gap of attainment of bilingualism and biliteracy. The survey was conveyed to the teachers through an electronic data collection source, Qualtrics, and paper
surveys distributed through administration at each site. The surveys were provided to maintain anonymity of the user. However, the survey requested identifying demographics information of each participant in order to track the desired minimum contribution per department and school sites.

**Qualitative interviews and classroom pedagogical tool.** The qualitative interviews were conducted through semi-structured open-ended interview questions. This permitted space for improvisation and subsequent questioning when a topic inspired further disclosure or information that would illuminate knowledge, motivation, and organizational variables impacting the performance gap. When clarification was needed, interviewer could ask a clarifying question.

Because classroom observations could not be conducted, the information from the interviews was utilized to complete a classroom observation protocol with identifying information about dual language instruction and culturally relevant and sustaining pedagogy. One protocol was completed for each of the seven interviews in the areas of English, mathematics, science, social science, special education, and world language from the district comprehensive and magnet secondary sites. Data collected through the classroom pedagogical protocol included teacher activities and instruction relevant to culturally relevant pedagogy through academic achievement, cultural competence, sociopolitical consciousness, and relevance to bilingualism through use of more than one language during instruction.

**Document analysis.** Document analysis was conducted upon Board of Education policies (BP), professional development calendar and agendas, and student performance data. The document analysis enabled understanding of the planning, professional development, and
actual student performance. The data obtained through document analysis was triangulated with the other sources of data collected.

Performance data was collected from AP World Language scores, CAASPP English scores, CELDT and ELPAC results, and seal of biliteracy attainment.

Professional development agendas were reviewed for English, mathematics, science, social science, special education, world language, and visual and performing arts.

Document analysis included review of board policies, which included curriculum development and design (BP 6141), selection and evaluation of instructional materials (BP 6161.1), courses of study (BP 6143), education for ELLs (BP 6174), multicultural education (6141.6), and international exchange (6145.6).

**Validation of the Influences**

The assumed influences mentioned above underwent further primary data collection using surveys, interviews, observations, and document analysis to make conclusive decisions about their validation. The assumed root causes influencing the organization’s ability to meet the teacher’s goal were imperative to the validation process. Important elements in the validation process included teachers’ knowledge about bilingualism and biliteracy, knowledge about culturally relevant and sustaining pedagogy, and knowledge of dual language acquisition and how each of these elements are implemented within core content areas. Deciding to deliver lessons that are culturally relevant and sustaining reciprocally influenced curriculum and instruction and delivery of dual language instruction despite limited bilingual capacity of the teachers. The influences were validated, partially validated, or not validated based on the findings through triangulation of qualitative and quantitative data. As an innovation study, the validated influences will require innovative recommendations.
Motivation assumed root causes influencing the organization’s ability to meet teacher’s goal are among the most significant and impactful in the improvement process. Teacher’s belief about and value in bilingualism and biliteracy with target language and student’s heritage language, teacher’s ability to demonstrate confidence to design, deliver, and implement student-led and student-centered lessons that progress students in dual language learning and engage them in culturally relevant and sustaining curriculum, and teacher’s mastery goal-orientation toward alignment of 21st-century skills within all tasks through the units are the fundamental elements of motivation that were addressed through this study.

Organizational assumed root causes influencing the organization’s ability to progress in teacher’s achieving their goal is also instrumental. Elements of organization analyzed for validation included the district and school’s responsibility to provide teachers with the essential tools, resources, and materials relevant to dual language acquisition, culturally relevant and sustaining pedagogy, and collective promotion of the seal of biliteracy. It is the responsibility of the organization to develop an infrastructure to provide ongoing professional learning, growth opportunities to develop and sustain dual language acquisition and pedagogy that is culturally relevant, provide time and space for teachers to collaborate amongst themselves within their content areas, and provide time and space for language teachers to collaborate with core content teachers in physical and biological science, social science, and mathematics, and communication of policies and procedures that support completion of the seal of biliteracy.
Table 6

*Assumed Causes and Validation Methods for Knowledge, Motivation, and Organization (Ambrose et al., 2010; Rueda, 2011)*

<table>
<thead>
<tr>
<th>Assumed Causes and Influences</th>
<th>Survey</th>
<th>Interview</th>
<th>Document Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers need to understand what bilingualism and biliteracy is. (F)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers need to know what culturally relevant and sustaining pedagogy is. (F)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to understand how to include students’ primary and target languages into core content area instruction. (C)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Teachers need to understand how culturally relevant and sustaining pedagogy influences curriculum and instruction. (C)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Teachers need to deliver best instructional practices through student-led and student-centered pedagogy that elicits native and target languages. (P)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to demonstrate an ability to plan and deliver lessons in their content area that are inclusive of culturally relevant and sustaining pedagogy. (P)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Teachers need to reflect on lesson and unit development and how students are progressing in two or more languages. (M)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to reflect on how the curriculum and pedagogy is culturally relevant. (M)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Motivation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers need to believe that bilingualism and biliteracy is an asset for students’ cognitive development and academic achievement. (B)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Table 6, continued

<table>
<thead>
<tr>
<th>Assumed Causes and Influences</th>
<th>Survey</th>
<th>Interview</th>
<th>Document Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motivation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers need to value students’ heritage languages and cultures in order to incorporate them into student-led instruction. (V)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to demonstrate confidence and self-efficacy in planning and facilitating dual language instruction and culturally relevant and sustaining pedagogy within their content area. (SE)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to align their instructional goals with the organizational goal and 21st century standards, which includes dual language learning and culturally relevant pedagogy. (GO)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schools need to provide teachers with instructional materials and curricula in all content areas that support dual language learning and culturally relevant and sustaining pedagogy. (R)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Schools need to embrace and support all teachers in progressing toward the LCAP goals and organizational mission. (CM)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Schools need to celebrate growth in dual language acquisition. (CM)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Schools need to provide teachers with professional learning and growth opportunities and collaborative time within each content area. (CS)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Schools need to provide language teachers and core content area teachers (science, social science, and mathematics) time and space to collaborate. (CS)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Schools need to provide teachers with ongoing professional development in dual language instruction and culturally relevant and sustaining pedagogy. (T)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Table 6, continued

<table>
<thead>
<tr>
<th>Assumed Causes and Influences</th>
<th>Survey</th>
<th>Interview</th>
<th>Document Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schools need to commit to providing a range of tools for teachers to achieve the standards for meeting their stakeholder goal and the organizational mission. (T)</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Schools need to communicate policies and procedures for scheduling student 4-year plans to ensure maximum completion of State Seal of Biliteracy requirements. (PP)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(R) Resources; (CM) Cultural Models; (CS) Cultural Settings; (T) Training; (PP) Policies and Procedures

**Trustworthiness of the Data**

To secure valid results from this methodology, the use of triangulated data was instituted. Data was collected from teacher surveys, teacher interviews with classroom observations tool data collection revealing pedagogical practices, and document analysis of relevant prior data and district planning. The district was provided with transparent instructions about the progression of the data collection process and about how the data would be analyzed. Teachers were coded and provided pseudonyms to secure anonymity for survey completion and interviews. Survey data was collected on a secure data entry system, Qualtrics, which requires principal investigator to login securely and enables for the anonymous data collection. District documents were encoded with pseudonyms to secure the confidentiality of the district data and documentation. Whenever data provided apparent revelation of the district, it was omitted or edited to secure the confidentiality. Most document analysis material was open access data that could be retrieved by the public through the department of education or open statistics websites. The data was securely stored on a password-protected computer within a password-protected data collection online system that does not record login information.
Role of the Investigator

As investigator in this study, the role of was one of school site administrator at one of the district comprehensive high schools. With permission granted by the Assistant Superintendent of Educational Services and the Assistant Superintendent of Human Resources of the CPHSD, this study was approved to help provide the district with an analysis of the data surrounding the district LCAP goal pertaining to the California SSB. The district agreed to the investigation which was designed to illuminate requisite steps to improve student outcomes in the realm of bilingualism and biliteracy district-wide. The validated knowledge, motivation, and organizational influences contributing to the gap can be used by administration throughout the district to inform their district priorities, which is why participants throughout the organization who participated in the study through surveys and interviews will remain anonymous and their individual responses confidential. Each survey participant was assigned a code when their data was captured. Each interview participant was assigned a pseudonym. Participants were informed that their contribution through interview and survey was invaluable but voluntary.

For survey collection, the principal investigator used the encoded Qualtrics data collection system to maintain anonymity; however, to ensure more participants, paper surveys were distributed to each school site for distribution. To secure anonymity in the paper copies, names were not requested, and surveys were turned into the office manager or principal’s secretary. Surveys were then collected by the principal investigator.

For interviews, the investigator met with teachers in person. Because their identity was revealed explicitly, they were assigned pseudonyms to secure their identity. The investigator focused mainly on allowing teachers to elaborate, but when they seemed to misunderstand a question or did not provide depth to the question, subsequent and provocative questions were
enlisted to gain more depth to understanding the teacher’s position. Because investigator is employed as a direct supervisor over teachers with whom the interviews would need to be conducted, a guest interviewer was assigned to conduct the interviews at one of the school sites within the district. However, no teachers at the supervisor’s site agreed to participate in the interview.

Data Analysis

To proceed with obtaining themes in the validation of knowledge, motivation, and organizational assumed causes, data analysis consisted of several steps. Once survey data were collected, they were prepared within a spreadsheet to analyze. The interviews were transcribed, coded, and analyzed within the knowledge, motivation, and organization categories of assumed influences. Survey and interview questions were aggregated by category of knowledge, motivation, and organization; therefore, knowledge, motivation, and organization questions within the surveys and interviews will be cross-checked for accuracy, consistency, and themes. The teacher survey and interview data, classroom observation tool pedagogical findings, and document analysis data were consolidated into several Excel spreadsheets to organize the process for validating the assumed causes. On a separate tab within the Excel spreadsheet, each assumed cause was reviewed against the results of the data to deduce whether each assumed influence was validated, partially validated, or not validated as a pungent reason for the organizational gap.

Limitations and Delimitations of the Study

Each research study is limited by externalities and internalities outside of the control of time, space, resources, and access of the researcher. This section will outline some of the expected limitations and delimitations incurred throughout this study’s methodology. Efforts were made to minimize limitations and increase the validity of results so that the findings can be
generalized and used to make sustainable organizational change in support of building an infrastructure for gaining bilingualism and biliteracy through earning the California SSB.

**Limitations**

One limitation engendered in this study existed in the form of incomplete data collection. The sample size was created due to the constraints of time and availability of participants and the investigator. Ideally, to develop an accurate view of the teachers’ KMO landscape, all teachers would have completed the survey and interview; however, only one teacher per department district-wide was expected to participate in the interviews, while all were invited to participate in the survey. Additionally, teachers who may have significant experience, knowledge, or expertise about the topics may not have completed the survey or volunteered to participate in the interview, while those teachers less familiar or comfortable with the topics may have been reluctant to respond. Additionally, during surveys and interviews, participants may have experienced social desirability bias, wherein participants responded how they believe they should have responded. However, the questions were selected and phrased in such a manner to try to minimize that as much as possible. Though teacher observations were desired and would have been beneficial in affirming teachers’ expressed ideas about bilingualism and culturally relevant pedagogy, the practicality of time and availability of the investigator and participants was a realistic constraint.

Another limitation of this study includes the documents utilized in the document analysis. Data that is finally reported is often 2 or more years old, so it is not reflective of what is occurring directly in the classroom within the current school year. Therefore, when triangulating the data with classroom observations, the outcomes may not reflect any shifts, changes, or revisions to the curriculum that occurred in the past year or two. Therefore, the range of time
between the current data, current LCAP plan, and current student cohort are always in flex within 1 to 4 years of alignment. It will also not reflect the professional development in which teachers have engaged throughout the past year or two; however, that is why professional development schedules, agendas, and minutes will be reviewed.

Another limitation of this study included the lack of research on secondary bilingual models in schools within the United States, and particularly in California. Though California possesses the majority of dual language programs in the United States, they are primarily instructed throughout kindergarten through eighth grade. European nations have undergone more research since the initiation of their EU expectation of one plus two language policy. Because this study is an innovation study that juxtaposes bilingualism and biliteracy with culturally relevant pedagogy with teachers who are not proficient in two languages, the research covering these topics is not comprehensive. Additionally, the California SSB was originated in 2011 as the first state to permit students to earn a seal demonstrating their bilingual proficiency, there is minimal but growing research about the validity of the seal as a language marker and sufficient measure of bilingualism and biliteracy.

Other limitations include self-reporting data, which may impinge on comprehensive recollection of historical information; external variables over which the organization does not have any influence, such as university and college pre-service teacher preparation programs.

**Delimitations**

Teachers were selected as the primary stakeholder group because they possess the potential for greatest impact on the organization’s ability to impact knowledge, motivation, and organizational assumed root causes which lead to closing of the gap between present and desired performance on the seal of biliteracy. Site and district administrators are considered as the
stakeholders with the potential for greatest impact on the organizational goals; however, there are limitations to their ability to impact instruction, pedagogy, curriculum planning, and language interaction with students directly. Parents may be considered as stakeholders of focus; however, parents would have been more difficult to access and measure because they vary each year and do not have a direct impact on the value-added instruction, pedagogy, and academic language that aligns with the curriculum. Parents have a tremendous influence on their children’s language development, but it would be much more difficult to determine which parents to select and obtain feedback and results from parents on the surveys.

All stakeholder groups should have an interest in the findings of the study. However, unless delivered directly to them in a variety of forms of media, parents will not know about the research study. Site and district administrators will likely have the most interest in the results of the study because they directly instruct and support teachers and develop the school site and LCAPs, which each outline the district goals and priorities in alignment with the eight state priorities and five overarching local control goals. Because the organizational performance goal came directly from the LCAP plan that was developed from the input of all stakeholders, it should be apparent that the stakeholders found it to be a priority to increase the number of students who become fluent in two or more languages. Finally, students are the stakeholder group with the most invested in the goal, but they are mostly dependent upon the actions and decisions of those who control the funds, resources, curriculum and materials, and instructional delivery.

The limitations, though present, should not impact the gap analysis process to reveal validated assumed root causes that impact the organization in making progress on the organizational goals.
CHAPTER FOUR: DATA RESULTS AND ANALYSIS

The gap analysis framework was applied to the study to systematically validate or invalidate the assumed influences, of which were determined from literature review on the topics, learning and behavioral theories, and professional knowledge about the environment of curriculum and pedagogy at secondary schools. Given that the overall purpose of this study was to extrapolate the present performance in knowledge, motivation, and organization for promoting bilingualism and biliteracy through a student-led culturally relevant pedagogy, validation of the assumed influences will be assessed in this chapter.

Chapter Four presents the findings and analysis of the data that was quantitatively and qualitatively collected through online and paper surveys to teachers, interviews of content area teachers, and document analyses. Key findings from the data are analyzed and synthesized according to the assumed influences. In this chapter, the objective to validate the assumed influences in the areas of knowledge, motivation, and organization will be evident in each of the subsequent subheadings.

**Participating Stakeholders**

Teachers invited to participate in the surveys were all those currently in teaching positions within English, math, science, social science, visual and performing arts, special education, and world language at four comprehensive high schools, one of which is a magnet school. The overall quantity of surveys distributed was 260. Forty-two completed surveys were submitted, and among them, one or two teachers left one or several questions blank. There were two additional incomplete surveys whose incomplete results were discarded from the study altogether.
Interviewees were selected through random stratified sampling, and ultimately there were seven participants, one from each department, including English, math, science, social science, visual and performing arts, special education, and world language. Chapter Four contains pseudonyms for all interview participants to protect their identity. Interview participants included Sofia, Trischa, Jessica, Nikola, Simon, Elise, and Ray, and whose pseudonyms will be named in association with their quoted contribution.

For math, the first randomly selected teacher agreed to participate. For special education, the third invitee agreed to participate. For visual and performing arts, the fourth invitee agreed to participate. For world language, the eighth invitee agreed to participate. For English and social science, the eleventh invitee agreed to participate for each, while for social science, an administrator was contacted to help expedite selecting a participant due to lack of responses. For science, after eight invitations were sent, an administrator was contacted to help facilitate a willing participant. Among interview participants, Indium High School was not represented in any department.

For document analysis, some documents were obtained through public access on the GamutOnline.net board policy page for the district, while professional development documents were requested and obtained through the district director of professional learning. Student achievement assessment scores were publicly available for CAASPP and CELDT for the previous 3 years, while AP scores were requested and provided from the district director of assessment and accountability.

**Data Collection and Validity**

In pursuit of answering the research questions, data was collected in the form of teacher surveys for quantitative results, teacher interviews for qualitative results, which included a
pedagogy protocol for quantifying positive responses for dual language learning and culturally relevant pedagogy, and document analysis for evidence of the assumed influences. The research questions to be answered were threefold:

1. What is the teachers’ knowledge and motivation related to promoting bilingualism and biliteracy through culturally relevant and sustaining pedagogy and student-centered dual language instruction to improve proficiency in two or more languages?

2. What is the interaction between the organizational culture and context and teachers’ knowledge and motivation?

3. What are the recommended knowledge and skills, motivation, and organizational solutions needed to accomplish the goal of promoting bilingualism and biliteracy through culturally relevant and sustaining pedagogy and student-centered dual language instruction to improve proficiency in two or more languages?

Demographic data were collected on the survey participants, and the results are displayed in Figure 5. There was balanced participation among secondary school sites, teaching assignment types, and years of teaching experience. Additional demographic information was obtained regarding language learning in which teachers have engaged formally and informally. Data was reviewed and compared holistically and among subcategories, such as per academic department, number of years of experience teaching, and degree of teacher language proficiency in a language other than English.

Longevity is instrumental for illuminating how impactful some of the preparation is within contemporary teacher preparation programs, especially given that new teachers are at the precipice of the change in California language mandates versus teachers who have been engrossed in the previous EO legislation. A critical rationale for identifying teachers’ language
learning is to extrapolate whether teachers with more extensive language learning themselves invite higher degrees of dual language learning into their classrooms.

Table 7

Demographic Information of Survey Respondents

<table>
<thead>
<tr>
<th>Survey Measure</th>
<th>Item</th>
<th>Total Surveys Completed per Site</th>
<th>Percentage of Participants per Site</th>
<th>Total Teachers within District</th>
<th>Percentage of Overall Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td>Antimony</td>
<td>13</td>
<td>30.9</td>
<td>84</td>
<td>15.5</td>
</tr>
<tr>
<td></td>
<td>Indium</td>
<td>10</td>
<td>23.8</td>
<td>61</td>
<td>16.4</td>
</tr>
<tr>
<td></td>
<td>Titanium</td>
<td>14</td>
<td>33.3</td>
<td>80</td>
<td>17.5</td>
</tr>
<tr>
<td></td>
<td>Berkellium</td>
<td>5</td>
<td>11.9</td>
<td>31</td>
<td>16.1</td>
</tr>
<tr>
<td>Current Teaching Assignment</td>
<td>English</td>
<td>9</td>
<td>21.4</td>
<td>63</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>Math</td>
<td>9</td>
<td>21.4</td>
<td>43</td>
<td>20.1</td>
</tr>
<tr>
<td></td>
<td>Science</td>
<td>8</td>
<td>19.0</td>
<td>36</td>
<td>22.2</td>
</tr>
<tr>
<td></td>
<td>Social Science</td>
<td>7</td>
<td>16.7</td>
<td>33</td>
<td>21.2</td>
</tr>
<tr>
<td></td>
<td>Special Education</td>
<td>6</td>
<td>14.3</td>
<td>38</td>
<td>15.8</td>
</tr>
<tr>
<td></td>
<td>Visual and Performing Arts World Language</td>
<td>2</td>
<td>4.8</td>
<td>21</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>World Language</td>
<td>1</td>
<td>2.4</td>
<td>22</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Note: Sample size is 42.

According to the demographic information listed above, the number of world language and visual and performing arts teachers is low compared to the other departments. As world language teachers, curriculum and instruction surrounding imperatives of second language acquisition and culture are paramount, so the imbalance in input may be skewed. However, inferences about the participation and lack of participation of teachers is speculative and is not critical to the validity of the existing data. Additionally, English teachers at Del Lago Academy
jointly teach social science as Humanities teachers. They are not double counted in the results.

The existing data is a sufficient sample to draw conclusions representative of the district.

![Figure 5](chart.png)

**Figure 5.** Languages teachers learned. French, Spanish, German, Mandarin Chinese, and Japanese are AP and SAT-II Subject Exams; Italian is an SAT-II Subject Exam; Arabic, Russian, Tagalog, and Portuguese are not exam languages, but there are students in the district who speak these languages.

Teachers who engaged in the survey are predominantly native English speakers with 76.2% (32 of 42) having some level of Spanish proficiency, which is the predominant second home language in the community besides English. French is the next most populous language spoken among teachers at 23.8% of teachers indicating some level of proficiency. German and Mandarin Chinese each had a small number of teachers having proficiency at 14.2% and 7.1%,
respectively. No teachers have any level of proficiency in Arabic or Tagalog, both languages that are represented by students in the district. Among all teachers, five indicated some level of proficiency in two or more languages in addition to English. Six teachers indicated some proficiency in three or more languages in addition to English. This is important to note because the minimum requirement for language instruction in the EU is the mother tongue plus two additional languages, which that requirement is not equivalent in the United States. As a caveat when considering this data, it is probable that those who have a background with language learning may have been more interested in a survey about language and culture than colleagues who do not have prior language experience or interest.

Upon analysis of the means and methods pursued for language acquisition among teachers, high school and college were the predominant pathways for formal language learning. Additional methods of language learning teachers indicated were adult school, special language international institutes, Rosetta Stone, Duolingo, and informal learning through travel, television and movies, colleagues, and family members.

Validation of Assumed Influences

In the following knowledge, motivation, and organization sections within this innovative study, the validated items are those influences that the teachers demonstrated as a sustained need, in which case they do not already persist in them. Partially validated items demonstrate mixed results. Items that are identified as not validated indicate that the teachers already possess these influences, and they are, therefore, unnecessary to from which to achieve the stakeholder goals.

Knowledge and Skills

Data analysis of the knowledge items for bilingualism, biliteracy, and culturally relevant and sustaining pedagogy will enable a clear path to validation or invalidation of the assumed
influences of which the organization needs to implement an innovative program for promoting bilingualism and biliteracy through a student-centered culturally relevant pedagogy. Factual, conceptual, procedural, and metacognitive knowledge was obtained through surveys and interviews. Factual knowledge about bilingualism and culturally relevant pedagogy and conceptual, procedural, and metacognitive knowledge were partially validated among teachers due to mixed results on survey and interview data. Conceptual, procedural, and metacognitive knowledge about dual language learning was validated because teachers exhibited an expressed need to develop in order to achieve the organizational mission.

Table 8

Validation of Knowledge Assumed Causes or Influences

<table>
<thead>
<tr>
<th>Knowledge Category</th>
<th>Assumed Influence</th>
<th>Validated</th>
<th>Partially Validated</th>
<th>Not Validated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factual</td>
<td>Teachers need to understand what bilingualism and biliteracy is.</td>
<td>(\checkmark)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factual</td>
<td>Teachers need to know what culturally relevant and sustaining pedagogy is.</td>
<td></td>
<td>(\checkmark)</td>
<td></td>
</tr>
<tr>
<td>Conceptual</td>
<td>Teachers need to understand how to include students’ primary and target languages into core content area instruction.</td>
<td>(\checkmark)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conceptual</td>
<td>Teachers need to understand how culturally relevant and sustaining pedagogy influences curriculum and instruction.</td>
<td>(\checkmark)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procedural</td>
<td>Teachers need to deliver best instructional practices through student-led and student-centered pedagogy that elicits native and target languages.</td>
<td>(\checkmark)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procedural</td>
<td>Teachers need to demonstrate an ability to plan and deliver lessons in their content area that are inclusive of culturally</td>
<td>(\checkmark)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
relevant and sustaining pedagogy.

### Metacognitive

Teachers need to reflect on lesson and unit development and how students are progressing in two or more languages.

### Metacognitive

Teachers need to reflect on how the curriculum and pedagogy are culturally relevant.

---

### Factual Knowledge

Having a solid understanding of bilingualism, biliteracy, and culturally relevant pedagogy is imperative for being able to progress in the implementation of pedagogy, design and delivery of instruction that is inclusive of high academic achievement, cultural competence, and sociopolitical awareness and the furtherance of proficiency in two or more languages. Table 9 displays the mean scores for questions related to factual information, such as understanding how students earn the seal of biliteracy, what is dual language pedagogy, and what is culturally relevant pedagogy.

#### Table 9

**Survey Mean Score Results: Factual**

<table>
<thead>
<tr>
<th>Knowledge: Factual</th>
<th>Mean Score (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I know methods for students to earn the California State Seal of Biliteracy.</td>
<td>0.79</td>
</tr>
<tr>
<td>I know what dual language acquisition pedagogy is.</td>
<td>1.05</td>
</tr>
<tr>
<td>I know what culturally relevant or sustaining pedagogy is.</td>
<td>1.45</td>
</tr>
</tbody>
</table>

**Teachers need to understand what bilingualism and biliteracy is.** This influence is validated. The survey results indicate that a small number of teachers are familiar with dual language acquisition pedagogy and how students can earn the SSB. Table 4 displays the mean score for teachers understanding methods for earning the seal is 0.79, while dual language
acquisition pedagogy understanding merited a mean score of 1.05. As unaware as teachers reported themselves to be about the seal, they indicated a higher awareness, although still at novice levels, of understanding bilingualism and biliteracy.

The interviews projected a keen understanding among teachers regarding their knowledge of strategies for developing the English language ability of English learners. All teachers referenced some historical training for supporting English learners. One example was when Trischa described, “A few years ago there was a real focus on professional development through the district that focused on ELLs, vocabulary development.” Three teachers explicitly stated the authorization under their credential that they earned, such as the CLAD or BCLAD: Nikola, “The only training I had was my BCLAD.” Trischa, “I did my CLAD when I did my [credential] training.” Elise, “I almost got a BCLAD.”

However, no teacher indicated how bilingualism is promoted within the core curriculum for all students regardless of primary language. Two teachers described the importance of and their pedagogies for developing higher levels of literacy, which can be attained through higher level vocabulary and context and demonstrated through complex writing. It should be expressed that among teachers participating in the interviews, three directly teach classes that include newcomer English learners as a significant portion of the classes or as the entire class.
This influence is validated because the knowledge of the seal of biliteracy is still unknown and dual language pedagogy knowledge at the secondary level is relatively low. Teachers who exhibited a greater understanding of bilingualism provide instruction to newcomer English learners. Therefore, this influence will need to be further supported.

**Teachers need to know what culturally relevant and sustaining pedagogy is.** This influence is partially validated. Definitively, culturally relevant pedagogy was viewed through the lens of academic achievement, cultural competence, and sociopolitical awareness. Teachers demonstrated through self-reported surveys mixed results ranging from no understanding to extremely solid understanding, wherein the majority of participants expressed understanding somewhat to well. The mean score on the surveys factual understanding of culturally relevant and sustaining pedagogy is 1.45. Interviews enabled teachers to provide more explicit descriptions of culturally relevant pedagogy. No teacher blatantly described culturally relevant pedagogy as possessing the three-prong philosophy of academic achievement, cultural competence, and sociopolitical awareness. All teachers identified the importance of maintaining
high expectations and pursuing academic achievement for all students through the analysis of data and scaffolding or differentiating of instruction, this regardless of their socioeconomic or ethnic background, with some minor exceptions extrapolated from the interview data. Two teachers described barriers for student achievement, such as issues at home, lack of access to resources, or inability to grasp concepts sufficiently, while the remainder of teachers described district and site organizational barriers, but not students’ inability to achieve.

Regarding cultural competence, every teacher identified at least a minimum commentary about how understanding student cultures and backgrounds, making connections to them, and building relationships with the students is important. Teachers used terms like, “consider,” “be sensitive to,” be “culturally sensitive to,” be “aware,” and be “socially responsive” when describing how they should engage students of all ethnic and socioeconomic strata. Three teachers pointedly expressed how they have adjusted their curriculum, resources, and pedagogy to include the represented ethnicities of their students, such as through artists or authors with varying backgrounds aside from the dominant European heritage.

Figure 7. Teacher understanding of culturally relevant and sustaining pedagogy.

Two teachers acknowledged the sociopolitical nature of how the curriculum and instruction should provoke students to engage civically and attend to their agency within an ability to impact the world. Ray emphasized that the student’s position and agency matter, which are critical to the sociopolitical arm of culturally relevant pedagogy in that, “They’re
becoming invested in something that clearly affects them…but then understanding how that impacts them personally and being able to express that in the form of an argument.”

The influence was partially validated because though some teachers present nascent to intermediate knowledge of culturally relevant pedagogy, it is still inconsistent across all content areas. This partial validation will not result in direct intervention.

**Conceptual Knowledge**

Conceptual understanding of dual language learning and culturally relevant pedagogy are essential for teachers to be able to procedurally implement curriculum and instruction for supporting dual language learning through a culturally relevant pedagogy. Teachers expressed the arduous nature of incorporating dual language into their core instruction for various reasons, which may include lack of training, lack of language ability, and materials that are not inclusive of embedded supports. Additionally, only one school site referenced a school-wide training about culturally sensitive instruction, but other sites spoke from places of prior experience or pedagogical training regarding engaging students more generally. Conceptual knowledge about dual language learning was validated, while conceptual knowledge about culturally relevant pedagogy was partially validated. Dual language learning will need intervention, but culturally relevant pedagogy will not require intervention for this study.

Table 10

*Survey Mean Score Results: Conceptual*

<table>
<thead>
<tr>
<th>Knowledge: Conceptual</th>
<th>Mean Score (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>My curriculum and materials address dual language learning.</td>
<td>0.83</td>
</tr>
<tr>
<td>My curriculum and materials address culturally relevant pedagogy.</td>
<td>1.09</td>
</tr>
</tbody>
</table>

**Teachers need to understand how to include students’ primary and target languages into core content area instruction.** This influence was validated. Teachers self-reported below
average understanding in dual language acquisition models and their implications for their content area with a mean of 0.83. Over 75% of surveyed teachers indicated that they have somewhat to no knowledge of dual language acquisition. Except for the world language teacher, no teachers overtly described how they incorporate etymology, other language learning, or direct comparisons among language or origin within content. However, every teacher interviewed described a need for explicit vocabulary instruction when building language in English, especially for ELLs. Trischa described, “…Ensuring that vocabulary, for example, academic specific vocabulary, content specific vocabulary is actively taught rather than just the assumption that the students will absorb the meaning.” Sofia echoed, “It’s a lot of explicit vocabulary…making sure they have time to write and then you talk about stuff.” Elise said,

You add a lot of vocabulary, and then you teach them to use it, to apply it…You have to read higher level texts, academic texts, and literature. That is the only way to increase your vocabulary and to increase the sophistication of your language.

Ray provided the same sentiment in is description of incorporating vocabulary, “Speaking-wise and writing-wise, it’s the vocabularic knowledge is not where it needs to be,” so he encouraged the student to look up the word in context and use it similarly, “Getting practice with the language […] putting it in context.”
The nearly 25% of surveyed teachers who indicated that their curriculum and materials address dual language learning was not equally met in the interview data. Only those teachers who directly work with clusters of English learners referenced the inclusion of dual languages, and that was English and Spanish. Nikola and Sofia described the difficulties of addressing languages other than English, while Jessica voiced that she was able to employ her own multilingual language skills with parents.

Given that California only recently passed the Proposition 58 in 2017, teachers did not reference proactively instructing in a language other than English because it was previously contrary to California legislation. Jessica inerferenced the previous Proposition 227, which required teachers to instruct in EO. Other teachers described their efforts at supporting English learners in the mainstream classrooms, but they did not describe dual language pedagogy or instruction. The Board of Education documents explicitly described the requisite ELD instruction and specially designed academic instruction in English (SDAIE) in AR 4112.22 in accordance with Education Code 44253.2.

The influence was validated because teachers are not yet aware or educated on how to incorporate dual language learning into their content areas across all schools. Therefore, the
influences will require intervention to progress toward the organizational goals. This influence was expected to be not validated because it was known that the district did not have a coordinated plan for promoting bilingualism systematically. For those that self-reported they could incorporate dual languages well or extremely well, it would require further investigation because interview responses spoke mostly to the strategies employed with English learners.

**Teachers need to understand how culturally relevant and sustaining pedagogy influences curriculum and instruction.** This influence was partially validated. Teachers self-reported low average understanding for how culturally relevant pedagogy influences curriculum and instruction with a mean of 1.09, most respondents indicating they understand somewhat. More than half of survey respondents purported to have somewhat of an understanding of culturally relevant pedagogy. Through interviews, teachers gave life to the scope of their understanding of culturally relevant pedagogy, referencing such notions as academic achievement, cultural competence and sensitivity from teachers, and the imminent changed nature of a teacher in the presence of his or her students depending on what they need. Teachers did not use terms like cultural competence and sociopolitical awareness, but their sentiment was exemplified through their circumstantial anecdotes and descriptions, which will be quantified more in the subsequent procedural section.

![Chart showing teacher understanding of culturally relevant pedagogy](chart.png)
Figure 9. Cultural relevant pedagogy influences curriculum and instruction.

Survey responses indicated that teachers appeared to have more difficulty understanding how knowledge about culture translates into curriculum and pedagogical shifts. Almost 75% of teachers said their materials did not or only somewhat address cultural relevance, but they have a slightly higher degree of conceptual knowledge about how to plan lessons that incorporate cultural relevance.

Exemplars for promoting a shift toward pedagogy that is culturally relevant, Simon commented, “I don’t differentiate my tactics or my classroom, I’m a different person,” which highlights the notion of teacher as pedagogue described in Ladson-Billings’ work around culturally relevant pedagogy. Simon also commented, “You’re really changing every aspect of what you do,” when describing how he does not simply employ different strategies or tactics to produce outcomes for students. He and two other teachers described how they shift who they are to meet the needs of their students, wherein Ray expressly divulged that, “It’s all about differentiation and making sure that you’re teaching to the kid, not teaching to the class.”

Board policy indicates,

It is the job of schools to preserve and perpetuate our common pluralistic culture and to accurately reflect the contributions of all ethnic groups to the common culture” (BP 6141.6). Furthermore, in the same section of board policy, the district advises that students must learn to respect and cooperate with people from all backgrounds, “recognizing that we all have equal claim to the American culture which we have collectively created and which we share. (BP 6141.6)

This influence was partially validated because culturally relevant pedagogy is not yet pervasive and thoroughly understood, especially as it relates to promoting bilingualism and biliteracy, despite the anecdotes from several interviewees. Though the Governing Board has
generated some explicit language around the inclusion of all cultures and beliefs, the expression of teacher’s conceptual knowledge in this area was mixed. This influence will not be addressed in the interventions, but it can be implicitly threaded throughout the other interventions.

**Procedural Knowledge**

The ability for teachers to implement or facilitate instruction that supports learning in two or more languages and that is culturally relevant was measured by how teachers responded to survey questions about lesson planning and delivery and interview questions about language and culturally relevant pedagogy. The quantitative responses are displayed in the subsequent tables and figures, while the qualitative responses accompany the claims associated with the quantitative data. The procedural knowledge about dual language learning was validated, while the procedural knowledge about culturally relevant pedagogy was partially validated.

Table 11

*Survey Mean Score Results: Procedural*

<table>
<thead>
<tr>
<th>Knowledge: Procedural</th>
<th>Mean Score (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I know how to plan lessons and units incorporating dual language learning.</td>
<td>0.95</td>
</tr>
<tr>
<td>I know how to deliver and facilitate student-led and student-centered dual language experiences.</td>
<td>0.88</td>
</tr>
<tr>
<td>I know how to plan lessons and units incorporating culturally relevant pedagogy.</td>
<td>1.36</td>
</tr>
</tbody>
</table>

**Teachers need to deliver best instructional practices through student-led and student-centered pedagogy that elicits native and target languages.** This influence was validated. Evidence through the surveys indicates that most teachers have below average knowledge about how to plan lessons that incorporate dual language learning or student-led and student-facilitated dual language learning.
Board policy 6141.6 describes, “Instruction should help students realize the value of individual differences as well as the human dignity and worth common to all people.” As explicit as the board policy is about the intention of promoting equity and value of differences, it is unclear the pathway to enhancing teaching and learning to facilitate this with fidelity. Described in the board policies are definitions of models for English learners, such as English language classroom, English mainstream classroom, sheltered English immersion, and bilingual education/native language instruction. Bilingual or native language instruction, “means a language acquisition process for students in which much or all instruction, textbooks, and teaching materials are in students’ native language,” (AR 6174).

The professional learning calendar and agendas exemplify designated reflection sessions for English and ELD teachers four times per year. The English and ELD teachers are expected to review common assessments and reflect on ways to improve instruction in support of developing the language capacity in reading, writing, speaking, and listening among English learners. Additionally, there is a unique training for mathematics and ELD teachers to collaborate about instruction in mathematics content that incorporates explicit language learning.

Worth noting is the absence of language in the board policies around the newly passed legislation of Proposition 58, the Education for a Global Economy Initiative, which is the impetus for districts soliciting input from parents to determine the type and degree to which native and heritage language instruction will be incorporated into instruction.
The interviews illuminated a lack of understanding of how to incorporate dual language learning into content instruction. Figure 11 shows the mean quantity of interviewees on a binary scale (yes = 1, no = 0) of zero to one who described pedagogy for dual language learning, which was outlined based on a description by Lindholm-Leary (2015).

Each item was either evident or not evident in teacher responses to the interview question prompts, “What other factors do you take into consideration when planning lessons?” and “Describe how you approach language instruction within your curriculum.” The following graphics indicate the quantity of teachers interviewed that described these concepts within their responses. Their description of the concept was tallied for an overall mean score per characteristic.
Explicit vocabulary instruction was the most frequently noted pedagogical claim given by five of the seven interviewees. Four teachers indicated that students use their native language to negotiate learning English, so they invite students to use their first language to more readily understand the content or facilitate learning English. None of the teachers explained that native English speakers are invited to or requested to use or demonstrate use of their second language. Two of seven teachers indicated that there is a balance between two languages, one of whom teaches a sheltered English course and one of whom is a world language teacher.

This influence was validated because most teachers responded that they do not provide student-led or student-centered pedagogies and because aside from explicit vocabulary instruction and elicitation of native languages of English learners, teachers still need systematic training on this type of instructional transformation to promote bilingualism and biliteracy. The validation of this influence will require intervention to address the need.

Teachers need to demonstrate an ability to plan and deliver lessons in their content area that are inclusive of culturally relevant and sustaining pedagogy. This influence was
partially validated. Teachers were not given a definition of culturally relevant pedagogy yet self-reported that they have an ability to deliver content in a culturally relevant way somewhat or well with a mean of 1.36 (Table 11).

Figure 12. Planning and delivering culturally relevant pedagogy.

According to Powell (2014), culturally relevant pedagogy consists of three prongs: Academic achievement, cultural competence, and sociopolitical awareness. Powell delineates more specific detail for each of the three prongs, which is described in the y-axis of the following figures. Data from the interviews was quantified, such that those teachers who referenced academic achievement, cultural competence, or sociopolitical awareness within their instruction implicitly or explicitly were given a value of one. The tallies of teachers responding positively provided a mean score per sub-component of each of the three prongs.

Figure 13. Culturally relevant pedagogy: Academic achievement.
The academic achievement index indicates a unique need in developing student-led instruction, especially for developing and promoting language acquisition in two or more languages. The pervasive high expectations for student academic achievement were endemic to each content area and school site. Student collaboration was utilized in all content areas. Academic language usage in instruction was evident, as each teacher described how their content area vocabulary was important for student comprehension and knowledge acquisition, but all but one teacher described explicit academic vocabulary instruction. None of the teachers portrayed that the explicitly taught academic language was in a language other than English.

Figure 14. Culturally relevant pedagogy: Cultural competence.

Similar to the low prevalence of student-led instruction in the academic achievement section, teachers did not give responses that indicated that there was consistent sharing of classroom control with students. Teachers often described how they plan, improvise, or deliver the lessons, but there was little mention of student choice and initiative except for two of seven teachers. All teachers referenced how they contextualize their content area to students’ background or prior understanding or their cultural or ethnic heritage. As an example, Sofia described how she fold into the community culture,
I was invited to quinceañeras. I was invited to funerals and got to experience the culture in a completely different way…All those little things they won’t tell you exactly what’s happening, but you can figure it out if you’re paying attention.”

All teachers acknowledged that teachers must consider the backgrounds of all the students when planning instruction. Ray expressed that the authors of most of the literature presented in class is from the perspective that does not match the dominant ethnicity of the students, but he makes intentional effort to allow students to choose texts that they might find relevant. Jessica declared that she previously used a resource that was from the perspective of someone who is older and not ethnically related to the students, “[The students were like] it’s a bunch of boring white people talking to the camera.”

Figure 15. Culturally relevant pedagogy: Sociopolitical awareness.

Sociopolitical awareness promotes engagement in explicit instruction or discussion about bias, ideology, status quo, and real-world connections. Teachers explicitly or inferentially described lessons that included real-world learning opportunities, but there was minimal mention of explicit teaching of ideology, bias, status quo, or minority culture consistently across all classrooms, indicative in Simon’s comment, “we’ll all be citizens, we’ll all be voters,” and, “I
know I’m doing a great job in these classes when the kids keep asking [about my political affiliation] because that means it’s not become abundantly clear.”

This influence was partially validated because there are significant trenches regarding the incorporation of culturally relevant pedagogy. Teachers were reluctant to describe explicit ways they provide instruction about ideologies and biases or elevate minority languages and cultures. There are mixed results in the areas of student-centered autonomy and facilitation of students’ own learning. This influence will not be addressed in the interventions explicitly, but it will be incorporated implicitly.

**Metacognitive Knowledge**

Reflection on pedagogical performance holds sway to improving outcomes for students; therefore, metacognitive influences were included in the assumed causes for validation. Teachers who reflect on dual language acquisition and culturally relevant pedagogy will attune themselves to implementing consistent supportive strategies at greater rates than those who do not. Data results indicate a range of metacognitive pathology related to language and culture. Metacognitive reflection about dual language learning was validated, while metacognitive reflection for culturally relevant pedagogy was partially validated.

Table 12

*Survey Mean Score Results: Metacognitive*

<table>
<thead>
<tr>
<th>Knowledge: Metacognitive</th>
<th>Mean Score (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I regularly reflect on improving my teaching practice related to dual language learning.</td>
<td>1.24</td>
</tr>
<tr>
<td>I regularly reflect on improving curriculum and instruction that is culturally relevant and sustaining toward building students’ capacities in value-added cultural learning.</td>
<td>1.60</td>
</tr>
<tr>
<td>I am conscious of my biases of other ethnicities, languages, and cultures.</td>
<td>2.26</td>
</tr>
</tbody>
</table>
Teachers need to reflect on lesson and unit development and how students are progressing in dual languages. This influence was validated. Most teachers indicated that they reflect on how students are progressing in two or more languages somewhat, with an overall mean of 1.24, which is the lowest of that which teachers were asked regarding their metacognitive reflection. Consistent with the questions around dual language acquisition, teachers expressed the least amount of knowledge about dual language learning within their content areas. Teachers are not regularly reflecting on how to improve their instruction to include dual language learning, but several teachers conveyed that they work with their professional learning communities will occasionally talk about how English learners are progressing. All teachers articulated some form of training they received or participated in to support and include English learners, which illuminates why the only references to dual language learning are related to the progress of English learners.

![Metacognitive - I regularly reflect on improving my teaching practice related to dual language learning](chart.png)

**Figure 16.** Teacher reflection on progressing in dual languages.

This influence was validated because there is still a strong cohort of teachers who are unsure how to incorporate dual language learning into the core content, let alone reflection on how instruction in two or more languages is progressing or impacting students. The validation of this influence will require intervention to achieve the organizational goal of attaining greater bilingualism and biliteracy.
Teachers need to reflect on how the curriculum and pedagogy are culturally relevant. This influence was partially validated. Teachers had a mean score of 1.6 regarding their own reflection on how culturally relevant their pedagogy is reflective of the students. It is elevated as compared to notion of reflecting on dual language learning. The question about teachers’ own perspectives on their awareness of bias proved a much higher mean response at 2.26. Only one teacher indicated that he or she was not at all aware of his or her own biases; however, 80% indicated that they are well or extremely aware of their own biases. Aside from the mention of one training that one school site participated in about culturally responsive teaching, teachers did not mention of any training regarding culturally relevant pedagogy, but they are heavily aware of their own biases of languages and cultures.

![Figure 17. Teacher reflection on culturally relevant pedagogy.](image)

When questioned about reflection on culturally relevant pedagogy, teachers each referenced some notion of professional learning collaboration, but the degree of reference to personal or collective reflection varied. Simon described the culture of students as more than simply their ethnicity, but also their age, socioeconomics, and social groups, while Elise described the culture of students through sports, preferences, and entertainment and described how her class lends to making cross-cultural comparisons.
This influence is partially validated because there is a strong cohort of teachers who exhibit strong metacognitive reflections on bias regarding ethnicities, languages, and cultures, but there continues to be a need for reflection of cultural relevance and dual language learning within professional learning.

Key Insights

Teachers’ knowledge of culturally relevant pedagogy surpasses their understanding of how to include and elicit students’ movement in the furtherance of learning two or more languages. Results indicate a broad opportunity to capitalize on the foundational knowledge teachers exhibit about culturally relevant pedagogy to promote bilingualism and biliteracy. The inability to incorporate non-English languages into core curriculum is residual from Proposition 227 because it was contrary to the law to provide instruction in a language other than English. The methods for furthering other language development concurrently with English is yet to be determined within the new Education for a Global Economy Initiative, otherwise known as Proposition 58.
Figure 18. Knowledge findings summary.
Motivation

Choice, persistence, and mental effort are the cornerstone to defining motivation, and the more elevated each aspect is, the greater degree of motivation teachers have to accomplish the objectives. Belief and value in bilingualism and biliteracy was heavily present through the surveys, while teachers provided some insight to the sentiment of the beliefs and values through the interviews. Teachers’ beliefs about and values for bilingualism and the incorporation of students’ heritage languages and cultures were not validated because they present with a strong belief and value in heritage languages and cultures. Goal-orientation for mastery was partially validated because of the mixed results leaning toward emphasizing student mastery of 21st-century skills over performance. Teachers’ self-efficacy toward student-centered culturally relevant pedagogy and dual language learning was validated because teachers demonstrated a need to grow in these areas to meet the organizational goal.

Table 13

Validation of Motivation Assumed Causes or Influences

<table>
<thead>
<tr>
<th>Motivation Category</th>
<th>Assumed Cause or Influence</th>
<th>Validated</th>
<th>Partially Validated</th>
<th>Not Validated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belief</td>
<td>Teachers need to believe that bilingualism and biliteracy is an asset for students’ cognitive development and academic achievement.</td>
<td></td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td>Teachers need to value students’ heritage languages and cultures in order to incorporate them into student-led instruction.</td>
<td></td>
<td></td>
<td>√</td>
</tr>
</tbody>
</table>
Table 13, continued

<table>
<thead>
<tr>
<th>Motivation Category</th>
<th>Assumed Cause or Influence</th>
<th>Validated</th>
<th>Partially Validated</th>
<th>Not Validated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-Efficacy</strong></td>
<td>Teachers need to demonstrate confidence and self-efficacy in planning and facilitating dual language instruction and culturally relevant and sustaining pedagogy within their content area.</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Goal-Orientation</strong></td>
<td>Teachers need to provide instruction that is student-centered for achievement in alignment with 21st-century standards, which include bilingualism and culturally relevant pedagogy.</td>
<td>√</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Belief for Bilingualism and Culturally Relevant Pedagogy**

For teachers to be able to support increasing bilingualism among students, they need to believe that bilingualism and biliteracy is an asset for students, such that the primary or heritage language and the target language are important for cognitive development and academic achievement. Teachers displayed the strongest notions of belief in and value for the complexity of developing bilingual and biliterate students, but as will be evidenced throughout the chapter, belief and value are not met with equivalent investment in pedagogy, materials, and training for promoting this throughout the district. Belief was not validated due to strong outcomes from teachers in this area.
Table 14

Survey Mean Score Results: Belief

<table>
<thead>
<tr>
<th>Motivation: Belief</th>
<th>Mean Score (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe that bilingualism and biliteracy are assets for students’ cognitive</td>
<td>2.68</td>
</tr>
<tr>
<td>development and academic achievement.</td>
<td></td>
</tr>
<tr>
<td>I believe bilingualism and biliteracy are a priority for our students.</td>
<td>1.96</td>
</tr>
<tr>
<td>I believe that students’ native language is an asset for them and should be</td>
<td>2.60</td>
</tr>
<tr>
<td>utilized in learning.</td>
<td></td>
</tr>
</tbody>
</table>

Teachers need to believe that bilingualism and biliteracy is an asset for students’
cognitive development and academic achievement. This influence was not validated because
teachers demonstrate a strong belief in favor of the assets of bilingualism. According to the
survey results, 39 of 40 survey respondents believed well or extremely well that bilingualism and
biliteracy is an asset for students' achievement. Only 29 of 40, still a significant number, believe
that bilingualism is a priority for students. Thirty-eight of 40 teachers believe that a student's
native language is an asset for them and should be utilized in learning. No teacher believed that
these were not at all valuable for students.

Figure 19. Beliefs about bilingualism and biliteracy.
Interviews revealed a mixed perspective about the belief teachers have regarding the importance and contribution bilingualism can have toward cognitive and academic achievement. All teachers made some mention that they want students to do well and achieve, and none of the teachers indicated that learning two or more languages will present any harm to students or their future opportunities. As evidence of teacher beliefs about students’ individual growth and added value of bilingualism, Elise presumed that,

> When we don’t understand other cultures, we make assumptions and prejudices come out and we stay ignorant…There’s a world out there beyond their close-mindedness…You need to challenge your comfort zone…It’s like living in two dimensions versus three…for a lot of students it takes pushing and pulling for them to get to a point where they [are] more open-minded.

Nikola explicitly described how learning two languages is imperative in the current marketplace. Sofia was quick to describe the added richness that other languages and cultures can bring to the classroom, especially given how closely students’ social emotional lives are intermingled with their identities.

All teachers frequently referenced English learners when discussing language acquisition, suggesting that supporting them to learn English was a requisite task for them. However, none of the teachers expressed that they could support all students to further their bilingual abilities, even if native English-speaking students were taking world language courses. Ray expressed the complexity of language as he referenced an example of how students in his class discuss language through ancient texts. Through the discussion, he described how anachronistic the English language can be, how it has evolved, and how it varies regionally. He indicated that this is relevant regardless of what the primary language of the student is.
Elise posed a belief that some students may not be suited toward language learning, suggesting that “not every student is a language person, and you start thinking maybe they don't have the mental hardware,” while Nikola described how challenging having multiple languages in a class can be for a teacher, stating, “having such a huge diversity in one classroom is beyond normal differentiation.” These two comments were anomalous compared to all other qualitative and quantitative data, and although they don’t discredit the belief that all students can achieve bilingualism and biliteracy, they shed different light on the complexity of language acquisition.

This influence was not validated because there was an overwhelming strength in belief about students learning two or more languages and the benefits bilingualism presents; therefore, there will not be interventions for this influence. The notion that bilingualism is a priority remains average, which may be impacted by district priorities, but teacher beliefs about their belief in the value of culture and language remains elevated.

Value of Bilingualism and Biliteracy

For the objectives to be accomplished in promoting bilingualism and biliteracy through a culturally relevant pedagogy, teachers must value these notions, which will increase their motivation to fulfill and facilitate students’ achievement in this realm. Teachers exhibited an above average to high degree of value for students’ native languages and heritage cultures through surveys. Interviews reflected an inclusive practice and recognition of the value of students’ primary language and culture with few exceptions. Therefore, the values in native and heritage languages as assets for learning were not validated.
Table 15

*Survey Mean Score Results: Value*

<table>
<thead>
<tr>
<th>Motivation: Value</th>
<th>Mean Score (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students’ native language is an asset for them and should be utilized in learning.</td>
<td>2.60</td>
</tr>
<tr>
<td>Teachers need to value students’ heritage languages and cultures in order to incorporate them into student-led instruction.</td>
<td>2.44</td>
</tr>
</tbody>
</table>

**Teachers need to value students’ heritage languages and cultures in order to incorporate them into student-led instruction.** This influence was not validated. Value and belief play a critical role in motivation because they construct the foundational infrastructure to withstand swaying ideas. Through survey responses, teachers reflected a high degree of value on the accompanying languages and cultures of students. The survey results indicate above average results for valuing students’ native language and culture. Throughout the interviews, teachers made sporadic reference to the incorporation of the first language of students to build biliteracy. However, only two teachers made an explicit comment about the value the first language in learning. Elise described how directions and jokes may need to be delivered in the students’ first language so they can thoroughly and meaningfully grasp the concepts. Sofia described her way of incorporating students’ first languages, “Last year, we had vocab sheets that had Spanish, Guatemalan…Arabic, and…not Russian…Ukrainian. It’s hard, it’s easy, it’s good.”
Figure 20. Teachers value language and culture.

This influence was not validated because though there were an overwhelming majority who responded well and extremely well about the value of the native language and culture. The district does not need intervention in this area. Comments skewed away from a notion of value were generally teased out as more reflective of teacher self-efficacy with language and culture rather than a lack of value in it.

Teacher Self-Efficacy

Teachers must have confidence in their ability to plan, implement, deliver, and adjust curriculum and pedagogy that promotes bilingualism, biliteracy, and culturally relevant pedagogy. Described in this section is the teachers’ self-reported perception of their ability to promote bilingualism and biliteracy through a culturally relevant pedagogy. Self-efficacy was validated because teachers demonstrated a need to grow in their confidence regarding how to promote and develop students’ dual language acquisition.
Table 16

Survey Mean Score Results: Self-Efficacy

<table>
<thead>
<tr>
<th>Motivation: Self-Efficacy</th>
<th>Mean Score (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel confident in planning dual language instruction within my content classes.</td>
<td>0.80</td>
</tr>
<tr>
<td>I feel confident with incorporating culturally relevant strategies into my content area curriculum.</td>
<td>1.32</td>
</tr>
<tr>
<td>I feel confident with student-led language learning.</td>
<td>1.04</td>
</tr>
</tbody>
</table>

Teachers need to demonstrate confidence and self-efficacy in planning and facilitating dual language instruction and culturally relevant and sustaining pedagogy within their content area. This influence was validated. Teachers demonstrated a lack of confidence in teaching in a dual language context with a mean of 0.80 with the majority responding somewhat or not at all confident. Juxtaposed from the degree of belief and value asserted toward aspiring bilinguals, teachers exerted a much lower degree of confidence toward planning and incorporating lessons and units that employ dual language learning.

![Figure 21. Self-efficacy of incorporating language and culture into content.](chart)

Interviews revealed a range of barriers in the pursuit of helping all students attain high levels of learning and performance, such as the time and space of collaboration and the lack of resources and training for promoting bilingualism through culturally relevant pedagogy. One
barrier that was not described, but it is impacted due to some of the other absent processes, is the impact on the self-efficacy of teachers within a realm that is admittedly lacking. When describing his language abilities, Nikola expressed, “I know enough Spanish to Spanglish my way through certain things,” and he hesitates when expressing, “having such a huge diversity in one classroom is beyond normal differentiation.” Sofia concurs with his sentiment, “When I got pregnant I lost all my Spanish…I feel like a kindergartener.” When describing the additional planning that addressing language entails, Sofia also expresses, “That is really hard for a lot of teachers to do because it takes a lot of planning.” Despite the challenges of differentiating to all students, Ray expressed the assistance of comedy, “Don’t waste a moment, every moment is a comedic moment.”

This influence was validated because support for including dual language learning through culturally relevant pedagogy persists, even though some teachers feel confident with aspects of dual language learning or culturally relevant pedagogy. Interventions to address self-efficacy in producing dual language within context should be provided.

**Goal-Orientation for Mastery**

Transitioning from performance to mastery-based learning remains quintessential to a transition to 21-century learning. Several teachers implicitly referenced 21-century standards or adjustments students are expected to dominate as independent young adults, but no one explicitly referred the demands of 21-century academia. Most teachers provided reference to a prior training, Essential Elements of Instruction (EEI) to describe strategies or methodologies for enabling engaging learning opportunities. Aside from mathematics, who relies heavily student-centered discourse, teachers did not describe a radical transformation of instruction that is exploratory or constructivist. Goal-orientation for mastery was partially validated.
Table 17

Survey Mean Score Results: Goal-Orientation

<table>
<thead>
<tr>
<th>Motivation: Goal-Orientation</th>
<th>Mean Score (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>My lesson plans and pedagogy encourage mastery-based learning over performance.</td>
<td>1.48</td>
</tr>
<tr>
<td>Teachers need to align their instructional goals with the organizational goal and 21st century standards, which includes dual language learning and culturally relevant pedagogy.</td>
<td>1.88</td>
</tr>
</tbody>
</table>

Teachers need to provide instruction that is student-centered for achievement in alignment with 21st-century standards, which include bilingualism and culturally relevant pedagogy. This influence was partially validated. Teachers self-reported a high degree of goal-orientation fixed toward helping students achieve in alignment with 21st-century standards. Evident in the belief section and correlate to this assumed goal-orientation influence, teachers rated a high degree of belief in the value of bilingualism and biliteracy but a 0.72 and 0.64 lower degree respectively of priority for implementation (See Table 7). Goal-orientation for achieving 21st-century standards had a mean survey score of 1.48 and 1.88, respectively to each question. Lesson planning for mastery over performance was rated lower, indicating that teachers are still inclined to assess for student performance rather than help students develop mastery for long-term proficiency.
Board policies indicate that, “With Board approval, a district school may establish a sister-school relationship with a school in another country” (BP 6145.6). In her interview, Elise mentioned the students from China who came to their school last year, and because she speaks some Mandarin Chinese, she was able to communicate with these students successfully. No other teacher referenced the inclusion of cultural exchange within their classroom to promote further 21st-century opportunities to engage in discourse with other sister schools where language and culture could escalate to a significant level of integration. Additionally, the LCAP plan has an additional goal for having a plan to deliberate and potentially revise grading practices to become more equitable and focused around mastery over performance.

The influence was partially validated because a majority of survey participants rated well or extremely well on planning for mastery over performance and planning with 21st-century learning at the forefront. However, though the board policy exists regarding sister-school relationships, only one teacher had awareness or referenced this experience. This partial validation will not be explicitly addressed through intervention, but it will fold into other interventions.

Key Insights

Teachers exemplified a strong collective degree of belief and values in the heritage and primary language and cultures of students, yet their fervency was not met with a high degree of self-efficacy in delivering curriculum and instruction that is student-centered, student-led, or inclusive of students’ primary languages or promoting dual language learning. Culturally relevant pedagogy was met with a more efficacious response, but teachers’ efficacy waivers based on external variables, such as resources, materials, or training. Teachers rated themselves
high on the inclusion of 21st-century skills within their lessons, and to provide a more through description of whether teachers are actually utilizing 21st-century tools and resources to advance 21st-century skills among students, further research would need to be conducted.
### Motivation

<table>
<thead>
<tr>
<th>Statement</th>
<th>Not at all</th>
<th>Somewhat</th>
<th>Well</th>
<th>Extremely Well</th>
</tr>
</thead>
<tbody>
<tr>
<td>BELIEFS - I believe bilingualism and biliteracy are assets for students' cognitive development and academic achievement</td>
<td>10</td>
<td>16</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>BELIEFS - I believe bilingualism and biliteracy are a priority for our students</td>
<td>11</td>
<td>16</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>BELIEFS - I believe that students' native language is an asset for them and should be utilized in learning</td>
<td>15</td>
<td>24</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>VALUES - Students' native language is an asset for them and should be utilized in learning</td>
<td>13</td>
<td>25</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>VALUES - Teachers need to value students' heritage languages and cultures in order to incorporate them into student-led instruction</td>
<td>7</td>
<td>24</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>SELF-EFFICACY - I feel confident in planning dual language instruction within my content classes</td>
<td>15</td>
<td>18</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>SELF-EFFICACY - I feel confident with incorporating culturally relevant strategies into my content area curriculum</td>
<td>18</td>
<td>13</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>SELF-EFFICACY - I feel confident with student-led language learning</td>
<td>11</td>
<td>17</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>GOAL ORIENTATION - My lesson plans and pedagogy encourage mastery-based learning over performance</td>
<td>15</td>
<td>16</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>GOAL ORIENTATION - Teachers need to align their instructional goals with the organizational goal and 21st century standards, which includes dual language learning and culturally relevant...</td>
<td>10</td>
<td>21</td>
<td>9</td>
<td>0</td>
</tr>
</tbody>
</table>

*Figure 23. Motivation summary findings.*
Organization

The organization’s role in propelling the teachers to achieve a greater degree of bilingualism and biliteracy among students is evident through alignment of the organization’s goal using resources, cultural models, cultural settings, training, and policies and procedures is essential. The need for teachers to have instructional materials and curricula that support dual language learning and culturally relevant pedagogy, embracing and supporting teachers to achieve LCAP goals, providing adequate professional development within and across content areas for improving dual language learning, and the provision of tools for attaining district goals were validated needs. Celebrating bilingualism, professional development for dual language and culturally relevant pedagogy, and communication of policies and procedures were partially validated because of mixed results.

The organization consists of the Board of Education elected representatives, superintendent, three assistant superintendents, three directors within educational services, and seven full-time instructional coaches. The entire district is guided by the approved board polices in alignment with the Education Code of California, wherein members of the entire organization are enabled an opportunity to contribute to curriculum adoption and policy development and implementation. Especially regarding curriculum and instruction, teachers are the foremost impacting on student achievement in accordance with the district goals.
Table 18

Validation of Organizational Assumed Causes or Influences

<table>
<thead>
<tr>
<th>Organization Category</th>
<th>Assumed Cause or Influence</th>
<th>Validated</th>
<th>Partially Validated</th>
<th>Not Validated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources</td>
<td>Schools need to provide teachers with instructional materials and curricula in all content areas that support dual language learning and culturally relevant and sustaining pedagogy.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural Models</td>
<td>Schools need to embrace and support all teachers in progressing toward the LCAP goals and organizational mission.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural Models</td>
<td>Schools need to celebrate growth in dual language acquisition.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural Settings</td>
<td>Schools need to provide teachers with professional learning and growth opportunities and collaborative time within each content area.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural Settings</td>
<td>Schools need to provide language teachers and core content area teachers (science, social science, and mathematics) time and space to collaborate.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td>Schools need to provide teachers with ongoing professional development in dual language instruction and culturally relevant and sustaining pedagogy.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td>Schools need to commit to providing a range of tools for teachers to achieve the standards for meeting their stakeholder goal and the organizational mission.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policies and Procedures</td>
<td>Schools need to communicate policies and procedures for scheduling student 4-year plans to ensure maximum completion of State Seal of Biliteracy requirements.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Organizational Resources

The amount and quality of resources provided to teachers can have a direct and substantial impact on student performance, especially as it relates to promoting dual language learning through a culturally relevant pedagogy. Resources may come in the form of materials for instruction, supplies for enabling access to core curriculum, core curriculum, or technological supplements, each of which can enhance or promote inclusion of more than one language, student-centeredness, cultural competence, and sociopolitical awareness. The organization is responsible for providing resources to teachers for deliverance of the curriculum and instruction. Teachers described that resources are one of their greatest needs pertaining to promoting bilingualism through culturally relevant pedagogy.

Table 19

Survey Mean Score Results: Resources

<table>
<thead>
<tr>
<th>Organization: Resources</th>
<th>Mean Score (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have sufficient materials and supplies for teaching dual languages within my content area.</td>
<td>0.56</td>
</tr>
<tr>
<td>I have sufficient materials and supplies to provide culturally relevant and sustaining pedagogy.</td>
<td>0.72</td>
</tr>
</tbody>
</table>

Schools need to provide teachers with instructional materials and curricula in all content areas that support dual language learning and culturally relevant and sustaining pedagogy. Teacher perspectives about materials and resources that support dual language learning and cultural relevance belays significance. Contrasted against teacher beliefs about their own ability to know and deliver lessons that support bilingualism or are culturally relevant, resources appear to be a gaping need. Some teachers declared that they must adhere to the prescribed curriculum, while other teachers contrasted with how they are afforded the flexibility to monitor, adjust, or adapt the core curriculum to the students’ needs.
This influence was validated because only one teacher indicated he or she had adequate materials and supplies for culturally relevant pedagogy, while no teachers have sufficient materials and supplies for dual language learning within content despite the board policies that indicate curriculum will reflect the desires of the community and needs of society. Though the LCAP goal of bilingualism was added, additional resources to develop biliteracy do not appear to be evident.

![Figure 24](image)

**Figure 24.** Sufficient materials to support dual language and culturally relevant pedagogy.

Only one surveyed teacher proclaimed that he or she had sufficient materials to support cultural relevance. None of the teachers surveyed indicated that they had sufficient materials for teaching bilingually in the core content. Through interviews, teachers mimicked these sentiments through discussion about barriers in cohesion, resources, or coordinated training. Nikola indicated that he may attempt to interject his “Spanglish” into the lesson, but it is often not embedded into the text, materials, or resources. Ray indicated that he allows students to select authors with whom they may connect, though he referenced the canonical authors that are typical within the curriculum.
According to the board policies around curriculum and instruction, the “course of study shall provide students with opportunities to attain the skills, knowledge, and abilities they need to be successful in school, college, and/or the workplace,” (BP 6143). Additionally, curriculum is adopted, “which to the extent possible reflects the desires of the community, the needs of society, and the requirements of the law” (BP 6141). This validated influence will require intervention.

Organizational Cultural Models

Cultural models that support, embrace, and encourage the facilitation of bilingualism and biliteracy through pedagogy that is culturally relevant was addressed in this section. The models are exemplary of the values, priorities, and organizational systems that reflect the inherent culture of the schools and district. Board documents describe an ability of the district to hire bilingual teachers for the “purpose of providing primary language instruction,” (AR 4212.22).

Table 20

<table>
<thead>
<tr>
<th>Organization: Cultural Models</th>
<th>Mean Score (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our school culture embraces and celebrates bilingualism or multilingualism.</td>
<td>1.36</td>
</tr>
</tbody>
</table>

The mean for reflecting teachers’ embrace and celebration of bilingualism was 1.36, which was almost solidly average, which was less than the means for belief and value toward bilingualism, but there was evidence of the lack of priority for making bilingualism and cultural relevance organic and pervasive among content areas.

**Schools need to embrace and support all teachers in progressing toward the LCAP goals and organizational mission.** Teachers mentioned English learner programs, such as the move toward “cluster” classes, wherein English learners were clustered into small groups in mainstream classes or the collaborative model for team teaching Math with English learners.
Some teachers expressed that they were unaware that there is an LCAP sub-goal about achieving higher rates of students who earn the California SSb, which was also evident in that nearly half of survey participants were not at all aware, and only six felt they knew well or extremely well, how students earn the seal.

This influence was partially validated because various teachers at each unique site made references to data and pursuit of earning higher scores or ranking, but there was no explicit description of the LCAP goals or alignment with what occurs at the school setting to the attainment on LCAP goals. This is combined with the expressed description of a need for coherent and interdependent professional learning. Teachers did not describe the LCAP goals generically or specifically. This influence will not be addressed through the interventions.

**Schools need to celebrate growth in dual language acquisition.** This influence was partially validated. According to survey results, the mean score for recognizing a culture of celebration for bilingualism is 1.36, with more than half indicating that they somewhat agree. Interview data suggests that there is an appreciation for bilingualism and biliteracy among students, though there is not a celebration or inclusion of dual language learning across the school and district culture. Several teachers pointed out that bilingualism is an essential skill and is beneficial for students. Nikola articulated that bilingualism is “an absolute must now,” and he wished there were “more options” for the students. Sofia emphasized her belief that, “recognizing different languages are [a] benefit to the class, not a hindrance.” Elise commented about how many people in San Diego do not respect language learning the same as schools on the east coast of the United States,

It’s different on the east coast. They have French and Russian and German and then other languages, Tagalog. They have a lot of languages. It’s not just [the language] I’m
teaching here. Part of it is teaching your brain to grow and deal with sophistication. We also learn about quality of life and happiness…appreciating history and education and food and art.

In addition to the comments teachers made about their belief about bilingualism, the district has shared the seal of biliteracy data with counselors and administrators to be able to reward the students at their senior awards night and on their diploma. The district pointed out the strength of the students’ attainment of the seal of biliteracy among their top academic achievements. The district highlighted the strength of the students’ attainment of the Seal of Biliteracy among the district’s top academic achievements.

![Cultural Models - Our school culture embraces and celebrates bilingualism or multilingualism](image)

*Figure 25. School culture for celebrating bilingualism and multilingualism.*

This influence was partially validated because though there are pockets of celebration for the attainment of bilingualism and biliteracy as evidenced through the seal of biliteracy, there are still a significant number of teachers who do not know how to earn it, and just over a third of teachers believed that the schools and district did well to extremely well on celebrating bilingualism. This influence will not be addressed through the interventions, but continuing to celebrate bilingualism is expected.
Organizational Cultural Settings

Time and space were significant concerns among teachers, each of which are finite resources. The correlational relationship between teachers’ beliefs about bilingualism, biliteracy, and culturally relevant pedagogy and the expressed lack of curricular materials and resources impact illuminates the need for time and space to plan and collaborate. Planning and collaborating play a central role in the furtherance of dual language learning through culturally relevant pedagogy.

Table 21

Survey Mean Score Results: Cultural Settings

<table>
<thead>
<tr>
<th>Organization: Cultural Settings</th>
<th>Mean Score (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have sufficient time and space to plan lessons that include dual language learning and that are culturally relevant.</td>
<td>0.40</td>
</tr>
<tr>
<td>My professional learning community has sufficient time and space to collaborate about improving curriculum and instruction for dual language learning and culturally relevant pedagogy.</td>
<td>0.60</td>
</tr>
<tr>
<td>Language teachers (English, Spanish, French, ASL) collaborate with core content teachers to discuss strategies for supporting bilingualism and biliteracy within each content area.</td>
<td>0.40</td>
</tr>
</tbody>
</table>

Schools need to provide teachers with ongoing professional development in dual language instruction and culturally relevant and sustaining pedagogy. This influence was validated. Planning time is essential when teachers are required to initiate aspects of curriculum and pedagogy that are not readily accessible through a prescribed curriculum. At almost 50% of survey respondents, teachers expressed not at all having sufficient time and space to plan lesson inclusive of two languages that are culturally relevant, while only three total teachers expressed the notion that they are at least well-equipped with the time and space. The overall mean of time and space sufficiency rested at 0.40, which is the lowest finding among all knowledge, motivation, and organizational influences.
Teachers interviewed identified barriers to coordinated professional development, but they did not necessarily identify the need to meet with language teachers. Only Nikola emphasized more training related to language instruction across all content areas except for explicit vocabulary instruction indicating he would like, “definitely more training…we’ll benefit from more training on what that looks like in very specific content classes.” Sofia referenced an Advancement Via Individual Determination (AVID) culturally relevant pedagogy strand at the summer institute training, and three other teachers from the same site all described an on-site training about culturally sensitive and responsive teaching. Simon depicted his previous teaching experiences at ethnically and socioeconomically diverse schools in other locales in the United States, which he believed shaped his thinking and practice for teaching in a manner that is culturally relevant. Though everyone brought different experience and knowledge to their teaching experience, finding support through a coordinated effort at the district level was lacking. Jessica explicitly described this need, “I think [we need] more organized ongoing training. Systematic training can help a lot…every 2 years, every 3 years. [Maybe a] half day of: these are the latest things people do.”

Figure 26. Professional development for dual language and culturally relevant pedagogy.
Document analysis of board policies and professional development documents reflected a similar finding to what teachers expressed. From professional development agendas, there is no evidence that dual language learning and culturally relevant pedagogy is discussed. Professional learning communities do not prioritize dual language learning, while some discuss English learners and how to differentiate instruction among them. Culturally relevant pedagogy was not discussed among any of the teachers or sites as a topic of discussion within their professional collaborative time, while most of the time was noted as dedicated to planning and collaborating about the lessons and units. There were no specific prompts or aspects that specifically guided the teachers to discuss whether or how the curriculum and instruction was culturally relevant or inclusive of other languages.

This influence was validated because teachers pointed to the lack of time and space for them to participate in professional development that supports the planning and preparation of dual language learning and culturally relevant pedagogy specifically. This influence will be addressed through the interventions.

**Schools need to provide teachers with professional learning and growth opportunities and collaborative time within each content area.** This influence was validated. Teachers indicated through interviews that they all, at each school site, have some time for professional learning and collaboration built into their schedule, whether they are early morning meetings or after school weekly meetings, but they all would concur that it is not enough time. Trischa and Nikola regrettabley declared that they have a specific professional learning community team, but they haven’t been able to meet consistently due to other circumstances and responsibilities. Trischa commented,
We spend a significant amount of time as a staff, but we now have about an hour left to work with our content area or department…we haven’t really had an opportunity to collaborate much with our content areas, but I imagine that’ll happen.

The survey responses demonstrate a common perspective in that nearly 50% felt they had somewhat sufficient time, while more than one third felt that do not have sufficient time at all.

![Figure 27. Collaboration time within content.](image)

Professional development agendas indicated there are district level supports for increasing teacher professional capacity, such as a director of professional learning, instructional coaches, and teacher release days wherein teachers report to the district office or an identified school site to learn more about how to improve instruction. The majority of teachers indicated that they feel they are released from their classes too frequently, which impacts the growth of their students.

This influence was validated because teachers almost unanimously pointed to the lack of time and space their professional community must plan and prepare together, let alone for dual language learning and culturally relevant pedagogy. A rational and ubiquitous constraint, time and space remain limited in perspective of developing curriculum and planning pedagogy. This influence will be addressed through interventions.
Schools need to provide language teachers and core content area teachers (science, social science, and mathematics) time and space to collaborate. This influence was validated. Time and space to collaborate through professional learning and growth was indicative of somewhat to not at all meeting the needs of teachers, and language and content collaboration was no different. Nearly 60% of teachers surveyed positively collaborated among core content and language teachers.

Through interviews, Sofia revealed that she partners with a language teacher specialist because of the demographic makeup of her classroom. Nikola and Simon do not have a language collaborating teacher, but they each have an assistant that supports the acquisition of English. It does not appear to be a practice at any of the sites for content area teachers to collaborate with language teachers. One site has inter-departmental projects which lead to cross-disciplinary collaboration, but it was not specifically explained by any of the interviewed teachers that they collaborate about explicitly teaching, reinforcing, or generated student-led opportunities to further develop proficiency in two or more languages.

Figure 28. Collaboration with world language teachers.

This influence was validated because over half of the teachers indicated they have no interdisciplinary contact whatsoever. Teachers did not reference any collaboration across disciplines with language teachers unless they provided instruction in a collaborative way, such
as team teaching. Trischa, Jessica, and Ray described some integrated projects completed by students annually, which would require cross-content collaboration. The interventions will incorporate solutions to this influence.

**Organizational Training and Professional Growth**

Tools and training for implementation of culturally relevant pedagogy for bilingualism inversely reflects the belief and value that teachers indicated. Dual language training was absent from the discussion of teachers, but every teacher referenced participating in training surrounding strategies to support English learners, all of whom are learning a second language or more.

**Schools need to provide teachers with ongoing professional development in dual language instruction and culturally relevant and sustaining pedagogy.** This influence was partially validated. Ray, Trischa, and Jessica, who worked at the same school site, all described a one-time training during the 2016-2017 school year about culturally responsive teaching. Trischa described a focus on providing professional development for English learners, “A few years ago, there was a real focus on professional development through the district that focused on ELLs, vocabulary development…culturally relevant instruction…that’s starting to be a focus here.”

Several teachers mentioned an “EEI” training, which signifies the Essential Elements of Instruction, a training required of all district teachers and administrators. Jessica articulated of these trainings, “I believe [they had] some of these kinds of training embedded in it,” referring to culturally relevant pedagogy.
Table 22

Survey Mean Score Results: Training

<table>
<thead>
<tr>
<th>Organization: Training</th>
<th>Mean Score (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have received or attended training that pertains to dual language learning across core content areas.</td>
<td>0.72</td>
</tr>
<tr>
<td>I have received training that pertains to culturally relevant or sustaining pedagogy within my core content area.</td>
<td>1.08</td>
</tr>
</tbody>
</table>

The mean score in survey results for dual language training was low to non-existent at 0.72, while training pertaining to culturally relevant pedagogy was only slightly more present at 1.08, likely because of the one unique training that was held at one of the school sites the previous school year. Another prevalent training referenced by Sofia was the culturally relevant pedagogy strand at the AVID summer institute, of which she indicated that at least one teacher participated.

This influence was partially validated because though there were several teachers who engaged in a one-time training about culturally relevant pedagogy, it was not systematic or consistent across all school sites. Additionally, there was little to no reference about dual language training, so that influence continues to be prevalent and essential for promoting bilingualism and biliteracy district-wide.

**Schools need to commit to providing a range of tools for teachers to achieve the standards for meeting their stakeholder goal and the organizational mission.** This influence was validated. Teacher surveys indicated that there is somewhat to no training or tools provided in the areas of dual language learning and culturally relevant pedagogy. Jessica pointed out that the district could improve upon developing a more strategic and systematic approach to professional development, yet she, Trischa, Ray, and Elise insisted that the district already offers a lot of professional growth opportunities, especially if a teacher seeks them out. Ray expressed,
“There haven’t been a tremendous amount of opportunities that have been brought to us. I’m sure if I went out of my way, they’d be entirely supportive, but it’s just nothing.”

All teachers referenced the notion that they must have English learner authorization, aligned with the board policy and state requirements. While they agreed that the district has also offered English learner training in the past, they verbalized that there does not continue to be continuous coordinated professional development. Simon described the segmented disconnect between the training a teacher receives as the transformational impact in the classroom, stating, “one of the problems of some of the workshops I’ve been to is, they stick closely to tactics…how really innovative are those tactics?”

![Training for dual language acquisition and culturally relevant pedagogy](image)

**Figure 29.** Training for dual language acquisition and culturally relevant pedagogy.

Though board policy indicates that “instructional materials, as a whole, present a broad spectrum of knowledge and viewpoints, reflect society’s diversity, and enhance the use of multiple teaching strategies and technologies,” (BP 6161.1), there is no specific plan or language in the policies about the integration of world language and core content teachers. The absence of specific guidelines about how to plan for how to reflect society’s diversity implies that it is up to the curriculum designers and teachers about how to include these culturally relevant notions. Dual language learning is not mentioned in the essentials of diverse learning, but the board
policy does reference that the district should identify “specific actions and services to enhance student engagement, academic achievement, and other outcomes for English learners,” (BP 6174).

This influence was validated because it remains to be a poignant area of growth for the district, especially as it relates to promoting furtherance of bilingualism and biliteracy across academic content and having a strategic and systematic approach to professional development that supports all learners. The interventions will address this influence to progress to goal achievement.

**Organizational Policies and Procedures**

The organizational policies and procedures, though not having direct impact on student achievement in the proximal sense, portray mixed results. Most teachers indicated that policy and procedure do not help teachers provide student-centered culturally relevant pedagogy. The district abides by systems and processes for adopting new curriculum and materials, such that, “Recommendations for the adoption and/or withdrawal of instructional materials shall be presented to the Board by the Superintendent or designee,” (BP 6161.1 cf. 9720).

Table 23

*Survey Mean Score Results: Policies and Procedures*

<table>
<thead>
<tr>
<th>Organization: Policies and Procedures</th>
<th>Mean Score (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policies and procedures help me to provide student-centered culturally relevant pedagogy.</td>
<td>0.92</td>
</tr>
<tr>
<td>Our policies align with the California bilingual education laws.</td>
<td>1.17</td>
</tr>
</tbody>
</table>

**Schools need to communicate policies and procedures for scheduling student 4-year plans to ensure maximum completion of SSB requirements.** This influence was partially validated. Teachers de-emphasized the merit of policies and procedures to support the
attainment of student-centered culturally relevant pedagogy or bilingualism. With a mean of 1.17, teachers surveyed expressed a low average belief that the school and district policies align with the current state bilingual education laws. According to the district course catalog, throughout the district, students have the opportunity to earn the seal of biliteracy in Spanish or French through a 4-year course of study. English learners who possess fluency in another home language have an opportunity to produce evidence of biliteracy through the World Language AP Exam or SAT-II Language Subject Test, but those tests are limited in language options.

Figure 30. Policies that support dual language acquisition and culturally relevant pedagogy.

Document analysis included review of board policies, which included Curriculum Development and Design (BP 6141), Selection and Evaluation of Instructional Materials (BP 6161.1), Courses of Study (BP 6143), Education for ELLs (BP 6174), Multicultural Education (6141.6), and International Exchange (6145.6). These board policies were developed before the state adoption of Proposition 58, which will enable districts to have more local autonomy regarding multilingualism than ever before. The board policies that clearly and pointedly address English learners provide residual evidence that teacher credentialing for English learner
authorization was pervasive to support ELD and SDAIE, but there is no reference to pedagogy that supports bilingualism or biliteracy specifically.

This influence was partially validated because there remains room for strategic systematic growth in communicating policies and district goals regarding bilingualism. This influence will be implicitly addressed through the interventions, but it will not be explicitly addressed. Additionally, the notion that bilingualism and biliteracy infrastructure is yet to be built remains the impetus for this study.

**Key Insights**

Resources and materials, time and space for collaboration among and across content areas, and a systematic plan for professional development rose to the surface of teachers’ essential needs regarding the promotion of bilingualism, culturally relevant pedagogy, and higher academic achievement overall. Despite the plethora of intellectual, linguistic, and cultural capital within and throughout the district, there appears to persist a need for more continuity and communication about the district priorities and professional learning.
Figure 31. Organization summary findings.
Key Findings

There are four consistent themes represented throughout the data that are noteworthy. The first theme is the notion that there are strong positive beliefs about and value in bilingualism and biliteracy concurrent with a lack of coordinated plan for training for and delivery of instruction that supports and promotes the furtherance of bilingualism and biliteracy. The second theme is the focus on emerging English language acquisition for students whose primary language is not English, but there appears to be a lack of any concentration or investment in the furtherance of bilingualism and biliteracy among all learners. The third theme identified in the data is the need for a coordinated plan for professional learning pertaining to the district priorities and teacher needs, despite the plethora of opportunities for professional development opportunities. The fourth theme is overarching theme that the district is primed for a comprehensive plan for promoting and expanding bilingualism and biliteracy broadly, so the district could take advantage of its natural resources, students with language assets to develop a coordinated plan for promoting bilingualism and biliteracy.

Belief and Value Over Self-Efficacy

The belief and value in bilingualism and heritage languages and cultures within the school community was prevalent, but the inability to deliver instruction that supports it was. Belief and values toward heritage languages and cultures and the furtherance of bilingualism and biliteracy abounds. The self-efficacy and training of teachers in the area of culturally relevant pedagogy was favorable compared to that which was evident for dual language learning. Improving self-efficacy can be attained by providing a schematic plan for professional development, which would also improve teachers’ responses to their ability to engage dual language learning in their content areas.
Focus on English Learners Over Bilingualism

The focus on English learners has traversed the district language learning landscape for decades but has offered little other than world language optional courses for students to attain, refine, or build vocabulary in another language other than English. Given the legislative obligations to instruct English learners for attainment in English as quickly as possible since the 1997 legislative endorsement known as Proposition 227, it is not surprising that teachers are less equipped for promoting dual language learning in their content areas and less inclined to discuss ways to build in etymology or student-led linguistic development for languages other than English.

Coordinate Professional Learning Collaboration

There has been a plethora of professional development opportunities, but a thematic coordination or structure for professional learning was evidenced throughout the data. Teachers stated that significant and expansive professional development opportunities inside and outside the district exist, and no one was disappointed with their opportunities. Time and space for professional growth is a constant across teachers, which is inherently limited due to the nature of calendars, schedules, and contracts. The school calendar is 180 instructional days, and teachers are required to attend four professional development days beyond the requisite instructional days. All curriculum professional development occurs via pull-out days throughout the school year. There are select trainings and curriculum planning sessions that occur during the summer, such as AP and integrated mathematics. Each school site has professional learning communities by content area that meet ranging from two times per month to daily. Considering the change to the Common Core State Standards and other revised standards per content area, teachers expressed the need to have much more time to collaborate with intra and interdisciplinary
colleagues, especially as it relates to the types of strategies and pedagogies that support all learners across content areas.

**Systematic Plan to Develop Bilingualism and Biliteracy for All Students**

The need for an aligned and coordinated systematic plan to promote bilingualism and biliteracy among all students threaded through all required educational plans resounds. Shortly after California redesigned its funding formula and accountability to county offices of education and LEAs, ushering an era of local control through the LCFF and each district’s responsibility to create a LCAP, Proposition 58 was passed through a statewide vote. Proposition 58 was named as the Education for a Global Economy Initiative (EdGE), which would allow each LEA to decide if and to what degree to provide bilingual and multilingual instruction, incorporating native and heritage languages into the mainstream education programs. The current board policies address English acquisition in alignment with the previously reigning Proposition 227, which outlawed the use of native and heritage languages in primary instruction.

The BP for CPHSD have not yet incorporated language and alignment of Proposition 58 and the LCAP plan, so there remains a need to develop alignment and language around the degree and type of inclusion of native and heritage language instruction will be provided in schools. The plans and goals developed through the LCAP should align with school improvement plans, site and teacher instructional goals, and the California Standards for the Teaching Profession (CSTP).
The purpose of this study was to identify and validate the knowledge and motivation influences for teachers impacting the CPHSD’s ability to reach the stated LCAP goal of students achieving the California SSB upon graduation, the implication that the student has achieved bilingualism and biliteracy status. The study took an innovative approach because attaining the seal had a limited number of pathways. The study sought to identify teachers’ present knowledge and motivation attributes toward furthering bilingualism through culturally relevant pedagogy. Additionally, the study sought to reveal how teachers perceive the way the organization supports them via a systematic approach to reinforcing dual language learning through a student-centered culturally relevant pedagogy.

**Closing the Gap: Solutions for Implementation**

With the conclusion of the following validated needs for knowledge, motivation, and organization, solutions and action items will be proposed for implementing the innovation. Solutions were developed based on innovative ideas, best practices of successful organizations, and some existing literature.

Table 24

*Validated Needs Summary Table*

<table>
<thead>
<tr>
<th>Gap Analysis Dimension</th>
<th>Validated Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Factual</strong></td>
<td>Teachers need to understand what bilingualism and biliteracy is.</td>
</tr>
<tr>
<td><strong>Conceptual</strong></td>
<td>Teachers need to understand how to include students’ primary and target languages into core content area instruction.</td>
</tr>
<tr>
<td><strong>Procedural</strong></td>
<td>Teachers need to deliver best instructional practices through student-led and student-centered pedagogy that elicits native and target languages.</td>
</tr>
<tr>
<td>Gap Analysis Dimension</td>
<td>Validated Needs</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Metacognitive</td>
</tr>
<tr>
<td></td>
<td>Teachers need to reflect on lesson and unit development and how students are progressing in two or more languages.</td>
</tr>
<tr>
<td>Motivation</td>
<td>Self-Efficacy</td>
</tr>
<tr>
<td></td>
<td>Teachers need to demonstrate confidence and self-efficacy in planning and facilitating dual language instruction and culturally relevant and sustaining pedagogy within their content area.</td>
</tr>
<tr>
<td>Organization</td>
<td>Resources</td>
</tr>
<tr>
<td></td>
<td>Schools need to provide teachers with instructional materials and curricula in all content areas that support dual language learning and culturally relevant and sustaining pedagogy.</td>
</tr>
<tr>
<td>Cultural Models</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Schools need to embrace and support all teachers in progressing toward the LCAP goals and organizational mission.</td>
</tr>
<tr>
<td>Cultural Settings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Schools need to provide teachers with professional learning and growth opportunities and collaborative time within each content area.</td>
</tr>
<tr>
<td>Cultural Settings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Schools need to provide language teachers and core content area teachers time and space to collaborate.</td>
</tr>
<tr>
<td>Training</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Schools need to commit to providing a range of tools for teachers to achieve the standards for meeting their stakeholder goal and the organizational mission.</td>
</tr>
</tbody>
</table>

Solutions for Validated Needs

The following sections highlight the validated needs within the study and propose solutions that align with creating maximum impact for developing the innovation and improving the outcomes for dual language learning among all students. Most notably through the research findings, factual, conceptual, procedural, and metacognitive knowledge related to dual language learning was validated and prioritized. Self-efficacy for dual language learning arose as a significant motivational influence in meeting the established goal of the organization, and
therefore, it is validated. Organizational resources and training surfaced as validated needs alongside cultural models and cultural settings influences to achieve the bilingualism and biliteracy goals within the organization.

![Figure 32. Validated needs diagram.](image)

**Knowledge and skills.** The knowledge and skill validated needs were factual, conceptual, procedural, and metacognitive surrounding dual language learning and acquisition. Teachers demonstrated a greater propensity for knowing, planning for, delivering, and reflecting for culturally relevant pedagogy, which is fundamental to eliciting a student-centered pedagogy for promoting bilingualism and biliteracy. Therefore, elevating the current knowledge assets that teachers possess to encourage a curriculum that is inclusive of the development of two or more languages simultaneously will be essential.
Table 25

Knowledge Validated Needs and Solutions

<table>
<thead>
<tr>
<th>Knowledge Category</th>
<th>Validated Need</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| Factual            | Teachers need to understand what bilingualism and biliteracy is. | • Pre-service teacher preparation with emphasis on dual language development, a reform to the English authorization requirement.  
• In-service teaching professional development that embeds dual language learning and student-centered pedagogy within all content areas, which includes job aids and training. |
| Conceptual         | Teachers need to understand how to include students’ primary and target languages into core content area instruction. | • Integration of Writing, Inquiry, Collaboration, Organization, and Reading (WICOR), Common Core Standards, English Learner (EL) Roadmap, and multilingualism within the curriculum |
| Procedural         | Teachers need to deliver best instructional practices through student-led and student-centered pedagogy that elicits native and target languages. | • Structured reflection within pre-service and in-service teacher training wherein teachers learn how to participate in a continuous cycle of reflection and lead students into a continuous cycle of reflection |
| Metacognitive      | Teachers need to reflect on lesson and unit development and how students are progressing in two or more languages. | |

*Pre-service teacher preparation with emphasis on dual language development, an extension of the English authorization requirement, which includes information and education.* Though pre-service education and training is a priority for ensuring teachers are equipped with dual language pedagogy across writing, inquiry, collaboration, organization, and reading within the curriculum, 21st-century skills, and capabilities of advancing bilingualism and biliteracy, it will be supplemental to the recommendations provided in this chapter given the organization’s inability to directly and immediately influence pre-service programs through California universities.
In-service teaching professional development that embeds dual or multiple language learning and student-centered pedagogy within all content areas, which includes job aids and training. Professional development needs to include job-embedded learning that incorporates and furthers teachers’ capacity in language pedagogy. Language is the foundation to all instruction, so building teacher capacity in identifying and capitalizing on dual or multiple language learning opportunities, as well as creating student-centered learning through all content areas is essential to achieving the identified district goals for academic achievement and bilingualism and biliteracy attainment. Providing teachers with language supplements that coordinate with their curriculum and instruction will assist in the implementation of these new ideologies.

Structured reflection within pre-service and in-service teacher professional development wherein teachers learn how to participate in a continuous cycle of reflection and lead students into a continuous cycle of reflection. Reflection seems self-evident, but teachers will require structured and intentional reflection cycles for improving their own pedagogical practices to further dual language learning. The metacognitive notions of thinking deeply about their own thinking about bilingualism and biliteracy within their content areas will be fundamental to prioritizing language learning. Teachers will engage in cycles of reflection that directly correlates to how language is highlighted, and dual language is provoked throughout course vocabulary and etymology (Fandiño Parra, 2008).

Motivation. Teachers exhibited strong beliefs, values, and goal-orientation for mastery, but they demonstrated an expressed need for improving self-efficacy in planning and facilitating dual language instruction through culturally relevant pedagogy within all content areas. Teachers will need to expand their literacy inclusion to consider more than just English learners,
but rather develop a whole language approach and highlight dual language learning opportunities extensively throughout the content.

Table 26

Motivation Validated Needs and Solutions

<table>
<thead>
<tr>
<th>Motivation Category</th>
<th>Validated Need</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| Self-Efficacy       | Teachers need to demonstrate confidence and self-efficacy in planning and facilitating dual language instruction and culturally relevant and sustaining pedagogy within their content area. | • Structured reflection and systems of teacher feedback that develop and grow teacher efficacy in the areas of dual language learning and culturally relevant pedagogy built within the professional learning for dual language acquisition.  
• Professional development plan that incorporates and emphasizes 21st-century standards and skills as a transformative process within curriculum and instruction. |

**Structured reflection and teacher feedback.** Building confidence in others is daunting, but some proven strategies for increasing work performance of employees is to provide them with models and feedback (Sweigart, Collins, Evanovich, & Cook, 2016). Whether through colleagues or supervisors, structured systems of providing usable feedback for improving practice proves critical to increasing student achievement. The organization has an abundance of talent, especially as it pertains to language learning expertise, such as through world language, English, and English Learner teachers. Therefore, the ability to instill systems of teachers providing feedback to one another regarding the acquisition of two or more languages is relevant and extant.

**21st-century professional development.** Creating a professional development plan for teachers that builds in 21st-century learning across all content areas will support teachers in attaining higher levels of student-centered culturally relevant and bilingual pedagogy. Because
few current teachers possess bilingual certification in one or more languages indicates that a
systematic plan around student-centered learning is critical. Through professional learning,
teachers will need to gain skills in elevating student assets and enabling more student-centered
discourse, create options for students to pursue high interest 21st-century topics, and utilize 21st-
century technologies, resources, and pedagogies that lead toward bilingualism and biliteracy.

**Leadership for reinforcing 21st-century skills.** District and site leadership’s vision for the
curriculum and instruction and needed infrastructure for ensuring high achievement is
essential. Through a comprehensive review of 21st-century learning standards and resources,
including an assessment of the alignment among seemingly competing initiatives, will allow the
district to streamline professional learning and lead for improving practices. It is essential to
elevate the priorities of continuing to develop excellent opportunities for students to engage in a
global marketplace by increasing 21st-century skill development. Leadership must conduct
curriculum review and revision which incorporates 21st-century standards, AVID quintessential
components of writing, inquiry, collaboration, organization, and critical reading (WICOR) and
International Baccalaureate’s curricular components of global citizenry within the Diploma
Programme, through courses such as Cultural Anthropology, Information Technology in a
Global World, and Languages (AVID Center, 2018; International Baccalaureate Organization,
2018).

**Organization.** The organizational validated needs persist in the areas of resources and
materials for dual language learning and culturally relevant pedagogy, cultural models of
embracing and supporting teachers in progressing toward LCAP goals, cultural settings of
providing teachers with professional learning and collaboration time within and across content
areas, and training and tools for attaining the organizational goals of bilingualism and biliteracy.
Solutions are proposed for the validated needs in order to move the organization toward higher degrees of bilingualism and biliteracy across all content areas. The organizational solutions intersect with the knowledge and motivation solutions because they are either interdependent (e.g. knowledge, professional learning and collaboration, and structures) or they are complementary (i.e. structures for policy implementation and curriculum and instruction revision).
Table 27

Organization Validated Needs and Solutions

<table>
<thead>
<tr>
<th>Organization Category</th>
<th>Validated Need</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| **Resources**         | Schools need to provide teachers with instructional materials and curricula in all content areas that support dual language learning and culturally relevant and sustaining pedagogy.                               | • Language specialist to coordinate the following implementation plan  
• District to reevaluate organizational priorities considering current outcomes, capitalizing on student assets and building toward a 21st-century curriculum that is culturally relevant and promotes expansion of their given assets  
• International Baccalaureate, AVID, Common Core Standards, Global Competence, and EL Roadmap integration resource development and training  
• CLIL courses in a language other than English  
• District to communicate consistently and effectively regarding the priorities once stakeholder information has been gathered  
• Redesign the school schedules to incorporate and require up to 3 hours per week of collaboration among and across content areas with consistency  
• Begin to deconstruct content area silos and build a system of inter-departmental collaboration, primarily between language and content teachers  
• Search for and secure instructional materials that further dual language learning  
• Content and Language Integrated Learning (CLIL) for content area courses in languages other than English  
• Adjust California Standards for the Teaching Profession (CSTPs) to include developing bilingualism and student-centeredness  
• Language learning courses for teachers available during and after school                                                                 |
| **Cultural Models**   | Schools need to embrace and support all teachers in progressing toward the LCAP goals and organizational mission.                                                                                           |                                                                                                                                                                                                                                                                                                                                          |
| **Cultural Settings** | Schools need to provide teachers with professional learning and growth opportunities and collaborative time within each content area.                                                                        |                                                                                                                                                                                                                                                                                                                                          |
| **Cultural Settings** | Schools need to provide language teachers and core content area teachers (science, social science, and mathematics) time and space to collaborate.                                                             |                                                                                                                                                                                                                                                                                                                                          |
Table 27, continued

<table>
<thead>
<tr>
<th>Organization Category</th>
<th>Validated Need</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| Training              | Schools need to commit to providing a range of tools for teachers to achieve the standards for meeting their stakeholder goal and the organizational mission. | • Primary language content instruction for students who are speakers of other languages (up to 5 hours per week)  
• Language buddy system wherein all students have a target language buddy who is more proficient or a native speaker of another language with targeted meeting goals. |

**District priorities.** The LCAP process requires the district to solicit input from stakeholders, therefore the consolidation of priorities among management is imperative for furthering students’ ability to progress in a bilingual or multilingual community. Given the abundance of existing talent and assets among teachers and staff, the district will need to reevaluate the capitalization of the assets against the needs for moving the district toward higher student achievement. Based on the research about the benefits of bilingualism and biliteracy for improving cognitive and academic performance overall, the elevating the native languages of students and furthering the development of bilingualism and biliteracy has potential to increase overall student achievement.

**Communicating goals and policy implementation priorities.** Communication the goals and policy implementation priorities are imperative for furthering the bilingualism through student-centeredness and cultural relevance. Since teachers are the policy implementers in the case of curriculum, instruction, and pedagogy, they should have clear communication and expectations from district administration regarding the nature of the priorities or policy goals.

**Scheduling for optimum and consistent collaboration.** The school and professional development calendar and schedule can unpack or restrict a teacher team’s ability to progress toward achieving high performance in new initiatives, such as promoting dual language learning
in core content area courses. Collaboration was an imperative for teachers, and as the area of greatest need through the data findings, it should be prioritized and be systematically allocated with the goals of enabling discussion, planning, and reflection on student progress, especially regarding elevating opportunities to develop bilingualism and biliteracy through a culturally relevant pedagogy.

*Instructional materials that enhance dual language learning.* Textbook and novel publishers have significant stake in the achievement of curricula that is culturally relevant and multilingual. However, teachers cannot wait for all publishers to produce material that is adequate for furthering students’ linguistic potential. Teachers may need to explore resources or strategies for incorporating student-centered learning wherein students are able to utilize and capitalize on their own strengths and further their linguistic potential.

*Content and Language Integrated Learning (CLIL).* With the adoption of the Education for a Global Economy (EdGE) Initiative, California, inaugural opportunities surface to provide instruction in languages other than English for core content, which is especially notable at the secondary level. Having content courses in a language other than English will afford students who are native and non-native speakers to participate in advancing their linguistic repertoire in various content areas, hence building their vocabularic knowledge in two languages rather than just one. The current world language offerings of AP Spanish or French language and culture and Spanish literature leave much room for growth in course content in a target language to further enhance biliteracy and bilingualism.

**Strategies and Action Items**

The following section summarizes the overall solutions and implementation action items that the district can employ to advance the furtherance of attaining the LCAP academic goals,
predominantly the goal for more students to achieve bilingualism and biliteracy by earning the
California SSB. The solutions were categorized into five segments, including policy and
partnerships, systematic planning, professional learning and growth, curriculum and instruction,
and reflection and progress monitoring. Each category contains solution action items to progress
toward achieving the stakeholder goals.

Table 28

Solutions and Solution Categories

<table>
<thead>
<tr>
<th>Solution Categories</th>
<th>Solutions Implementation Action Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy and Partnerships</td>
<td>Propose adjustment to California Standards for the Teaching Profession (CSTPs) to the California Department of Education to include developing bilingualism and student-centeredness (O)</td>
</tr>
<tr>
<td></td>
<td>Pre-service teacher preparation with emphasis on dual language development, a reform to the English authorization requirement (K)</td>
</tr>
<tr>
<td>Systematic Planning</td>
<td>Language specialist to coordinate the professional learning and growth, curriculum and instruction, and reflection implementation plan</td>
</tr>
<tr>
<td></td>
<td>District to reevaluate organizational priorities considering current outcomes, capitalizing on student assets and building toward a 21st-century curriculum that is culturally relevant and promotes expansion of their given assets (O)</td>
</tr>
<tr>
<td></td>
<td>District to communicate consistently and effectively regarding the priorities once stakeholder information has been gathered (O)</td>
</tr>
<tr>
<td></td>
<td>Redesign the school schedules to incorporate and require up to 3 hours per week of collaboration among and across content areas with consistency (O)</td>
</tr>
<tr>
<td></td>
<td>Language learning courses for teachers available during and after school (O)</td>
</tr>
<tr>
<td>Professional Learning and Growth</td>
<td>In-service teaching professional development that embeds dual language learning and student-centered pedagogy within all content areas, which includes job aids and training (K)</td>
</tr>
<tr>
<td></td>
<td>Begin to deconstruct content area silos and build a system of inter-departmental collaboration, primarily between language and content teachers (O)</td>
</tr>
<tr>
<td></td>
<td>Professional development plan that incorporates and emphasizes 21st-century standards and skills as a transformative process within curriculum and instruction (M)</td>
</tr>
</tbody>
</table>
Table 28, continued

<table>
<thead>
<tr>
<th>Curriculum and Instruction</th>
<th>Integration of WICOR, Common Core Standards, EL Roadmap, and multilingualism (K)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Multilingual embedded curriculum emphasized student-centeredness (How do you grow your own vocabulary in two or more languages in this content area simultaneously?) (K)</td>
</tr>
<tr>
<td></td>
<td>International Baccalaureate, AVID, Common Core Standards, Global Competence, and EL Roadmap integration resource development and training (O)</td>
</tr>
<tr>
<td></td>
<td>Search for and secure instructional materials that further dual language learning (O)</td>
</tr>
<tr>
<td></td>
<td>Content and Language Integrated Learning (CLIL) for content area courses in languages other than English (O)</td>
</tr>
<tr>
<td></td>
<td>Primary language content instruction for students who are speakers of other languages up to 5 hours per week (O)</td>
</tr>
<tr>
<td></td>
<td>Language buddy system wherein all students have a target language buddy who is more proficient or a native speaker of another language with targeted meeting goals. (O)</td>
</tr>
<tr>
<td>Reflection and Progress Monitoring</td>
<td>Structured reflection and systems of teacher feedback that develop and grow teacher efficacy in the areas of dual language learning and culturally relevant pedagogy (M)</td>
</tr>
<tr>
<td>Reflection and Progress Monitoring</td>
<td>Structured reflection within pre-service and in-service teacher training wherein teachers learn how to participate in a continuous cycle of reflection and lead students into a continuous cycle of reflection (K)</td>
</tr>
</tbody>
</table>

**Resource Requirements**

To implement the strategic plan for innovation within the district, tangible and intangible resources are essential. A district-wide strategic plan must be developed to outline all professional learning and personnel needs, the collective bargaining contract needs to be reviewed and revised to incorporate language surrounding components of the plan, and instructional materials and textbooks must be sought throughout all content areas so as to include other languages and etymologies.

**Systematic Professional Learning Plan**

The need for a systematic approach to comprehensively provoking, developing, and enhancing dual language learning through culturally relevant pedagogy hangs in the balance...
regarding the priorities of the district leadership and its adherence to the ripe sentiment of the stakeholders to take hold of the assets students possess.

The recent adoption of the EdGE legislature in California initiated the development of a new English Learner Roadmap (California Department of Education, 2018). The English Learner Roadmap is the state’s response to the omission of the diverse heritage languages of students across the state who have been historically marginalized. Though the English Learner Roadmap is the state’s response to omitting the diverse heritage languages of students across the state who have been historically marginalized. Though the legislature is entitled with a global citizenship focus, the plan specifically targets English learners, who were the targeted population to remediate during the previous reign of Proposition 227.

The English Learner Roadmap includes four principles, which are, (a) assets oriented and needs responsive schools, (b) intellectual quality of instruction and meaningful access, (c) system conditions that support effectiveness, and (d) articulation within and across systems (California Department of Education, 2018). The district must respond by incorporating these principles, therefore enhancing the educational experience of students who are learning in two or more languages.

**Collective Bargaining Contract Revisions**

The collective bargaining agreement is the cornerstone for outlining teacher responsibilities and obligations. The contract does not currently incorporate up to three hours per week of collaborative time nor interdisciplinary collaboration. To enhance teachers’ ability to effectively collaborate about and develop the essential tools for promoting bilingualism and biliteracy, they must have more time each week within their paid contract to intentionally meet with their colleagues to further this work.
Instructional Materials and Textbooks

Materials and textbooks, important as they are, depend largely on publishers and district funding within a textbook’s life cycle. Textbook purchases encapsulate a significant portion of the budget per student, and they lack language learning and strategic dual language supports for provoking student-centered language development or etymology. Given this constraint, teachers will likely need to develop their own materials and resources to address multilingualism and cultural relevance.

Timeline for Implementation

An efficient and coordinated timeline will maintain focus on achieving and attaining the goals of the district to produce more students who are validly bilingual and biliterate as evidenced by their attainment of the California SSB. The timeline considers the remaining time left on the LCAP planning cycle. The LCAP is fully funded after 3 years, and it is currently in its second year within the three-year cycle. The timeline expressed in Table 29 is reflective of the remaining year into the planning of the next LCAP. The next LCAP will take effect as of July 2019.

Table 29

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Solutions Implementation Action Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2018</td>
<td>Language specialist to coordinate the following implementation plan</td>
</tr>
<tr>
<td>July 2018</td>
<td>Redesign the school schedules to incorporate and require up to one hour per week of collaboration among and across content areas with consistency (O)</td>
</tr>
<tr>
<td>July 2018</td>
<td>Redesign the school schedules to incorporate and require up to 3 hours per week of collaboration among and across content areas with consistency (O)</td>
</tr>
<tr>
<td>July 2018</td>
<td>Professional development plan that incorporates and emphasizes 21st-century standards and skills as a transformative process within curriculum and instruction (M)</td>
</tr>
<tr>
<td>Date Range</td>
<td>Action Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>August 2018</td>
<td>Propose adjustment to California Standards for the Teaching Profession (CSTPs) to the California Department of Education to include developing bilingualism and student-centeredness (O)</td>
</tr>
<tr>
<td>August 2018</td>
<td>Propose pre-service teacher preparation reform within BCLAD to include Content and Language Integrated Learning (K)</td>
</tr>
<tr>
<td>August 2018</td>
<td>Language buddy system wherein all students have a target language buddy who is more proficient or a native speaker of another language with targeted meeting goals. (O)</td>
</tr>
<tr>
<td>August 2018</td>
<td>Structured reflection and systems of teacher feedback that develop and grow teacher efficacy in the areas of dual language learning and culturally relevant pedagogy (M)</td>
</tr>
<tr>
<td>August 2018</td>
<td>Integration of WICOR, Common Core Standards, EL Roadmap, and multilingualism (K)</td>
</tr>
<tr>
<td>August 2018 to June 2019</td>
<td>District to communicate consistently and effectively regarding the priorities once stakeholder information has been gathered (O)</td>
</tr>
<tr>
<td>August 2018 to June 2019</td>
<td>Structured reflection within pre-service and in-service teacher training wherein teachers learn how to participate in a continuous cycle of reflection and lead students into a continuous cycle of reflection (K)</td>
</tr>
<tr>
<td>August 2018 to June 2019</td>
<td>In-service teaching professional development that embeds dual language learning and student-centered pedagogy within all content areas, which includes job aids and training (K)</td>
</tr>
<tr>
<td>August 2018 to December 2018</td>
<td>District to reevaluate organizational priorities considering current outcomes, capitalizing on student assets and building toward a 21st-century curriculum that is culturally relevant and promotes expansion of their given assets (O)</td>
</tr>
<tr>
<td>December 2018</td>
<td>Search for and secure instructional materials that further dual language learning (O)</td>
</tr>
<tr>
<td>January 2019</td>
<td>Begin to deconstruct content area silos and build a system of inter-departmental collaboration, primarily between language and content teachers (O)</td>
</tr>
<tr>
<td>February 2019</td>
<td>Propose extending professional learning to three hours per week (O)</td>
</tr>
<tr>
<td>January 2019 to March 2019</td>
<td>Language learning courses for teachers available during and after school (O)</td>
</tr>
<tr>
<td>March 2019</td>
<td>Content and Language Integrated Learning (CLIL) for content area courses in languages other than English (O)</td>
</tr>
<tr>
<td>March 2019</td>
<td>Primary language content instruction for students who are speakers of other languages up to 5 hours per week (O)</td>
</tr>
<tr>
<td>June 2019</td>
<td>Multilingual embedded curriculum emphasized student-centeredness (K)</td>
</tr>
<tr>
<td>June 2019 to July 2019</td>
<td>International Baccalaureate, AVID, Common Core Standards, Global Competence, and EL Roadmap integration resource development and training (O)</td>
</tr>
</tbody>
</table>
Implementation Constraints and Challenges

Every implementation plan has realistic constraints due to zero sum resources, unaccounted for external and internal variables or influences, and unforeseen, unpredicted, or unintended consequences. There are three notable systemic constraints for making recommended changes to increase SSB earners. There are three notable constraints for making drastic changes to increase SSB earners. The first constraint is the nature of LCAP prioritization and decision-making given the advent of the EdGE reform. The second constraint is the overall library of current textbook publications contained and approved within the district. The final constraint is the current small number of teachers who possess the bilingual certification through the BCLAD relative to the entire workforce.

Decision-Making and District Priorities

The plan is dependent on the value attributed to the linguistic assets of students and the desire to make all students in CPHSD proficient bilingual and biliterate young adults. If the stakeholders and district continue to value bilingualism and biliteracy, resources can be allocated to the furtherance of developing bilingualism and biliteracy among all students. Despite the EdGE legislation and adopted policy, parents and other stakeholders are not fully aware of the repercussions and potential opportunities available for developing dual language learning opportunities within LEAs, especially at the secondary school level and because the matriculating schools are not part of the CPHSD. Education for the broader public, including the imperative stakeholders within the district will enable greater success.

Textbook Publishers

Districts are often dependent on the textbooks and materials provided by publishers for an adopted schema to provide to teachers. The state has transitioned to common core standards
within the past six years, and therefore, teachers have either had to align their curriculum to the new standards or await district professional collaboration and planning for curriculum that aligns with the new standards. Though teachers could and sometimes do develop their own materials and resources, it is incredibly time consuming to include more than one language within all core content courses. With feedback from district, publishers may adjust their content and expand their supplemental materials, but the process is labored due to publication timelines and the life cycle of most textbooks. The district is unlikely to be able to make mass textbook purchases when books are still in good condition. Publishers are moving toward more digital footprints and cloud-contained resources, they are still in process of connecting the schematics of scaffolded instruction within their comprehensive materials. Alignment of all available technologies and textbooks is labor intensive.

Teacher Credentialing

Teacher credentialing programs are vast in contents and quality despite their reliance on abiding by state credentialing minimum obligations. Though the district can and does collaborate with local universities for securing teacher candidates for vacancies or partnering to identify best practices in pedagogy, they are not directly involved in determining the requirements of credential candidates or graduates. The pathway and exams exist for teachers to earn a bilingual credential through the BCLAD by demonstrating their bilingual proficiency, but alignment with single subject secondary teachers is unknown. Through continued partnership with state and county education agencies and the colleges of education at universities, the district can express their desirable candidate qualities, but credentialing program modifications or alignment are unique to the university. However, the district can be intentional about hiring content area teachers who also possess other language proficiencies.
Evaluation Plan

The evaluation plan is essential for the strategic collection of feedback from stakeholders regarding the effectiveness of the interventions proposed. Based on the work of Kirkpatrick and Kirkpatrick (2006) regarding the evaluation of professional development, the levels of evaluation to utilize include reaction or satisfaction level, the attainment of learning, behavior change or application of the learned knowledge, and impact on performance outcomes. The interventions proposed will each have a plan of evaluating their effectiveness on improving organizational performance toward achieving higher rates of bilingualism and biliteracy.

Table 30

Evaluation Plan (Kirkpatrick & Kirkpatrick, 2006)

<table>
<thead>
<tr>
<th>Intervention Proposed</th>
<th>Reaction or Satisfaction (Level 1)</th>
<th>Learning (Level 2)</th>
<th>Behavior or Application (Level 3)</th>
<th>Impact (Level 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language Specialist to coordinate professional learning and growth, curriculum and instruction, and reflection implementation plan</td>
<td>Changing in teaching pedagogy based on training and coaching</td>
<td>Metrics from students proving proficiency in both language</td>
<td>Increase in seal of biliteracy earners</td>
<td></td>
</tr>
<tr>
<td>In-service teaching professional development that embeds dual language learning and student-centered pedagogy within all content areas, which includes job aids and training (K)</td>
<td>Use rating sheets at the end of each training session with space for qualitative responses</td>
<td>Self-rating before, during, and after training to measure change in learning</td>
<td>Survey of participants and supervisors within six months and 12 months from training</td>
<td>Metrics from students proving proficiency in another language increase</td>
</tr>
<tr>
<td></td>
<td>Monitor attendance and completion rates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention Proposed</td>
<td>Reaction or Satisfaction (Level 1)</td>
<td>Learning (Level 2)</td>
<td>Behavior or Application (Level 3)</td>
<td>Impact (Level 4)</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------------------------------</td>
<td>-------------------</td>
<td>----------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Professional development plan that incorporates and emphasizes 21st-century standards and skills as a transformative process within curriculum and instruction (M)</td>
<td>Survey to check on how teachers feel interdisciplinary collaboration is working or not working</td>
<td>Self-rating before, during, and after training to measure change in learning</td>
<td>Teachers confidently express the integration of bilingual instruction and demonstrate student-centered learning using instructional materials that are bilingual and culturally relevant</td>
<td>Students are engaged in a college preparatory 21st-century curriculum and are performing at high levels for state, national, and international assessments</td>
</tr>
<tr>
<td>Begin to deconstruct content area silos and build a system of inter-departmental collaboration, primarily between language and content teachers (O)</td>
<td>Professional learning community visits from administration to check on discourse and notes</td>
<td>Observation of department conversations; evidence that interdisciplinary projects are planned within the curriculum</td>
<td>Interdisciplinary projects are evident in at least two departments</td>
<td>Collaboration occurs with fidelity and discusses student-centered language learning in all content areas</td>
</tr>
<tr>
<td>Use of and integration among International Baccalaureate, AVID strategies, Common Core Standards, Global Competence, and EL Roadmap (K and O)</td>
<td>Use rating sheets at the end of each training session with space for qualitative responses</td>
<td>Teachers confidently express the integration of bilingual instruction and demonstrate student-centered learning using instructional materials that are bilingual and culturally relevant</td>
<td>Students are engaged in a college preparatory 21st-century curriculum and are performing at high levels for state, national, and international assessments</td>
<td>All students are able to attain the seal of biliteracy upon graduation</td>
</tr>
<tr>
<td>Search for and secure instructional materials that further dual language learning (O)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention Proposed</td>
<td>Reaction or Satisfaction (Level 1)</td>
<td>Learning (Level 2)</td>
<td>Behavior or Application (Level 3)</td>
<td>Impact (Level 4)</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------------------------------</td>
<td>-------------------</td>
<td>-----------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Structured reflection within pre-service and in-service teacher training wherein teachers learn how to participate in a continuous cycle of reflection and lead students into a continuous cycle of reflection (K)</td>
<td></td>
<td></td>
<td></td>
<td>More embedded student-centered reflection for autonomy and ownership of learning</td>
</tr>
<tr>
<td>Content and Language Integrated Learning (CLIL) for content area courses in languages other than English (O)</td>
<td>Survey to teachers upon proposal to add courses with primary language other than English</td>
<td>Select teachers demonstrate proficiency in a language other than English</td>
<td>Select teachers are able to provide curriculum and instruction within a core content area in a language other than English</td>
<td>Students achieve higher proficiencies in two or more languages as evidenced by performance on language assessments</td>
</tr>
<tr>
<td>Primary language content instruction for students who are speakers of other languages up to five hours per week (O)</td>
<td>Survey to teachers about their reaction to heritage language instruction</td>
<td>Select teachers learn how to deliver instruction to heritage speakers so as to bridge with second language</td>
<td>Minority language teachers are recruited and serve students up to five hours per week</td>
<td>Minority language speakers develop second language more quickly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Minority language speakers earn the seal of biliteracy at higher rates than before</td>
<td></td>
</tr>
</tbody>
</table>
Table 30, continued

<table>
<thead>
<tr>
<th>Intervention Proposed</th>
<th>Reaction or Satisfaction (Level 1)</th>
<th>Learning (Level 2)</th>
<th>Behavior or Application (Level 3)</th>
<th>Impact (Level 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language buddy system wherein all students have a target language buddy who is more proficient or a native speaker of another language with targeted meeting goals. (O)</td>
<td>Survey to students about how they perceive and engage in the buddy program</td>
<td>Students learn higher level vocabulary</td>
<td>Students meet with buddies frequently and gain more autonomy of their language learning</td>
<td>Increase in students who earn the seal of biliteracy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Survey to students regarding the impact on their own second language learning</td>
<td>Students speak more confidently in their target language</td>
<td>Higher performance on language assessments</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>More practical applications and usages of bilingual and biliteracy skills in the local and global community</td>
</tr>
</tbody>
</table>

**Level 1 Reactions or Satisfaction**

Level one reactions are critical for determining immediate feedback regarding the initial responses and reactions to a training or intervention. Level one reactions will be gathered through the use rating sheets at the end of each training session with space for qualitative responses. The surveying of how teachers feel interdisciplinary collaboration is positive impacting their pedagogical and planning practice will help inform the value of the time. Teachers’ reactions to heritage language instruction, how they perceive the buddy program, the monitoring of attendance and completion rates, and reflection sheet completion rates will illuminate the ongoing beliefs and efficacy about the interventions. The ratings, surveys, and reflections will illuminate teachers’ reactions or satisfaction with the interventions.

**Level 2 Learning**

Level two learning metrics are gathered through self-rating before, during, and after training to measure changes or attainment of new learning. Surveys can be provided to students
to gather the noticeable impact on their second language learning and assessment results that indicate students are increasing in language proficiency is tangible evidence. Reflection sheets that address how teachers respond to data to improve outcomes will enable evidence of reflection and gather meaningful data about their conceptual understanding of the incorporation of languages and etymology within content areas. Professional learning community visits from administration with anecdotal notes about discourse and notes collected through their meeting will provide qualitative data to capture teachers’ immediate collaborative engagement around these topics. Identifying select teachers who demonstrate increased proficiency in a language other than English and utilizing the heritage languages of students will gauge the growing cultural and linguistic proficiency of teachers.

**Level 3 Behavior Transfer or Application**

Level three embodies the opportunity for a significant transition to changes in individual and organizational behavior for improving outcomes. At this stage, evaluation will include the evidence of increased usage of student-centered pedagogy with more dual language supports in class; teachers confidently express the integration of bilingual instruction and demonstrate student-centered learning using instructional materials that are bilingual and culturally relevant; survey of participants and supervisors within six months and 12 months from training; informal observation of department conversations and evidence that interdisciplinary projects are planned within the curriculum; that students meet with language buddies frequently and gain more autonomy of their language learning and students speak more confidently in their target language; select teachers are able to provide curriculum and instruction within a core content area in a language other than English; reflection results in continuous cycle of improvement and
adjustment within instruction that supports student achievement; and minority language teachers are recruited and serve students up to five hours per week.

**Level 4 Results or Impact**

Level four impact is the impetus for all of the knowledge, motivation, and organizational change efforts to address the validated influences. The theme for measuring the impact of the interventions includes the concrete exemplary increase in student achievement as measured by state, national, and international assessments, the increase in Seal of Biliteracy earners, the thorough and threaded 21st-century curriculum and instruction to prepare students for a global marketplace, and the advent of interdisciplinary projects to further develop students’ usage of multilingualism in context. Additionally, the organizational mechanisms of collaboration, planning, and reflection for student-centeredness should be evident as a sustainable feature in the organizations improvement. Finally, there should be a direct and substantial relationship to the practical applications and usages of bilingual and biliteracy skills in the local and global community.

**Future Research**

The field of bilingualism and multilingualism, biliteracy, and the maintenance of heritage languages and cultures pervades global sustainable development goals, demands of employment essentials in a global marketplace, and historical and cultural realms of human interaction. To further advance the study of and refine the supports afforded to developing bilingualism and biliteracy, the following aspects of future research will inform best practices.

**Seal of Biliteracy Impact with Employers**

Davin and Heineke (2017) are generating some initial research findings on the benefits to employers of students having the seal of biliteracy. Given that the seal of biliteracy
authentication ranges across state lines, it is to be explored among employers if the stated benchmarks for proficiency are enough for what they need in the marketplace.

**Promising Practices in Multilingualism**

The type of research that can discover and extrapolate the best practices in advancing multilingualism among their school populations will enhance the field and contribute to a diverse spectrum of students advancing toward multilingualism. The United States, though an expansive and diverse nation has few models for multiliteracy spanning the school-aged life cycle from preschool to secondary, so further research to validate the promising practices of the few high quality models for advancing students toward proficiency in three or more languages like many European nations is worth exploring.
Alternative Pathways to Bilingualism Besides Coursework

There are off-the-shelf exams that may meet the minimum requirements for demonstrating proficiency in one or more language other than English. The efficacy and validity of these assessments as useful measures for demonstrating proficiency are still being explored. Additionally, given the adoption of Spanish Common Core standards at the primary school level, further study on the requisites for secondary schools to develop matriculation programs could use further study. The expanse of dual immersion programs in early grades is opening the door to reformed secondary language delivery models within content courses, rather than the usual but short trajectory of taking the highest AP language and culture or literature course.

Conclusion

The innovative gap analysis study focused on exploring the present levels of knowledge, motivation, and organization in the area of bilingualism and biliteracy instruction within the context of student-centered culturally relevant pedagogy in a setting wherein few teachers possessed credentials for bilingual education (Clark & Estes, 2008). Quantitative and qualitative data was collected to reveal validations of various knowledge, motivation, and organizational influences to teachers’ ability to promote bilingualism and biliteracy through a culturally relevant pedagogy in their core content classes across the curriculum. Factual, conceptual, procedural, and metacognitive knowledge influences were validated in the area of dual language instruction, but for culturally relevant pedagogy, the influences were either partially or not validated. Motivation and organizational influences related to dual language learning were validated, while those addressing culturally relevant pedagogy were either partially or not validated. Therefore, given the change in legislation from EO to more inclusive of other native or heritage languages was not yet evident and in need of innovative remediation in the next wave of 21st-century
learning. These findings will provide timely insight to secondary schools across California as they grapple with and address the research and findings of students with multilingual assets and needs. With a systematic implementation plan, an increasing number of California secondary student will graduate college and career ready within the 21st-century expectations, prepared as multilingual and multiliterate global citizens.
REFERENCES


California Commission on Teacher Credentialing. (2013). *California teachers of English learners (CTEL) program leading to certification to teach English learners*. Retrieved from https://www.google.com/search?q=California+teachers+of+English+learners+(CTEL)+program+leading+to+certification+to+teacher+English+learners&oq=California+teachers+of+English+learners+(CTEL)+program+leading+to+certification+to+teacher+English+learners&aqs=chrome..69i57.424369j0j4&sourceid=chrome&ie=UTF-8


http://dx.doi.org/10.1353/etc.2016.0019


Younes, M. (2016). *The impact of CLIL on Arabic, English and content learning of Arab high school students in the UAE*

## APPENDIX A

Summary of Assumed Knowledge Causes and Validation Methods

Table A1

<table>
<thead>
<tr>
<th>Assumed Cause or Influence</th>
<th>Survey</th>
<th>Interview</th>
<th>Document Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers need to understand what is bilingualism and biliteracy. (F)</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to know what is culturally relevant and sustaining pedagogy. (F)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to understand how to include students’ primary and target languages into core content area instruction. (C)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to understand how culturally relevant and sustaining pedagogy influences curriculum and instruction. (C)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to deliver best instructional practices through student-led and student-centered pedagogy that elicits native and target languages. (P)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to demonstrate an ability to plan and deliver lessons in their content area that are inclusive of culturally relevant and sustaining pedagogy. (P)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to reflect on lesson and unit development and how students are progressing in two or more languages. (M)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to reflect on how the curriculum and pedagogy are culturally relevant. (M)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

*(F) Factual; (C) Conceptual; (P) Procedural; (M) Metacognitive*
Table A2

**Summary of Assumed Motivation Validation Methods**

<table>
<thead>
<tr>
<th>Assumed Cause or Influence</th>
<th>Survey</th>
<th>Interview</th>
<th>Document Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers need to believe that bilingualism and biliteracy is an asset for students’ cognitive development and academic achievement. (B)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to value students’ heritage languages and cultures in order to incorporate them into student-led instruction. (V)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to demonstrate confidence and self-efficacy in planning and facilitating dual language instruction and culturally relevant and sustaining pedagogy within their content area. (SE)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Teachers need to provide instruction that is student-centered for achievement in alignment with 21st-century standards, which include bilingualism and culturally relevant pedagogy. (GO)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

*(B) Belief; (V) Value; (SE) Self-Efficacy; (GO) Goal-Orientation*
Table A3

**Summary of Assumed Organization Validation Methods**

<table>
<thead>
<tr>
<th>Assumed Cause or Influence</th>
<th>Survey</th>
<th>Interview</th>
<th>Document Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schools need to provide teachers with instructional materials and curricula in all content areas that support dual language learning and culturally relevant and sustaining pedagogy. (R)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schools need to embrace and support all teachers in progressing toward the LCAP goals and organizational mission. (CM)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Schools need to celebrate growth in dual language acquisition. (CM)</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Schools need to provide teachers with professional learning and growth opportunities and collaborative time within each content area. (CS)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Schools need to provide language teachers and core content area teachers (science, social science, and math) time and space to collaborate. (CS)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Schools need to provide teachers with ongoing professional development in dual language instruction and culturally relevant and sustaining pedagogy. (T)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Schools need to commit to providing a range of tools for teachers to achieve the standards for meeting their stakeholder goal and the organizational mission. (T)</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Schools need to communicate policies and procedures for scheduling student 4-year plans to ensure maximum completion of State Seal of Biliteracy requirements. (PP)</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

(R) Resources; (CM) Cultural Model; (CS) Cultural Setting; (T) Training; (PP) Policies and Procedures
Table A4

*Summary of Assumed Knowledge Causes and Validation Methods with Questions*

<table>
<thead>
<tr>
<th>Assumed Cause or Influence</th>
<th>Instrument</th>
<th>Question or Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers need to understand what is bilingualism and biliteracy and the seal of biliteracy. (F)</td>
<td>Survey</td>
<td>I know methods for students to earn the California State Seal of Biliteracy.</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>I know what dual language acquisition pedagogy is.</td>
</tr>
<tr>
<td>Teachers need to know what is culturally relevant and sustaining pedagogy. (F)</td>
<td>Interview</td>
<td>Describe your understanding of culturally relevant pedagogy.</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>I know what culturally relevant or sustaining pedagogy is.</td>
</tr>
<tr>
<td>Teachers need to understand dual language acquisition models and understand their implementation within their core content area. (C)</td>
<td>Interview</td>
<td>All teachers are required to have completed English learner authorization with their single subject credential. Please describe your understanding and implementation of second language acquisition strategies.</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>My curriculum and materials address dual language learning.</td>
</tr>
<tr>
<td>Teachers need to understand how culturally relevant and sustaining pedagogy influences curriculum and instruction. (C)</td>
<td>Interview</td>
<td>Describe your understanding of culturally relevant pedagogy.</td>
</tr>
<tr>
<td></td>
<td>Interview</td>
<td>In addition to your content standards, what other factors do you take into consideration when planning lessons?</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>My curriculum and materials address culturally relevant instructional materials.</td>
</tr>
<tr>
<td>Teachers need to deliver best instructional practices through student-led and student-centered pedagogy that elicits native and target languages. (P)</td>
<td>Interview</td>
<td>In addition to your content standards, what other factors do you take into consideration when planning lessons?</td>
</tr>
<tr>
<td></td>
<td>Interview</td>
<td>Describe how you approach language (English or another) instruction within your curriculum.</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>I know how to plan lessons and units incorporating dual languages.</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>I know how to deliver and facilitate student-led and student-centered dual language experiences.</td>
</tr>
</tbody>
</table>
Table A4, continued.

<table>
<thead>
<tr>
<th>Teachers need to demonstrate an ability to plan and deliver lessons in their content area that are inclusive of culturally relevant and sustaining pedagogy. (P)</th>
<th>Interview</th>
<th>In addition to your content standards, what other factors do you take into consideration when planning lessons?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Survey</td>
<td>I know how to plan lessons and units incorporating culturally relevant and sustaining pedagogy.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teachers need to reflect on lesson and unit development and how students are progressing in dual languages. (M)</th>
<th>Interview</th>
<th>What barriers have experienced in lesson planning for dual language acquisition or culturally relevant pedagogy?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Interview</td>
<td>During and after you meet with your content area professional learning teams, what aspects of language learning do you reflect on?</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>I regularly reflect on improving my teaching practice related to dual language learning.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teachers need to reflect on how the curriculum and pedagogy are culturally relevant. (M)</th>
<th>Survey</th>
<th>I regularly reflect on improving curriculum and instruction that is culturally relevant and sustaining toward building students’ capacities in value-added cultural learning.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Survey</td>
<td>I am conscious of my biases of other ethnicities, languages, and cultures.</td>
</tr>
</tbody>
</table>
Table A5

*Summary of Assumed Motivation Causes and Validation Methods with Questions*

<table>
<thead>
<tr>
<th>Assumed Cause or Influence</th>
<th>Instrument</th>
<th>Question or Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers need to believe that bilingualism and biliteracy is an asset for students’ cognitive development and academic achievement. (B)</td>
<td>Interview</td>
<td>How do you acknowledge or capitalize on the assets or unique characteristics of your students within your instruction?</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>I believe that bilingualism and biliteracy is an asset for students' cognitive development and academic achievement.</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>I believe bilingualism and biliteracy are a priority for our students.</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>I believe that students' native language is an asset for them and should be utilized in learning.</td>
</tr>
<tr>
<td>Teachers need to value students’ heritage languages and cultures in order to incorporate them into student-led instruction. (V)</td>
<td>Interview</td>
<td>Describe how you approach language (English or another) instruction within your curriculum.</td>
</tr>
<tr>
<td></td>
<td>Interview</td>
<td>How do you acknowledge or capitalize on the assets or unique characteristics of your students within your instruction?</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>Students' native language is an asset for them and should be utilized in learning.</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>Teachers need to value students’ heritage languages and cultures in order to incorporate them into student-led instruction.</td>
</tr>
<tr>
<td>Teachers need to demonstrate confidence and self-efficacy in planning and facilitating dual language instruction and culturally relevant and sustaining pedagogy within their content area. (SE)</td>
<td>Interview</td>
<td>Do you feel equipped to meet the language and cultural learning instructional needs of your students within your content area? Why or why not?</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>I feel confident in planning dual language instruction within my content classes.</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>I feel confident with incorporating culturally relevant strategies into my content area curriculum.</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>I feel confident with student-led language learning.</td>
</tr>
</tbody>
</table>
Table A5, continued.

<table>
<thead>
<tr>
<th>Teachers need to provide instruction that is student-centered for achievement in alignment with 21st-century standards, which include bilingualism and culturally relevant pedagogy. (GO)</th>
<th>Interview</th>
<th>Describe how you approach language (English or another) instruction within your curriculum.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Interview</td>
<td>During and after you meet with your content area professional learning teams, what aspects of language learning do you reflect on?</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>My lesson plans and pedagogy encourage mastery-based learning over performance.</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>Teachers need to align their instructional goals with the organizational goal and 21st-century standards, which includes dual language learning and culturally relevant pedagogy.</td>
</tr>
</tbody>
</table>
Table A6

*Summary of Assumed Organization Causes and Validation Methods with Questions*

<table>
<thead>
<tr>
<th>Assumed Cause or Influence</th>
<th>Instrument</th>
<th>Question or Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schools need to provide teachers with instructional materials and curricula in all content areas that support dual language learning and culturally relevant and sustaining pedagogy. (R)</td>
<td>Interview</td>
<td>Do you feel equipped to meet the language and cultural learning instructional needs of students within your content area?</td>
</tr>
<tr>
<td></td>
<td>Interview</td>
<td>What barriers have you experienced in lesson planning for dual language acquisition or culturally relevant pedagogy?</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>I have sufficient materials and supplies for teaching dual languages within my content area.</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>I have sufficient materials and supplies to provide culturally relevant and sustaining pedagogy.</td>
</tr>
<tr>
<td>Schools need to embrace and support all teachers in progressing toward the LCAP goals and organizational mission. (CM)</td>
<td>Interview</td>
<td>What barriers have you experienced in lesson planning for dual language acquisition or culturally relevant pedagogy?</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>Our school culture embraces and celebrates bilingualism or multilingualism.</td>
</tr>
<tr>
<td></td>
<td>Document Analysis</td>
<td>LCAP goals and professional development calendar and agendas.</td>
</tr>
<tr>
<td>Schools need to celebrate growth in dual language acquisition. (CM)</td>
<td>Interview</td>
<td>How do you acknowledge or capitalize on the assets or unique of students within your instruction?</td>
</tr>
<tr>
<td>Schools need to provide language teachers and core content area teachers (science, social science, and math) time and space to collaborate. (CS)</td>
<td>Interview</td>
<td>During and after you meet with your content area professional learning teams, what aspects of language learning do you reflect on?</td>
</tr>
<tr>
<td></td>
<td>Interview</td>
<td>How can the organization better equip you for the language and learning instructional needs for the students you serve?</td>
</tr>
<tr>
<td></td>
<td>Survey</td>
<td>Language teachers (English, Spanish, French, ASL) collaborate with core content teachers to discuss</td>
</tr>
<tr>
<td>Document Analysis</td>
<td>strategies for supporting bilingualism and biliteracy within each content area.</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Professional development calendar and agendas and Board of Education policies.</td>
<td></td>
</tr>
</tbody>
</table>
### Table A6, continued.

<table>
<thead>
<tr>
<th>Schools need to provide teachers with time for professional learning and growth opportunities and collaborative time within each content area. (CS)</th>
<th>Interview</th>
<th>Do you feel equipped to meet the language and cultural learning instructional needs of students within your content area?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview</td>
<td>What barriers have you experienced in lesson planning for dual language acquisition or culturally relevant pedagogy?</td>
<td></td>
</tr>
<tr>
<td>Interview</td>
<td>How can the organization better equip you for the language and learning instructional needs for the students you serve?</td>
<td></td>
</tr>
<tr>
<td>Survey</td>
<td>I have sufficient time and space to plan lessons that include dual language learning and that are culturally relevant.</td>
<td></td>
</tr>
<tr>
<td>Survey</td>
<td>My professional learning community has sufficient time and space to collaborate about improving curriculum and instruction for dual language learning and culturally relevant pedagogy.</td>
<td></td>
</tr>
<tr>
<td>Document Analysis</td>
<td>Professional development calendar and agendas and Board of Education policies.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Schools need to provide teachers with ongoing professional development in dual language instruction and culturally relevant and sustaining pedagogy. (T)</th>
<th>Interview</th>
<th>What training have you received in second language learning, dual language learning, or culturally relevant pedagogy?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview</td>
<td>What barriers have you experienced in lesson planning for dual language acquisition or culturally relevant pedagogy?</td>
<td></td>
</tr>
<tr>
<td>Interview</td>
<td>How can the organization better equip you for the language and learning instructional needs for the students you serve?</td>
<td></td>
</tr>
<tr>
<td>Survey</td>
<td>I have received training that pertains to dual language learning across core content areas.</td>
<td></td>
</tr>
<tr>
<td>Survey</td>
<td>I have received training that pertains to culturally relevant or sustaining pedagogy within my core content area.</td>
<td></td>
</tr>
<tr>
<td>Document analysis</td>
<td>Professional development calendar and agendas and Board of Education policies.</td>
<td></td>
</tr>
</tbody>
</table>
Table A6, continued.

<table>
<thead>
<tr>
<th>What training have you received in second language learning, dual language learning, or culturally relevant pedagogy?</th>
</tr>
</thead>
<tbody>
<tr>
<td>How can the organization better equip you for the language and learning instructional needs for the students you serve?</td>
</tr>
<tr>
<td>Professional development calendar and agendas.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Policies and procedures help me to provide student-centered culturally relevant courses that lead to earning the seal of biliteracy.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our policies align with the California bilingual education laws.</td>
</tr>
<tr>
<td>Board policies reviewed for evidence of teacher expectations regarding pedagogy or dual language learning.</td>
</tr>
</tbody>
</table>
APPENDIX B

Data Collection Instruments

Section A: Secondary Bilingualism and Culturally Relevant Pedagogy Survey Protocol

Email Subject: VOLUNTARY RESPONSE REQUESTED: Bilingual and Culturally Relevant Pedagogy

Dear CPHSD Educator,

You have been selected to participate in a research study about Bilingual Education and Culturally Relevant Pedagogy at the secondary level because you teach at one of the comprehensive high schools in the College Prep HSD in Math, English, Science, Social Science, VAPA, or Special Education. Your participation is very much appreciated and desired in order to provide a reliable study about bilingual and culturally relevant pedagogy. Your identity will not be collected and will remain anonymous, and your name will never be used in association with your responses. Your expertise as an educator in secondary schools will help contribute to the body of knowledge in this field.

Please follow the link below to complete the survey. The survey should take approximately 15 minutes.

Follow this link to the Survey:
Take the Survey
Use Password: Bilingual

Or copy and paste the URL below into your internet browser:
https://usc.qualtrics.com/jfe/form/SV_1BbT3iWvmcQtkGN?Q_DL=42SdrpKJcKGOOB7_1BbT3iWvmcQtkGN_MLRP_4NNT7olUC1NWm6F&Q_CHL=email

Follow the link to opt out of future emails:
Click here to unsubscribe
EXPANDING BILINGUALISM AND BILITERACY WITH STUDENT-CENTERED CULTURALLY RELEVANT PEDAGOGY IN SECONDARY SCHOOLS: AN INNOVATION GAP ANALYSIS

You are invited to participate in a voluntary research study conducted by Jamie Lee* at the University of Southern California in the Global Executive Doctor of Education program. Please read through this form and ask any questions you might have before participating. If you have questions that need clarification about before deciding whether you want to participate, please feel free to ask before getting started.

PURPOSE OF THE STUDY
This research study aims to understand the degree to which students’ primary and secondary languages are developed within a pedagogy that is culturally relevant. The study incorporates an innovative gap analysis. An innovation study infers an area that is not currently employed, and it explores the present levels of understanding within the knowledge and motivation of stakeholders and organizational structures that impact the area of study. This study aims to discover knowledge, motivation, and organizational influences that would positively implement best practices in dual language acquisition at the secondary school level, enabling students to graduate ready to participate in a global economy and bilingual and bi-literate. From the data collected in this study, we hope to help improve bilingual and culturally relevant experiences for all students.

PARTICIPANT INVOLVEMENT
Your involvement is completely voluntary and is much appreciated about this area of study. If you do not want to answer a question or do not feel like you can adequately answer a question fully, you are invited to give as much information as you are able or are welcome to bypass the question. The survey should take approximately 15 minutes.

INCENTIVE FOR PARTICIPATION
By participating in the study, you are able to have your unique voice heard, which presents an opportunity for contribution to a significant body of knowledge in education locally, nationally, and internationally regarding these topics.

CONFIDENTIALITY
There will be no identifiable information used or shared in connection with this study, so your identity will remain anonymous. All data will be collected, transcribed, and secured on a secure password-protected computer program. At the completion of the study, the anonymous data may be used for future research studies regarding bilingual education, culturally relevant pedagogy, or a combination of the two. If you do not want your data used in future studies, you may elect not
to participate. Data collected will not be divulged to the district, nor will they receive any information about who participated or individual data collected.

The members of the research team and the University of Southern California’s Human Subjects Protection Program (HSPP) may access the data. The HSPP reviews and monitors research studies to protect the rights and welfare of research subjects.

Sincerely,
Jamie Lee*
USC Researcher and Doctor of Education Candidate

Please complete the survey below.

Q1 At which school do you currently work?
- Antimony High School (1)
- Indium High School (2)
- Titanium High School (3)
- Berkelium High School (4)
- Valley High School (5)

Q2 What is your current teaching assignment (Department, Course, Grade Level)?

<table>
<thead>
<tr>
<th>List the title of your department and course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current (1)</td>
</tr>
<tr>
<td>Previous (2)</td>
</tr>
<tr>
<td>Previous (3)</td>
</tr>
<tr>
<td>Department (1)</td>
</tr>
<tr>
<td>Course (2)</td>
</tr>
</tbody>
</table>

Q3 How many years have you taught in total?
- 0-2 (1)
- 3-5 (2)
- 6-8 (3)
- 9-11 (4)
- 12-14 (5)
- 15-17 (6)
- 18-20 (7)
- 21+ (8)
Q4 How many years have you been teaching at this site?
- 0-2 (1)
- 3-5 (2)
- 6-8 (3)
- 9-11 (4)
- 12-14 (5)
- 15-17 (6)
- 18-20 (7)
- 21+ (8)

Q5 Please self-identify your language proficiency in each language.

<table>
<thead>
<tr>
<th>Language</th>
<th>None (1)</th>
<th>Beginner Conversational (2)</th>
<th>Beginner Intermediate (3)</th>
<th>Intermediate (4)</th>
<th>Intermediate Advanced (5)</th>
<th>Advanced (6)</th>
<th>Native Speaker (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spanish (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>French (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portuguese (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tagalog (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mandarin Chinese (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Russian (6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arabic (7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>German (8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japanese (9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italian (10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English (11)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q6 Have you ever engaged in informal language learning? Please check which tools you have used.
- Duolingo (1)
- Rosetta Stone (2)
- Pimsleur (3)
- Dictionaries and Books (4)
- Picked it up from travel (5)
- Picked it up from family (6)
- Picked it up from co-workers (7)
- TV, Movies, and Music (8)
- Other _________________________
Q7 Have you ever received formal language instruction in a language other than English?

<table>
<thead>
<tr>
<th>Language</th>
<th>Formal Language Instruction?</th>
<th>What was the formal learning?</th>
<th>Program (i.e. High School, College, Adult School)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spanish (1)</td>
<td>◯</td>
<td>◯</td>
<td></td>
</tr>
<tr>
<td>French (2)</td>
<td>◯</td>
<td>◯</td>
<td></td>
</tr>
<tr>
<td>Portuguese (3)</td>
<td>◯</td>
<td>◯</td>
<td></td>
</tr>
<tr>
<td>Tagalog (4)</td>
<td>◯</td>
<td>◯</td>
<td></td>
</tr>
<tr>
<td>Mandarin Chinese (5)</td>
<td>◯</td>
<td>◯</td>
<td></td>
</tr>
<tr>
<td>Russian (6)</td>
<td>◯</td>
<td>◯</td>
<td></td>
</tr>
<tr>
<td>Arabic (7)</td>
<td>◯</td>
<td>◯</td>
<td></td>
</tr>
<tr>
<td>German (8)</td>
<td>◯</td>
<td>◯</td>
<td></td>
</tr>
<tr>
<td>Japanese (9)</td>
<td>◯</td>
<td>◯</td>
<td></td>
</tr>
<tr>
<td>Italian (10)</td>
<td>◯</td>
<td>◯</td>
<td></td>
</tr>
<tr>
<td>English (11)</td>
<td>◯</td>
<td>◯</td>
<td></td>
</tr>
</tbody>
</table>

Q8 I know methods for students to earn the California State Seal of Biliteracy (F).

<table>
<thead>
<tr>
<th>Level</th>
<th>0</th>
<th>1</th>
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Q9 I know what dual language acquisition pedagogy is (F).

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Q10 I know what culturally relevant or sustaining pedagogy is (F).

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Q11 My curriculum and materials address dual language learning (C).

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Q12 My curriculum and materials address culturally relevant instructional materials (C).

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Q13 I know how to plan lessons and units incorporating dual languages (P).

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Q14 I know how to plan lessons and units incorporating culturally relevant and sustaining pedagogy (P).

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Q15 I know how to deliver and facilitate student-led and student-centered dual language experiences (P).

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Q16 I regularly reflect on improving my teaching practice related to dual language learning (M).

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Q17 I regularly reflect on improving curriculum and instruction that is culturally relevant and sustaining toward building students’ capacities in value-added cultural learning (M).

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Q18 I am conscious of my biases of other ethnicities, languages, and cultures (M).

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Q19 I believe that bilingualism and biliteracy is an asset for students' cognitive development and academic achievement (B).

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Q20 I believe bilingualism and biliteracy are a priority for our students (B).

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Q21 I believe that students' native language is an asset for them and should be utilized in learning (B).

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Q22 Students' native language is an asset for them and should be utilized in learning (V).

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Q23 Teachers need to value students’ heritage languages and cultures in order to incorporate them into student-led instruction. (V)

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Q24 I feel confident in planning dual language instruction within my content classes (SE).

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Q25 I feel confident with incorporating culturally relevant strategies into my content area curriculum (SE).

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Q26 I feel confident with student-led language learning (SE).

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Q27 My lesson plans and pedagogy encourage mastery-based learning over performance (GO).

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Q28 Teachers need to align their instructional goals with the organizational goal and 21st century standards, which includes dual language learning and culturally relevant pedagogy (GO).

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Q29 I have sufficient materials and supplies for teaching dual languages within my content area (R).

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Q30 I have sufficient materials and supplies to provide culturally relevant and sustaining pedagogy (R).

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Q31 Our school culture embraces and celebrates bilingualism or multilingualism (CM).

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Q32 I have sufficient time and space to plan lessons that include dual language learning and that are culturally relevant (CS).

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Q33 My professional learning community has sufficient time and space to collaborate about improving curriculum and instruction for dual language learning and culturally relevant pedagogy (CS).

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Q34 Language teachers (English, Spanish, French, ASL) collaborate with core content teachers to discuss strategies for supporting bilingualism and biliteracy within each content area (CS).

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Q35 I have received or attended training that pertains to dual language learning across core content areas (T).

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Q36 I have received training that pertains to culturally relevant or sustaining pedagogy within my core content area (T).

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Q37 Policies and procedures help me to provide student-centered culturally relevant courses that lead to earning the Seal of Biliteracy (PP).

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Q38 Our policies align with the California bilingual education laws (PP).

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Thank you for participating in the survey!

INVESTIGATOR CONTACT INFORMATION
If you have any questions or concerns about the research, please feel free to contact Jamie Lee* at jamiemle@usc.edu* or (630) 202-4597*. The dissertation chairperson is Dr. Monique Datta of the University of Southern California; she can be reached at mdatta@usc.edu.

IRB CONTACT INFORMATION
If you have questions, concerns, or complaints about your rights as a research participant or the research in general and are unable to contact the research team, or if you want to talk to someone independent of the research team, please contact the University Park Institutional Review Board (UPIRB), 3720 South Flower Street #301, Los Angeles, CA 90089-0702, (213) 821-5272 or upirb@usc.edu.

*The name, email address, and phone number were replaced with Cathy Atwell, catwell@usc.edu, and (818) 723-3114 for Indium High School distribution because principal investigator is an administrator and supervisor at the site.
Section B: Secondary Bilingualism and Culturally Relevant Pedagogy Interview Protocol

Hi <Teacher>,

My name is Jamie Lee*, and I am a doctoral candidate in the Global Education Executive Doctoral Program at the Rossier School of Education at the University of Southern California in Los Angeles, California, USA.

You have been randomly selected among teachers in your content area within CPHSD to respond to a short interview and observation. Your participation is voluntary, and if you choose to participate, I would like to set up a time to conduct an interview with you regarding bilingualism, biliteracy, and culturally relevant pedagogy.

Your feedback through this interview will help to illuminate and develop understanding about language and culture in the classroom, shape potential future policies, support, or training, and provide insight for secondary schools domestically, in California and the United States, and internationally. Please answer the questions to the best of your knowledge, recollection, or feeling at the moment. Your identity will remain anonymous and pseudonyms will be used to protect identity.

The survey should take approximately 30 minutes. To thank you for participating in the interview, you will be rewarded with a $10 gift card for a select retail location. Please provide an address where the card can be mailed.

Attached is a Consent Form** for this process for your review. I will have a copy for you to sign at our interview. Please confirm your participation by replying via email or phone.

Email: jamiemle@usc.edu*
Phone: 630-202-4597*

Thank you!

*The name, email address, and phone number were replaced with Cathy Atwell, catwell@usc.edu, and (818) 723-3114 for Indium High School distribution because principal investigator is an administrator and supervisor at the site.

**Consent Form attached is included as Appendix C.
Demographics
School ____________________________________________________________
Department _________________________________________________________
Course(s) __________________________________________________________
Credential __________________________________________________________

Q1-Q12
1. Describe your understanding of culturally relevant pedagogy. (Factual, Conceptual)

2. All teachers are required to have completed English learner authorization with their single subject credential. Please describe your understanding of second language acquisition strategies. (Conceptual, Procedural)

3. What training have you received in second language learning, dual language learning, or culturally relevant pedagogy? (Training)

4. Do you feel equipped to meet the language and cultural learning instructional needs of your students within your content area? (Self-Efficacy, Cultural Setting, Resources)

5. In addition to your content standards, what other factors do you take into consideration when planning lessons? (Conceptual, Procedural)
6. Describe how you approach language (English or another) instruction within your curriculum. (Procedural, Beliefs, Values)

7. How do you acknowledge or capitalize on the assets or unique characteristics of your students within your instruction? (Procedural, Beliefs, Values, Cultural Model)

8. What barriers have you experienced in lesson planning for dual language acquisition or culturally relevant pedagogy? (Metacognitive, Cultural Setting, Resources, Training)

9. During and after you meet with your content area professional learning teams, what aspects of language learning do you reflect on? (Metacognitive, Goal-orientation, Cultural Model)

10. How can the organization better equip you for the language and learning instructional needs for the students you serve? (Cultural Setting, Training)
Section C: Secondary Bilingualism and Culturally Relevant Pedagogy Protocol

**Instructions:** After interview is complete, analyze the teachers’ responses regarding dual language and culturally relevant pedagogy.

| Dual or Second Language Acquisition: Teaching Methodologies (Kathryn Lindholm-Leary, 2015) | Evident
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<td>Students use native language</td>
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<td>Teacher facilitates or invites students to introduce native or heritage language</td>
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<td>Etymology explicitly taught</td>
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<td>Curriculum and materials provided in English and another language(s)</td>
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| Culturally Relevant Pedagogy: Academic Achievement (Powell, 2014) | Evident
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<tr>
<td>Academic language used in instruction</td>
<td></td>
</tr>
<tr>
<td>Academic language explicitly taught</td>
<td></td>
</tr>
<tr>
<td>Student-led instruction used</td>
<td></td>
</tr>
<tr>
<td>Student collaboration used</td>
<td></td>
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</table>

| Culturally Relevant Pedagogy: Cultural competence (Powell, 2014) | Evident
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Evident</strong> Yes or No</td>
<td></td>
</tr>
<tr>
<td>Cultural references of students represented</td>
<td></td>
</tr>
<tr>
<td>Content contextualized to students</td>
<td></td>
</tr>
<tr>
<td>Teacher shared control of the classroom with students</td>
<td></td>
</tr>
</tbody>
</table>

| Culturally Relevant Pedagogy: Sociopolitical consciousness (Powell, 2014) | Evident
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Evident</strong> Yes or No</td>
<td></td>
</tr>
<tr>
<td>References to elevate status of minority culture or language around the room</td>
<td></td>
</tr>
<tr>
<td>Students question the status quo</td>
<td></td>
</tr>
<tr>
<td>Students engage in real-world activity</td>
<td></td>
</tr>
<tr>
<td>Texts are deconstructed regarding ideologies and biases</td>
<td></td>
</tr>
</tbody>
</table>
Section D: Secondary Bilingualism and Culturally Relevant Pedagogy Document Analysis

District Professional Development Calendar and Agendas
1. What in-service professional development events address culturally relevant pedagogy?

2. What in-service professional development events address advancement of bilingualism or biliteracy?

3. Who participates in the in-service professional developments regarding culturally relevant pedagogy and bilingualism and biliteracy?

Board Policies
1. What Board Policies address inclusion of bilingualism or biliteracy?

2. How do the Board Policies address curriculum and instruction, if at all, regarding what is expected of teachers in regard to culturally relevant pedagogy or second language acquisition?

Student Performance Data
1. What themes emerge from the existing student performance data: CAASPP?

2. What themes emerge from the existing student performance data: AP language exams?

3. What themes emerge from the existing student performance data: ELPAC or CELDT scores?
EXPANDING BILINGUALISM AND BILITERACY WITH STUDENT-CENTERED CULTURALLY RELEVANT PEDAGOGY IN SECONDARY SCHOOLS: AN INNOVATION GAP ANALYSIS

You are invited to voluntarily participate in a research study interview conducted by Jamie Lee* at the University of Southern California. Please read through this form and ask any questions you might have before participating. If you have questions that need clarification before deciding whether you want to participate, please feel free to ask before getting started.

PURPOSE OF THE STUDY
This research study aims to understand the degree to which students’ primary and secondary languages are developed within a pedagogy that is culturally relevant. The study incorporates an innovative gap analysis. An innovation study infers an area that is not currently employed, and it explores the present levels of understanding within the knowledge and motivation of stakeholders and organizational structures that impact the area of study. This study aims to discover knowledge, motivation, and organizational influences that would positively implement best practices in dual language acquisition at the secondary school level, enabling students to graduate ready to participate in a global economy as bilingual and biliterate. From the data collected in this study, we hope to help improve bilingual and culturally relevant experiences for all students.

PARTICIPANT INVOLVEMENT
Your involvement is completely voluntary and is much appreciated about this area of study. If you agree to take part in this study, you will be asked to participate in a 10-question interview and a 10 to 20-minute observation within your own classroom. If you do not want to answer a question or do not feel like you can adequately answer a question fully, you are invited to give as much information as you are able or are welcome to bypass the question. By participating in the study, you are able to have your unique voice heard, which presents an opportunity for contribution to a significant body of knowledge in education locally, nationally, and internationally regarding these topics.

COMPENSATION FOR PARTICIPATION
You will receive a gift card immediately upon completion of participation in the interview and observation sequence. We know your time is valuable, and your assistance in my research is invaluable, which is why you will be compensated with a gift card.

CONFIDENTIALITY
There will be no identifiable information used or shared in connection with this study, so your identity will remain anonymous. All data will be collected, transcribed, and secured on a secure password-protected computer program. At the completion of the study, the anonymous data may
be used for future research studies regarding bilingual education, culturally relevant pedagogy, or a combination of the two. If you do not want your data used in future studies, you may elect not to participate. Data collected will not be divulged to the district, nor will they receive any information about who participated or individual data collected.

The members of the research team and the University of Southern California’s Human Subjects Protection Program (HSPP) may access the data. The HSPP reviews and monitors research studies to protect the rights and welfare of research subjects.

**INVESTIGATOR CONTACT INFORMATION**
If you have any questions or concerns about the research, please feel free to contact Jamie Lee at jamiemle@usc.edu* or (630) 202-4597*. The dissertation chairperson is Dr. Monique Datta of the University of Southern California; she can be reached at mdatta@usc.edu.

**IRB CONTACT INFORMATION**
If you have questions, concerns, or complaints about your rights as a research participant or the research in general and are unable to contact the research team, or if you want to talk to someone independent of the research team, please contact the University Park Institutional Review Board (UIPRB), 3720 South Flower Street #301, Los Angeles, CA 90089-0702, (213) 821-5272 or upirb@usc.edu.

*The name, email address, and phone number were replaced with Cathy Atwell, catwell@usc.edu, and (818) 723-3114 for Indium High School distribution because principal investigator is an administrator and supervisor at the site.*
APPENDIX D

Interview Knowledge, Motivation, and Organization Matrix

The following matrix was utilized to ensure the interview questions were addressing each element of the knowledge, motivation, and organization framework. Responses to the questions were categorized based on how they were addressed by the teachers. Some questions illuminated multiple layers of how a teacher possesses knowledge, motivation, or organization according to the topic of bilingualism, biliteracy, and culturally relevant pedagogy.

Table D

Knowledge, Motivation, and Organization within Interview Questions

<table>
<thead>
<tr>
<th>Interview Questions</th>
<th>Knowledge</th>
<th>Motivation</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F C P M B V GO SE CM CS PP R T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>x x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>x x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>x x x</td>
<td>x</td>
</tr>
<tr>
<td>5</td>
<td>x x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>x x x</td>
<td></td>
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</tr>
<tr>
<td>7</td>
<td>x x x</td>
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</tr>
<tr>
<td>8</td>
<td>x</td>
<td>x x x</td>
<td>x</td>
</tr>
<tr>
<td>9</td>
<td>x</td>
<td>x x x</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

(F) Factual; (C) Conceptual; (P) Procedural; (M) Metacognitive; (B) Beliefs; (V) Values; (G) Goal-Orientation; (SE) Self-Efficacy; (CM) Cultural Models; (CS) Cultural Setting; (PP) Policies and Procedures; (R) Resources; (T) Training
### Table E

*Countries Where English is the Primary Language (Sousa, 2017)*

<table>
<thead>
<tr>
<th>Countries Where English is the Primary Language</th>
<th>Total Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anguilla</td>
<td>13,452</td>
</tr>
<tr>
<td>Antigua and Barbuda</td>
<td>91,295</td>
</tr>
<tr>
<td>Australia</td>
<td>24,128,500</td>
</tr>
<tr>
<td>Bahamas</td>
<td>321,834</td>
</tr>
<tr>
<td>Barbados</td>
<td>277,821</td>
</tr>
<tr>
<td>Belize</td>
<td>368,310</td>
</tr>
<tr>
<td>British Indian Ocean Territory</td>
<td>3,000</td>
</tr>
<tr>
<td>British Virgin Islands</td>
<td>28,054</td>
</tr>
<tr>
<td>Canada</td>
<td>36,155,487</td>
</tr>
<tr>
<td>Cayman Islands</td>
<td>56,732</td>
</tr>
<tr>
<td>Dominica</td>
<td>72,324</td>
</tr>
<tr>
<td>Falkland Islands</td>
<td>2,932</td>
</tr>
<tr>
<td>Gibraltar</td>
<td>32,194</td>
</tr>
<tr>
<td>Grenada</td>
<td>109,590</td>
</tr>
<tr>
<td>Guam</td>
<td>161,785</td>
</tr>
<tr>
<td>Guernsey</td>
<td>65,849</td>
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<tr>
<td>Guyana</td>
<td>735,554</td>
</tr>
<tr>
<td>Ireland</td>
<td>4,635,400</td>
</tr>
<tr>
<td>Isle of Man</td>
<td>84,497</td>
</tr>
<tr>
<td>Jamaica</td>
<td>2,950,210</td>
</tr>
<tr>
<td>Jersey</td>
<td>100,080</td>
</tr>
<tr>
<td>Montserrat</td>
<td>4,900</td>
</tr>
<tr>
<td>Nauru</td>
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<tr>
<td>New Zealand</td>
<td>4,696,810</td>
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<tr>
<td>Philippines</td>
<td>102,635,000</td>
</tr>
<tr>
<td>Pitcairn</td>
<td>56</td>
</tr>
<tr>
<td>Saint Helena, Ascension and Tristan da Cunha</td>
<td>7,729</td>
</tr>
<tr>
<td>Saint Kitts and Nevis</td>
<td>54,961</td>
</tr>
<tr>
<td>Saint Vincent and the Grenadines</td>
<td>103,000</td>
</tr>
<tr>
<td>Singapore</td>
<td>5,535,000</td>
</tr>
<tr>
<td>South Georgia and the South Sandwich Islands</td>
<td>No Permanent Residents</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>1,349,667</td>
</tr>
<tr>
<td>Turks and Caicos</td>
<td>49,000</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>65,102,385</td>
</tr>
<tr>
<td>United States</td>
<td>323,625,762</td>
</tr>
</tbody>
</table>
## APPENDIX F

Table F

### Description of Teachers’ Language Learning Experiences

<table>
<thead>
<tr>
<th>Survey Measure</th>
<th>Item</th>
<th>Frequency</th>
<th>Percentage of Participants</th>
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<tr>
<td><strong>Language Proficiency:</strong> Spanish</td>
<td>Beginner Conversational</td>
<td>17</td>
<td>40.5</td>
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<tr>
<td></td>
<td>Beginner Intermediate</td>
<td>3</td>
<td>7.1</td>
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<tr>
<td></td>
<td>Intermediate</td>
<td>4</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>Intermediate Advanced</td>
<td>5</td>
<td>11.9</td>
</tr>
<tr>
<td></td>
<td>Advanced</td>
<td>1</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td>Native Speaker</td>
<td>2</td>
<td>4.8</td>
</tr>
<tr>
<td><strong>Language Proficiency:</strong> French</td>
<td>Beginner Conversational</td>
<td>4</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>Beginner Intermediate</td>
<td>2</td>
<td>4.8</td>
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<tr>
<td></td>
<td>Intermediate</td>
<td>2</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>Intermediate Advanced</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Advanced</td>
<td>2</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>Native Speaker</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Language Proficiency:</strong> Portuguese</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Beginner Intermediate</td>
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<tr>
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<tr>
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<td>Intermediate Advanced</td>
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<tr>
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<td>Advanced</td>
<td>0</td>
<td>0</td>
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<td></td>
<td>Native Speaker</td>
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<tr>
<td></td>
<td>Intermediate</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Intermediate Advanced</td>
<td>0</td>
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</tr>
<tr>
<td></td>
<td>Advanced</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Native Speaker</td>
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<tr>
<td><strong>Language Proficiency:</strong> Mandarin Chinese</td>
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</tr>
<tr>
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<td>2.4</td>
</tr>
<tr>
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</tr>
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</tr>
<tr>
<td></td>
<td>Advanced</td>
<td>0</td>
<td>0</td>
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<td>Native Speaker</td>
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<td></td>
<td>Beginner Intermediate</td>
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<td>7.1</td>
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<tr>
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<td>Native Speaker</td>
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<tr>
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<td>38</td>
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### APPENDIX G

Kirkpatrick Four Levels of Change

#### Table G

_Evaluation Instruments and Framework_

<table>
<thead>
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<th>Kirkpatrick Four Levels of Change</th>
<th>Assessing Knowledge and Skills</th>
<th>Assessing Learning Outcomes</th>
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<tr>
<td></td>
<td>Survey</td>
<td>Interview</td>
</tr>
<tr>
<td>Kirkpatrick Four Levels of Change</td>
<td>Close-ended Likert scale</td>
<td>Semi-structured interviews</td>
</tr>
<tr>
<td>Level 1: Reaction</td>
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<td>X</td>
</tr>
<tr>
<td>Level 2: Knowledge</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Level 3: Transfer</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Level 4: Impact</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Addressing Motivation and Engagement Through a Conceptual Model of Applied Gamification

Jon McFarland, Ed.D.
College of Education, California State University, Stanislaus, Turlock, CA, USA
jmcfarland1@csustan.edu

ABSTRACT
Gamification, or using game elements in non-game environments, is a growing trend in education used as a means of addressing issues with student demotivation and disengagement. Yet, the links between motivation and applied gamification have much to be explored in the literature. Furthermore, scholarly research on gamification lacks attention to its usage in secondary educational settings. This paper presents a brief literature review of gamification in relation to motivation theories as they are conceptually framed within applied gamification. The proposed model of applied gamification is an evolutionary result of a previous qualitative study in which ten secondary school teachers were interviewed on their uses of gamification methods in their high school curricula. Implications for educators of 21st century learners, the possible impact gamification can have for future secondary school leadership, and suggestions for future research are also provided.

Keywords
Applied gamification, Motivation, Engagement, Digital natives

Introduction
It is no surprise that motivation and engagement are two driving factors that significantly affect student success in school (Linnenbrink & Pintrich, 2002). The real conundrum for many high school educators today is finding different ways to disseminate their academic curricula that combats the growing demotivation and disengagement of 21st century learners. Several scholars and educational reformists have advocated for overhauling the antiquated and standardized-test-driven educational system in America by calling for open discussions on the transformative changes that need to be made if the upcoming generations of 21st century learners are to succeed in a highly competitive and globalized marketplace (Domenech, Sherman, & Brown, 2016; Vollmer, 2010; Zhao, 2009).

According to the game designer Jane McGonigal (2011), young people today will accumulate over 10,000 hours of digital stimulation through games before the age of 21. Known as digital natives, these young people do not know life or a world without technology (Prensky, 2001). While many educators and scholars alike are seeing a paradigm shift in the way that digital natives access, receive, and process information, we should not assume that these natives are somehow cognitively superior to digital immigrants, those of previous generations who were not born into a world surrounded by advanced technology stimuli. Many 21st century learners, who may be more adept with manipulating certain elements of technology as a way of life (e.g., online games and social media as central forms of social interaction) than their generational counterparts before them due to greater digital exposure, are subjected to an outdated educational system that continues to promote pedagogy that does not address the differentiated needs of today’s digital natives. This suggests that we educators are the ones who need to adapt to the growing needs of a generation who must compete in a global marketplace within the digital age.
Gamification offers possible solutions to issues of student demotivation and disengagement in an academic setting and with a scholastic curriculum. Gamification is a method of applying game elements to non-game contexts (Deterding, Dixon, Khaled, & Nacke, 2011a). Research is showing positive potential for increased engagement through heightened motivational stimuli (i.e., leaderboards, leveling up, point system, etc.) in fields such as exercise, healthcare, business, and education (Hamari, Koivisto, & Sarsa, 2014; Kapp, 2012a, 2012b; Zichermann & Cunningham, 2011). Applied gamification in educational settings has the potential to improve critical thinking and multi-tasking, as well as develop other important skills necessary for digital natives to be successful 21st century learners (Kapp, 2012b; Prensky, 2001; Shapiro, 2015a). However, gamification in education is a relatively new area of scholarly work with little written about its use in secondary education.

This paper attempts to fill a gap in scholarly literature by linking theoretical concepts of motivation and engagement within the context of applied gamification and by providing meaningful reasons for gamification application in secondary educational settings. To do so, I present a new conceptual Model of Applied Gamification since it is critical for educators to understand how these theories emerge through practical gamification use in order for them to implement future pedagogical change. Additionally, the proposed model attempts to categorically frame the stages of cognitive development one experiences when taking part in gamified activities. I offer a brief literature review of gamification, as well as theories of motivation leading to engagement as they relate to the educational experience, thereby laying the groundwork and context for the conceptual model. Furthermore, I offer implications of gamification usage in educational settings along with its impact on secondary educational leadership and future research.

**Review of the Literature**

With the positive aspects of gamification previously utilized in contemporary business models, it has made its way from the corporate and marketing arenas to the realm of education on an international level. Since its conceptualization, extensive research on gamification debating its contextual definition as it pertains to education continues to be explored (Deterding et al., 2011a; Erenli, 2013; Hamari et al., 2014; Teräs, Teräs, & Reiners, 2014). However, adopted for this study, Kapp (2012b) provided the most comprehensive definition that describes the elements of gamification and its purpose in education by stating, “Gamification is using game-based mechanics, aesthetics, and game-thinking to engage people, motivate action, promote learning, and solve problems” (p.10).

**Benefits & Challenges to Gamification**

Much of the scholarly work on gamifying education generally presents examples where gamification was either used in elementary or higher education as a motivator for improved student engagement, where best results were seen with middle-of-the-road students (Hamari et al., 2014). Some studies have been conducted where gamification served as the backbone to review such educational constructs as social gamification (Simões, Redondo, & Vilas, 2013), game thinking (Galetta, 2013), transformational play (Barab, Dodge, Ingram-Goble, Pettyjohn, Peppler, Volk, & Solomou, 2010), and rhetoric and composition (Sierra, 2013), all of which expressed positive feedback in the outcomes of student motivation and engagement.
While the outcomes of past research on gamification in education seem to promise positive results, criticisms of gamification have emerged. Much of the literature focuses on the theoretical utilization of gamification methods without offering data on its real-world application. Simões et al. (2013) made a call for further empirical research on the impact of game-based learning and the real effects gamification may have on student cognition. In comparing gamification and social networking, de-Marcos et al. (2010) suggested that a traditional e-learning approach was more effective in assessing knowledge than a gamified approach. Despite any challenges where researchers have criticized gamification, scholars expressed the need for further research as they recognized the positive effects gamification has on educational curricula (Bahji, Lefdaoui, & El Alami, 2013; de-Marcos, Domínguez, Saenz-de-Navarrete, & Pagés, 2014; Domínguez, Saenz-de-Navarrete, de-Marcos, Fernández-Sanz, Pagés, & Martínez-Herráiz, 2013).

Scholars continue to search for the validation of gamification and how the positive principles of gamified frameworks may be applied to education as possible alternatives to the traditional curriculum (Erenli, 2013; Hamari et al., 2014; McGonigal, 2011). From those who advocate the return to a more engaged school experience often encountered in early elementary education (Johnson, 2013), to those who promote higher order engagement through game concepts (Gee, 2003; Sheffield, 2005), the literature on gamification continues to explore the benefits of implementing gamified frameworks. Education has much to learn by viewing the design strategies of the video game industry in the development of successful games that continue to engage and motivate players through a recognizable reward system (e.g.) trophies, badges, experience points, and powers.

Theories of Motivation
Since one of the major premises of gamification in education is to “engage people [and] motivate action” (Kapp, 2012b, p. 10), it is justifiable to briefly discuss the literature of motivation leading to engagement as it relates to gamified methodology. To clarify how motivation leads to engagement and how both affect gamification, I looked to the theories of behaviorism, cognitivism, and self-determination.

Behaviorism has a longstanding base of research that focuses on the “prediction and control of behavior” (Watson, 1913), one which proposes that behavior can be initiated, trained, and controlled by various motivating factors. The emphasis of behavioral analysis in education is on physical and external outcomes of the learner rather than the cognitive or internal processes that result from motivation. Motivation can then be categorically divided into two different branches: extrinsic (behavioral) or intrinsic (cognitive), with motivation resulting from either different variables including inquisitiveness, perseverance, learning, and performative action (Vallerand, Pelletier, Blais, Briere, Senecal, & Vallieres, 1992). Gamified methods (i.e., badges, trophies, etc.) act as external stimuli meant to produce desirable behavior from the learner which spawns consequential action that leads to good or bad cognitive associations between motivational stimuli and learner behavior (e.g., points are awarded to students who participate regularly in class with the accumulation of points leading to awarded participation badges as reinforcement of good behavior within the class environment).

Conversely, the cognitivist approach is concerned with the individual’s mental processes, how one thinks and learns. With a focus on investigating individual intellect, cognitivists believe that
behavior cannot be completely comprehended without “a developmental perspective” (Upadhyay, 2011). Educational psychology promotes cognitive development in the classroom by recognizing that each student is unique and arrives in the educational environment at different cognitive developmental stages. Teachers’ understanding of their individual students in order to properly differentiate instruction is key to promoting motivational learning. Due to the nature of cognitivism, this theoretical approach to educational psychology concerns itself with intrinsic motivation. Vallerand et al. (1992) defined intrinsic motivation as “doing an activity for itself, and the pleasure and satisfaction derived from participation” (p. 1004). Value and effort are important factors in stimulating academic motivation. Value refers to the importance a student places on an activity, whereas effort denotes the time and energy a student invests in the activity. Students who are more intrinsically interested in the subject matter, will invest more time preparing assigned work in that content area without feeling like it is work once they have made a cognitive and purposeful connection to learning the subject matter.

Developed by Deci and Ryan (2011) self-determination theory (SDT) delves further into one’s motivation by assuming that people are “inherently active, intrinsically motivated, and oriented towards developing naturally through integrative processes” (p. 417). With regards to educating 21st century learners, the assertion that all students are intrinsically motivated may prove problematic as the traditional public-school curriculum and mandated state graduation requirements do not always afford high school students the choice of classes in which they are intrinsically interested. The authors continued by claiming, “These qualities need not be learned; they are inherent in human nature. Still, they develop over time, play a central role in learning, and are affected by social environments” (p. 417). Gamified frameworks assist the development of intrinsic motivation for students by establishing a meaningful and engaging social environment through which digital natives can explore, innovate, and create complex output (Zweirs, 2014).

Gamified methodology addresses both behavioral and cognitive aspects for 21st century learners by providing external motivators that help develop intrinsic motivation. Since gamification adopts the skeletal framework of video games, it too attends to the cognitive, emotional, and social needs of the student-player (Domínguez et al., 2013). Therefore, the social environment of the classroom and course can be set up in such a way that helps inspire the intrinsic motivation that may be lacking for students in the subject content. This does not refute Deci and Ryan’s (2011) claim that the qualities which make up SDT are not naturally occurring; however, a gamified course framework assists students in recognizing their motivation for cognitive development.

While motivation plays a key role for student engagement, it remains only one attribute affecting engagement. O’Brien and Toms (2008) investigated the use of several different theoretical approaches (i.e., aesthetics, play, and flow) to video games and educational applications in hopes of solidifying a comprehensive definition for engagement. Their research confirmed that prior literature linking play, flow, and aesthetic design to motivation are attributing factors to engagement (Csikszentmihalyi, 1990; Deterding, Björk, Nacke, Dixon, & Lawley, 2013; Deterding, Sicart, Nacke, O’Hara, & Dixon, 2011b). Many of the same qualities O’Brien and Toms (2008) used to define engagement such as visual appeal, pleasure, and challenging
interactivity, are also key factors that gamification methodology attempts to address with the education of digital natives.

**Methods**
I conducted a qualitative study including grounded theoretical elements with ten secondary school educators who were interviewed to better understand the teachers’ perspectives on their uses of gamification in a high school curriculum. The participants were chosen from a snowball sampling of a large public-school district in California and were selected for their use of gamification methods in their perspective curricula. The teacher-participants represented five different comprehensive schools within the district, all of which are Title I high schools and who work with a diverse population of students. All ten participants taught in different content areas including the Social Sciences, Business and Entrepreneurship, Marine Science, Biological Sciences, Special Education, and World Languages.

All interviews were initially transcribed and coded for general themes and commonalities. Close readings of interviews and teacher-generated documents led to subgroups within themes and the newly developed Model of Applied Gamification which attempts to categorize the different cognitive stages students experience while participating in gamified activities and frameworks. Additional data collected were in the forms of interviewer notes, photos, and teacher-generated documents and realia demonstrating gamification methods. The teacher-participants were given pseudonyms in this study to regard their confidentiality.

**Discussion**
For the purpose of this paper, the Model of Applied Gamification will serve as the main focus of the discussion as it links theory to the practice of gamification use in secondary schools. To better understand how gamification applies to the above theoretical influences, I provide a brief restructuring of the concepts of motivation theories discussed above within the context of an educationally gamified experience. I propose Figure 1 as a visual representation of this process.

**Figure 1: Model of Applied Gamification – The Development of Motivation & Student Engagement Through Academically Gamified Activities**
To begin, the teacher delivers or assigns an activity (or stimulus) in the form which can be expressed as a “quest” or “adventure.” Before any physical behavior takes place, the student experiences internal engagement or the mental drive to participate in the gamified activity that provides some motivational incentive to engage (i.e., a reward, points, or badge). Internal engagement is associated with a pre-evaluative state whereby the student decides whether or not the gamified activity has value and worth. This is represented in the perception formulation phase of the gamification model. While there are many factors associated with motivation as a cognitive process leading to physical engagement, research has shown that highly motivational teaching strategies and methods like gamification have a direct correlation to increased academic engagement and positive learning outcomes (Appleton, Christenson, Kim, & Reschly, 2006).

Nine of the ten participants in this study utilized incentivized points systems which students were aware of in advance, helping reinforce positive engagement. Many teacher-participants claimed an increase in student interactivity with assignments when situated within a gamified framework since students were cognizant of the upcoming rewards for their efforts. Tom, who taught Earth Science to freshmen and used both intrinsic and extrinsic motivators stated, “I think of how motivated they are in the game…They were motivated by the perk.” In her Marine Science classes, Breanne established a gamified Battleship-like activity for classroom management in which students competed against her to earn points for positive class behavior. She stated, “If they get more points than me for the day, they get to sink a piece of that ship. If they sink their whole ship within two weeks, they get a super awesome bonus day.”
One’s willingness to participate then leads to external engagement or the interactive phase. This refers to the physical participation in an activity that occurs after internal processing has taken place. Upon completion of the activity, students receive confirmation of the external motivator, referring to the reward or achievement (i.e., trophy, badge, points) for task completion. Zuckerman, Porac, Lathin, and Deci (1978) stated that “people need to feel competent and self-determining” (p. 443). External motivators can be used as a pedagogical method to entice students to make the initial attempt to feel competent with the subject matter content. Competency is never achieved if the activity is never attempted. Greater physical interactivity within the gamified framework may lead to increased comfort and a sense of self-determination with the academic curriculum. Mini-external motivators or compellers may also be distributed before the completion of the activity to initiate or compel student action in learners who are not quite convinced of the activity’s value (Gagné & Deci, 2005). The reciprocal exchange of rewards for task completion and collaborative learning among student-players as external motivators is validated as applied engagement within a gamified framework (Bayrak, 2009).

Several participants have mentioned the importance students place on competition with one another and among different classes. In Aric’s Business courses, he noted that “competition allows for better quality product.” While many of his course activities involved gamified simulations with practical application, Aric was able to involve local community businesses to adopt student ideas and incentivize project winners with real-world rewards (e.g., involving student groups on new entrepreneurial projects or earning monetary bonuses for logo designs on marketing campaigns). In Catherine’s Chemistry classes, students were more motivated by intangible rewards—the incentive of earning extra points on assessments. For her high-achieving students, competition was not amongst other students, but with themselves. She stated that “grades are incentives for them…it [the gamified activity] just seems more cut-throat when it’s a point for an exam or quiz.” As with many high-stakes games, the incentives of winning can compel players to engage with great focus and intensity.

Students may then experience a sense of inner elation or happiness factor, which refers to the contentment one feels after completing the task or receiving an external motivator (Nix, Ryan, Manly, & Deci, 1999). Students find contentment triggered by the external motivator as proof of the value and utility of the gamified activity, worthy of their effort (Ryan & Deci, 2000a; Wigfield & Eccles, 2000). In this phase, students make the positive association between reward and their external engagement. The reward is used as positive feedback for action that would not normally be associated with such activities outside the gamified framework such as homework (Cameron & Pierce, 1994). Research has shown that external rewards contingent on assessing high student performance offset teacher controlling behavior and the negative effects impeding intrinsic motivation (Deci, Koestner, & Ryan, 2001). An extended period of achievement over gamified challenges increases buy-in or acquiescence, and in turn, may lead students to experience flow (Csikszentmihalyi, 1990, 2013) and internalization. Internalization refers to the intrinsic motivation of the student-player, whereby the influential factors that promote student engagement are no longer externally motivating but internally satisfying (Cheong, n.d.; Gibson, Ostashewski, Flintoff, Grant, & Knight, 2013; Ryan & Deci, 2000b). Gamification offers choice to the academic curriculum that can foster a greater sense of competence with the subject matter, thereby enhancing "intrinsic motivation and performance" (Zuckerman et al., 1978, p. 443).
Getting students to see the value in doing homework continues to be an issue for many teachers which is where gamification can help educators gently persuade students to interact with their content, even when class is no longer in session. Aric found that using a gamified model based on the popular game *Clash of Clans* helped increase student production of assignments done outside of class when such products were communally tied to their own established groups or clans. He stated, “The clan that would earn the most points at the end of the week would earn different things based on that win…There was varying levels of excellence…The clans would then rank themselves based on which clans completed the most homework.” For Breanne, her gamified framework offered greater student agency when it came to the completion of homework and how students allocated their time. She stated, “If they want to do more work at home, they can. If they want to do all their work in class, they can. It’s their choice.” For both Aric and Breanne, students had to meet minimal requirements of work as previously indicated by their perspective gamified frameworks; however, the greater the engagement (e.g., with homework or extra credit assignments), the faster students were able to accelerate and earn greater rewards for their efforts.

While some researchers contest the congruity of extrinsic and intrinsic motivation (Deci et al., 2001; Deci & Ryan, 2011), there are scholars who counteract this notion. Extrinsic and intrinsic motivation are closely related as the former can lead to the latter. Rather than viewing the two types of motivation as oppositional, Hayamizu (1997) views them as "anchors of a continuous variable" (abstract). And, when choice is provided by external motivators, such as the reward system in established gamified frameworks, perceived intrinsic motivation increases (Ryan, 1982). In relation to this continuum of motivation leading to internalization within a gamified framework, three levels of increased cognitive recognition are identified: (1) The first stage is identified by higher levels of comfort with the content and structure of the gamified curriculum. Student-players develop a deeper understanding of the rules of engagement and ways to manipulate subject matter content for greater success in the game. Student-players may still struggle to understand the game-like curricular structure and remain somewhat timid about taking full advantage of the reward system the gamified framework has to offer; (2) In the second stage, self-confidence and assuredness increase as the acquisition of subject matter competence also increases through play and *hard fun* (McGonigal, 2011). Student-players’ comfort level may increase as the rules of engagement are fully realized. Teacher-inspired bonus play (i.e., extra credit) opportunities are explored with deeper interest, and creative expression that manipulates multiple intelligences is expressed; (3) In the third and final stage of the internalization phase, student-players may develop increased intrinsic motivation and a greater willingness to learn the subject content. Work no longer feels like work when subject content is framed within the context of a game (Csikszentmihalyi, 1990; Gee, 2010). Bonus play turns from teacher-inspired to student-inspired, and the complexity of student engagement increases. Acquiescence develops as internalization increases throughout the gamified educational experience. The students’ perception of the validity of the gamified framework, curriculum, or activity directly affects the internalization of student-players.

Teacher-participants in this study have shown that it is a combination of both intrinsic and extrinsic motivators that produce greater student production and increased engagement. Andrea realized this in her Spanish classes when she stated that “it's both that intrinsic and that physical thing together, but I can sell it to that person as what they need.” As previously mentioned, not
all high school students come into teachers’ classes intrinsically motivated by their subject matter. State and local principalities have established mandated curricula for the students in each district that does not necessarily comply with students’ choice of curricular content. Therefore, it is a continual struggle for teachers to find what motivates students, so that they may be successful in their courses. For Rick who teaches Advanced Placement U.S. History, he realized the power of student influence. When kids are actively engaged in academically challenged game play, word goes around, and they want to take part in that kind of learning. He stated, “…it’s because of the game [his gamified framework]. They’ve heard about the game, and they want to be a part of it. They want to do those things. They don’t just want to read a book and get all their information from that or just simply listen to a lecture. They want to do more than that.” Rick’s comment affirms why all teacher-participants of this study gamified their curricula—they wanted to bring purposeful fun back into the learning environment. Academically gamified frameworks centered around rigorous curricula are those which can produce statements like the example Sammy shared from a student in his Psychology class when he told him before leaving one day, “That was fun. That was interesting. Not only did I learn something, but it was a really exciting time.”

**Implications for 21st Century Educators & Educational Leadership**

To effectively address the needs of digital natives, teachers will need to rethink several different aspects of their pedagogical practices. They will need to develop various ways of delivery that target the modes of learning for all students in heterogeneous settings.

Differentiated instruction is not a new concept in 21st century curriculum and instructional development (Levy, 2008). It recognizes that all students do not learn the same way. They do not all share the same educational experiences, nor arrive in the classroom at the same cognitive level (Lawrence-Brown, 2004). Therefore, educators will need to modify teaching styles that provide sensory variation in disseminating information by manipulating multiple instructional modalities and intelligences (e.g., total physical response, hands-on learning, use of infographics and other manipulatives). Depending upon the needs of their student population, educators will need to assess the best methods of instruction that bifurcate from traditional lecturing including the Socratic method, problem method, small group work, and lab work (Atkins, Brown, & Brown, 2002; Hawkins-Leon, 1998).

The meaning of blended learning has often proven problematic; therefore, researchers found it necessary to develop a comprehensive explanation of blended learning over the past decade (Driscoll, 2002; Osguthorpe & Graham, 2003). Blended learning is a pedagogical approach that considers the influences of advanced technology and social media on 21st century learners and how exposure to a highly virtual and cyber-driven society has caused educators to realize the need to incorporate technology in the classroom. This approach encourages educators to utilize the benefits of both cyber and face-to-face environments to maximize learning (Osguthorpe & Graham, 2003).

Gamified frameworks embrace the innovation brought on by differentiated instruction and blended learning by nestling them within an environment of creative and instructional play. The changes educators make to developing their pedagogical approaches to instructing digital natives
will only better prepare students to “thrive in a rapidly evolving, technology-mediated world” (World Economic Forum, 2015) and develop needed 21st century skills for a global job market (Shapiro, 2015a, 2015b).

The implications concerning the utilization of gamification in a high school curriculum on educational leadership are multi-layered. Gameification offers the potential for great change in pedagogy, educational policy, and instructional reform. Therefore, further research is greatly needed on the study of gamification in the high school setting.

In all cases documented in this literature review and previous study, participants reported heightened student interactivity with greater motivation and engagement in and out of the classroom. If gamified frameworks are to be implemented more regularly among school faculty, such improved student activity may very likely lead to overall decreased failure rates. This in turn, betters school evaluation within the school district, leading to improved Academic Performance Index (API) and Academic Yearly Progress (AYP) reports. Next, innovative blended learning and differentiated instruction inspired by gamified frameworks can also be touted as beneficial to the overall school’s success with Western Association of Schools and Colleges (WASC) accreditation. Moreover, this can help validate school effectiveness in achieving progressive success with underrepresented student populations (i.e., foster youth, English Language Learners, and socioeconomically disadvantaged students).

Positive changes in one school would lead to a demand for more professional development in effective uses of gamification, variations in gamification methods, and tailoring gamification to fit one’s population. While teachers earn a greater understanding of how gamified methods can be used to increase motivation and engagement, educational leaders may see a greater demand for more technology use and better access for students during the school day. District leaders may find it obligatory to provide devices to underrepresented students or provide discounted Internet rates so that a larger number of the district’s student population has access to the online tools teachers use to gamify their curricula. Lastly, with district-wide acceptance of gamified methods and frameworks used for instruction, school and/or district policies may find themselves renovated to align with current trends.

**Conclusion & Further Research**

The scope of how gamification methods currently used in a high school curriculum offers great implications for the development of educational leadership and future research. With so little research done on the utilization of gamification in secondary education, this article allows for a greater understanding of how theories of motivation are framed within applied gamification in a high school setting, one that compliments the current literature by filling in gaps where scholarly research lacks in this area. With very little literature contributing to the perspectives of both educators and students alike on the implementation of gamified methodology, further academic inquiry in this area would greatly benefit the overall understanding of gamification usage in educational settings. It would be highly advantageous for future researchers to test the conceptual Model of Applied Gamification with different populations of students and within different educational contexts. Moreover, educators would significantly benefit from further scholarly research that focuses on the student perspective of how pedagogical frameworks that incorporate
gamification has affected student learning, motivation, and engagement with subject matter content. Finally, further research that addresses how educational leaders will need to continue the support of growing pedagogical trends like gamification for the academic success of digital natives will promote innovative educational leadership for the 21st century.
References


Teräs, H., Teräs, M., & Reiners, T. (2014). Giving virtual worlds a pedagogical boost with gamified authentic learning design. https://www.academia.edu/7463672/Giving_virtual_world_learning_a_pedagogical_boost_with_a_gamified_authentic_learning_design


Title: Addressing Workforce Needs and Boosting Enrollment in Community Colleges by Utilizing the Apprenticeship Model

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Abstract:
As the rapid pace of technological advances reshapes the global economy, the historic alignment between educational experiences and economic opportunity, credentials and careers, is being called into question. Individuals are left out of job opportunities by requirements for degrees they don’t have, or on-the-job experience they can’t get. Companies increasingly report that “the jobs are there, but the skills are not.”

Addressing this challenge in today’s economy may require applying lessons we learned decades ago: One of the best ways to succeed in the workplace is to combine education and training with learning — and mastering — skills on the job. Modern-day apprenticeships can do that for workers and employers. Community colleges, and other educational providers, can utilizing short-term and in-demand training programs and incorporate these into apprenticeships in a wide variety of industries.

Apprenticeships are a win-win-win for workers, employers, and colleges alike. Individuals get access to training in critical and relevant skills without the challenges of time and money that often accompany the pursuit of a degree. Employers benefit from higher productivity, increased retention rates, and a substantial return on investment. And colleges benefit from an increase in enrollment and gain a much better understanding of industry needs for their workforce development strategy. It’s a “grow-your-own” strategy that better aligns the needs of employers with the interests of the workforce and educational providers. Apprenticeships may have been around for centuries, but employers, educational providers, and policymakers alike are rediscovering their value in advancing the future of work.

This presentation will showcase Truckee Meadow Community College’s work on expanding apprenticeships throughout Nevada and becoming the largest apprenticeship intermediary in the state. With the award of an American Apprenticeship Initiative grant from the Department of Labor, TMCC developed several non-trade apprenticeship programs in partnership with local employers, specifically in healthcare and manufacturing, and increased enrollment at Truckee Meadows Community College by over 100 FTE in one semester. Additionally, these apprenticeship programs increased student diversity with over 80% coming from under-represented populations, including veterans and people with disabilities.
Transforming Early Childhood Education Through Culturally Sustaining Pedagogy

Early Childhood Education

Paper Session

My presentation will highlight how to effectively incorporate culturally sustaining pedagogy in an early childhood setting serving ages 0-5. I will introduce a framework that I developed which provides practical strategies early educators can implement into their learning environments immediately.

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Throughout the United States, low-income African American children have been identified among the majority of children without access to high-quality early education (Barnett, Carolan & Johns, 2013). Consequently, they lack the necessary skills to successfully navigate the schooling process (Wesley & Buysse, 2003). This lack of school readiness is only exacerbated by the dissonance between the school and home cultures of these students as it forces them to navigate between the cognitive and behavioral expectations necessary for academic success and the cultural values and beliefs of their families and neighborhoods. For many young children this may be both challenging and overwhelming especially in the absence of intentional transitional support between home culture and school culture, which makes the role of early educators so important. Early educators must be equipped with the necessary skills and knowledge to prepare students to succeed in mainstream culture while simultaneously affirming their home cultures (Ladson-Billings, 1995).

In acknowledgement of this need, I conducted an auto ethnography in which I highlighted my experiences as an administrator implementing culturally relevant teaching (CRT) into my predominantly African American early education program. In particular, I examine how I used CRT to foster both student and teacher engagement in an effort to enhance the quality of early care and education that we provided for the children and families. Additionally, I examined how CRT can be merged with the normalized predetermined criteria of quality as defined by developmentally appropriate practices in order to ensure that the cultural and developmental needs of all children are met.

Through this study I developed the Early Childhood Framework for Culturally Engaging Practices (ECCEP). This framework aligns with four guiding principles: 1) The fostering of a school culture of unity and respect, 2) The study of scholars whose cultures reflect those of the
teachers and students represented in the program, 3) An emphasis on school readiness through the reinforcement of essential academic skills such as emergent literacy and mathematics, 4) and the inclusion of character education. This framework served as the blueprint for effectively implementing culturally responsive pedagogy into the early childhood setting.

This study reflects on the insight I gained about developmentally appropriate practices and the implementation of culturally relevant teaching throughout the journey. Thus, I share my successes, my challenges, dilemmas, and epiphanies. I also provide suggestions for future research and highlight how the framework can be beneficial to multiple cultural backgrounds.
Title of Submission: Influences of research paradigmatic differences on the use of first-person pronouns in research articles in the field of information systems

Topic Area: ESL/TESL

Presentation Format: Paper Session

Description of Presentation:
We will report the results of analysis of how first-person pronouns (we, our, us) are used in research articles with two different paradigms in the field of information systems. A corpus of 40 articles taken from two of the major journals in the field of information systems was constructed. Frequencies, discourse functions and distribution patterns across the RA were investigated to reveal how paradigmatic differences influence the first-person usage in RAs.

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Abstract

Influences of research paradigmatic differences on the use of first-person pronouns in research articles in the field of information systems

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Tae ITO

First-person pronouns in research articles (RAs) function as a communication tool to construct the authorial identity while building a relationship with the readers. Confirming the increasing presence of this linguistic resource in academic writing, the emphasis in corpus-based research has shifted onto factors that influence the use of first-person pronouns in RAs. For instance, many cross-disciplinary studies have revealed that RAs from the soft disciplines tend to use first-person pronouns more frequently than RAs from the hard disciplines. Some researchers have observed different distribution of first-person pronouns across the article sections. Our past study found that English instructors in our country are not comfortable with using authorial pronouns in RAs due to their culture where collectivism and modesty are regarded important. Surprisingly, however, little attention has been given to another influential factor—paradigmatic/methodological differences in first-person pronoun use.

As a first step toward bridging the gap, we examined how different research methods (qualitative, quantitative, mixed approaches) would affect exclusive/inclusive first-person pronoun usage in the fields of TESOL and applied linguistics—the disciplines many EFL/ESL instructors are familiar with. Results showed that within each discipline, exclusive pronouns occurred more frequently in qualitative RAs than in quantitative RAs.

Partially replicating this research, the present study aims to investigate how two different paradigms (behavioral science and design science) influence the use of first-person pronouns in RAs in the field of information systems (IS). We chose this discipline for two reasons. First, IS covers a broad range of business or organization related areas, such as IT management, finance, accounting, marketing, design engineering, and social media, which many of our students are/will be involved in as their major or as part of their future work. Keeping up with the rhetorical conventions of this field certainly helps college EFL/ESL writing instructors in teaching ESP to
students with diverse academic and career goals.

Second, research on IS is generally characterized by two paradigms, behavioral science (BS) and design science (DS). BS paradigm with its root in natural science research methods aims at developing and verifying theories that explain or predict human or organization behavior, while DS paradigm with its roots in engineering aims at understanding and improving human and organizational capabilities by creating innovative artifacts. We believe together with the findings from our aforementioned study, exploring the two research paradigms in IS will further enhance our understanding of cross-methodological differences in the choice and function of first-person pronouns in RAs.

Our hypotheses are as follows: (1) Authors of both paradigmatic articles will employ first-person pronouns. (2) Because BS in IS derives from behavioral science (the soft discipline) and DS research deals with problems with engineering-based approaches (the hard discipline), BS RAs may have higher frequency than DS RAs, and we expect to observe differences in terms of their discourse functions and distribution across the article sections.

To test these hypotheses, we constructed a corpus of 40 RAs, taken from two major international IS journals, International Journal of Information Management and Decision Support Systems. The corpus consists of two sub-corpora with RAs of BS approach and DS approach. Using concordance software, AntConc, we first examined the frequencies of both exclusive and inclusive first-person pronouns and their distribution across different sections of the articles in each sub-corpus. We also analyzed each of the first-person pronouns detected to determine its communicative purpose. Finally, we compared the results of BS and DS corpora to see if paradigmatic differences have any bearing on the use of first-person pronouns in RAs in the field of information systems.

The results of our analysis showed that the frequency of exclusive first-person pronoun we, which refers to the authors themselves, was significantly higher in the BS corpora than in the DS corpora. In contrast, the frequency of inclusive first-person pronoun we, which refers to the authors and other people, was significantly higher in the DS corpora than in the BS corpora. Detailed analysis of discourse functions revealed that RAs with different paradigms adopted different argumentation, thus resulting in the different usage of first-person pronouns. The findings in our research point to the need for ESL/EFL writing instructors to be aware of differences in first-person usage in RAs with different research paradigms/methods within a field of study.

This work was supported by JSPS KAKENHI Grant Number 17K02898.
Mapping Our Way to Literacy

Early Childhood Education

Workshop

The presenter will provide a PowerPoint presentation describing how concept mapping can facilitate both teaching and learning in early childhood education. The many benefits of concept mapping, including visual-spatial and sequential learning, cognitive organization, clarification, conceptual relationship, and evaluation will be discussed. Further discussion will include the benefits of concept mapping with diverse learners.

Presenter: Dr. Sharon Vasser Darling

Dr. Sharon Vasser Darling
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Mapping Our Way to Literacy

Abstract

Dr. Sharon Vasser Darling – Marietta College

Concept mapping is instrumental in helping early childhood learners create explicit representations of implicit knowledge through visual-spatial learning. It provides a nonverbal venue for learners to communicate conceptual knowledge. By forming pictorial representations, early learners generate an interconnectedness of concepts that helps them problem-solve and make meaning. As a tool, concept mapping helps to explain ideas, identify what is important, and focus on patterns. As a problem-solving instrument, concept mapping encourages students to generate ideas and solutions when provided with organized information. The learner is able to make a relational connection of concepts and ideas that yields greater reflection and synthesizing. Concept mapping helps learners to synthesize information in a way that offers deeper connections. Offering a scaffolded approach, concept mapping enables learners to more fully activate and integrate prior knowledge with new knowledge. It provides a framework in which early learners can demonstrate cognitive organization, clarification, and conceptual relationship. Student-
centric, concept mapping is particularly helpful in promoting literacy for diverse learners and learner styles by providing a more holistic approach to conceptual learning. It is an instructional tool that accommodates differences in learners and learner styles. An inclusive methodology, concept mapping helps to foster partnership and collaboration. The teacher is able to be a facilitator of whole class, small group, and individual student conferences using concept mapping. It yields opportunity for modeling, comprehensible input, interaction, application, and evaluation. As a form of self-assessment, students using concept mapping are able to evaluate their textual understanding as they present information. Concept mapping further serves as a dynamic evaluative tool for educators that can be used to test conceptual validity. It can aid teachers in targeting student misconceptions and thereby serve as a valuable assessment tool to facilitate reteaching and opportunities for greater understanding. Concept mapping is profitable in any classroom when utilized effectively.
Title: Voices of students seeking bachelor’s degree of Social Welfare from Cyber University in Korea

Authors

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Abstract

Introduction

As hi-speed Internet has been widely provided, Cyber Universities become a great option for full-time workers who want to acquire social work degree and license in Korea. However, taking on-line classes is challenging as students should get used to on-line based discussion and exams as well as they should deal with feeling isolated. In recent years, students has expressed needs of face-to-face study groups and seminars in person; thus,
faculty members at Department of Social Welfare conducted a pilot study to address needs of face-to-face meetings and ways to meet the students’ needs.

Method

Researchers did three focus group interviews in 2017-2018 through student organizations and regional study groups. In each group, five to eight female interviewees were participated to approximately one-hour group interview. Participants spent at least one semester at the Department of Social Welfare and they were aged between 39 and 57.

Researchers conducted semi structured research asked three questions:
1. How did you feel about taking on-line classes during the first semester?
2. What is the most difficult thing while studying on-line?
3. What do you want from school?

Results

Students expressed feeling of isolation, frustration, and helplessness as they started schooling at Cyber University. Some students stated, at first, they felt that nobody helps them to successfully finish course works. Other students mentioned that they felt they were the only one who struggled with studying on-line. Thus, many students thought leaving school and/or taking time off especially at the first semester. In reality, many dropouts occur among those who just started their study. Thus, they started to find off-line meetings to obtain information about classes and exams. As they met senior students, colleagues, and faculty members in person, they said they were somewhat relieved and gradually earned know-hows of on-line study.

Students expressed necessity of off-line meetings, seminars, and classes while studying on-line. Especially, they were satisfied with regular regional study group meetings where they
were able to meet other students. At the meetings, they exchanged information about exams, field practice, and job market in their community. Also, they wanted more frequent off-line based seminars and classes.

Discussion

This study aims to explore needs of undergraduate students at Cyber University in Korea. While students felt isolated and frustrated, they seemed to be used to take on-line classes with help and support from their peers. They expressed great satisfaction on face-to-face meetings and seminars and wanted diverse off-line classes throughout the country. Based on the result, Department is planning to provide off-line seminars more regularly and trying to make firm ties among students through regional study group meetings.
A STEM Professional Development Workshop:

Finding “Patient Zero” by Building and Using Evidence-Based Mathematical Models

Workshop Topic Area: Cross-Disciplinary Areas of Education

Workshop Description:

Roll up your sleeves and perform as an actual scientist or engineer while studying an outbreak of a potentially deadly pathogen using mathematical data analysis and modeling. Participants will learn strategies being used in a rigorous and exciting after-school STEM initiative. This workshop will provide a variety of hands-on, inquiry and design mathematical instructional methods utilizing effective assessment strategies.

Presented by:

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Abstract

Roll up your sleeves and perform as an actual scientist or engineer while studying an outbreak of a potentially deadly pathogen using mathematical data analysis and modeling. Participants will learn strategies being used in a rigorous and exciting after-school science, technology, engineering, and mathematics (STEM) initiative. This workshop will provide a variety of hands-on, inquiry and design mathematical instructional methods utilizing effective assessment strategies.

Motivation

We were excited to collaborate with a diverse group of researchers, practitioners, curriculum developers, classroom instructors, and web developers whose passionate dedication to transforming the after-school learning environment drove them to develop and implement—in one year—a program worthy of sharing as a national model. Years of working with expert perspectives from a wide-range of STEM disciplines nurtured a new interdisciplinary space for rigorous dialogue which strengthened our collective capacity to design better STEM experiences for our students in and outside the classroom. The program was funded by the Defense Threat Reduction Agency--DTRA (www.dtra.mil/), developed and implemented by the National Center for the Advancement of STEM Education--nCASE (www.nacase.org) and evaluated by ProEvaluators, Inc. (www.proevaluators.com).

Introduction

This paper addresses the development and implementation of a unique, year-long STEM program recently completed in Virginia. The goal of the DTRA STEM Club Pilot Project was to introduce teachers and then students to the real-life work performed by the U.S. Department of Defense (DOD), but specifically by DTRA scientists and engineers (Subject-Matter Experts--SMEs), who defend this country and the world against various types of weapons of mass destruction.

The subject of this project was bio weapons. In the final product, teachers and students were given access to unique learning materials, supplies and software developed with the input of DTRA scientists and engineers, GLEAMviz scientists (www.GLEAMviz.org), on-line gaming developers, Bio-Rad Laboratory scientists (www.bio-rad.com), Science Center of Inquiry national trainers (www.thesciencecenter.org), PhysicsPharm national trainers, and nCASE national trainers and administrators. The rigorous, on-demand curriculum was made available via STEMonTV (www.stemon.tv) and Scriyb (https://scriyb.com). It demonstrated real-life DTRA STEM careers and emphasized their importance to the safety of the entire world.
Students were challenged to solve the outbreak of an unknown pathogen by locating “Patient Zero.” This involved detective work, logical thinking and understanding of mathematical principles that could lead to identifying a single patient from whom an epidemic originated.

nCASE Methodology

Extensive attention has been given to our nation’s critical need to produce more scientists and engineers (including those from underrepresented groups). To address this need, the program provides effective educational training and support services which include assessment, evaluation, use of DOD SMEs, and use of other mentors to directly impact our Pre-K-to-12 student population (inside and outside of the classroom). This collaboration promotes the development of a generation of creators and innovators. This delivery method introduces them to the knowledge required to enter the fields of STEM, thus strengthening our national security and empowering our country to maintain its place as a world leader.

Two prominent goals of the nCASE training programs are--improving students’ STEM skills and encouraging K-12 students to pursue STEM careers. We attempt to create a “research environment” in every STEM classroom where inquiry is the process used for students to actively learn new content and design is the process that allows students to assume the role of the scientist or engineer as they innovate and create solutions to specific problems. We incorporate hands-on, inquiry and design processes, augmented by simulation activities that can be virtually applied in the classroom. Students are guided to become creative thinkers and risk-takers who are able to work well in teams, both in the classroom setting and in the technological world. Ultimately, the hope is that these students will become active members of the workforce revitalization efforts who will contribute to their communities by solving relevant problems, designing innovative products, or mentoring other students toward successful STEM careers.

Project Specifics

The support system included a variety of mechanisms designed to ensure that the Prince William County (PWC) STEM Clubs in six pilot schools (grades 6-12) were able to use the new tools and techniques developed for this project. nCASE assistance included demonstration projects, simulation and module training, teacher and student content training, research opportunities, and ongoing on-line assistance using Scriyb.

The overall objective of the DTRA STEM Club Pilot Project was to align with and enable DOD Strategic goals and objectives to include workforce revitalization strategies. The STEM Clubs were created in part to educate students about future STEM careers, including those within DOD. Of the five learning components created, four and five were offered online:

1. Disease Detection/Surveillance
2. Information Systems/Capability Development
3. Advanced/Emerging Threats
4. Translational Medicine
5. Physical Sciences/Technology
These face-to-face and on-line instructional modules were designed to coordinate with the following overall nCASE/DTRA objectives:

- Improve the quality of STEM resources (i.e., mentors, supplies, hands-on and Internet-based activities) and simulated events by implementing research-based programs focused on knowledge, skills and abilities associated with STEM education
- Encourage STEM educators, including club leaders/advisors, to better understand STEM careers of the future by increasing and supporting volunteering of DOD SMEs in schools, labs and STEM events
- Expand the exposure of DOD-sponsored STEM education and outreach by engaging in opportunities that reach all populations, tailoring specific messages to underserved populations
- An evaluation team created a project evaluation plan, including the development and delivery of assessment instruments and appropriate statistical tests to evaluate the efficiency and effectiveness of each face-to-face and on-line club program. The team generated quarterly and end-of-program reports for the administrative leadership team.
These on-line modules were designed to coordinate with the following overall student learning objectives:

- Students will be able to recognize the five DTRA divisions and discuss how they are interrelated.
- Students will share their documentation and observations of cell behaviors and structures as an SME.
- Students will be able to solve ratio, proportion and scale problems.
- Students will be able to compare and contrast linear and exponential growth and decay.
- Students will be able to solve if/then statements and logic problems.
- Students will be able to solve probability problems.
- Students will be able to solve decay problems.
- Students will be able to describe the structure of a cell, including DNA, and explain how cell and viruses interact.
- Students will be able to understand the structure of the bacteria in relation to the protis and viruses.
- Students will be able to measure and predict the rate of growth of a virus.
- Students will be able to describe ways in which viruses are transmitted.
- Students will be able to design methods of stopping the expansion of the virus and countering mutant viruses.
- Students will be able to create a hypothetical virus for a positive purpose.
- Students will be able to identify Patient Zero.

**Session Focus**

Highlighted in this paper is mathematics from the modules with a focus on the transmission of a virus. Learning outcomes are designed to prepare students with the ability to establish the identity of Patient Zero, the primary goal of the culminating project challenge.

Through several activities, students learn about the attributes of mathematical functions through the use of multiple representations. The ability to model with mathematics is promoted using both inductive and deductive reasoning. The scientific inquiry process used in the activities is depicted in the work of Carin (Carin, Bass, & Contant, 2005), and our design process for the curriculum is a cyclic model adapted from Ball (2003). The design model depicts the relationship among the production of knowledge within students and the improvement of practice in STEM education. Movement within the cycle travels through the categories of Creating New Learning Materials and Teaching Methods, Engaging in Professional Development of Teachers, Implementing Educational Innovations into the Classroom, and Evaluating Using both Formative and Summative Methods. The importance of the cyclic model is that the interrelatedness assures that investments for improvement in one component contribute to the strengthening of all components. Figure 1 below depicts the formative assessment cycle used in this project.
Figure 1. The Four-Step Formative Assessment Design Cycle (FADC).

**Mathematical Objectives**

The overarching purpose of these activities, as a part of a coherently designed STEM offering, is to continue preparing students with the mathematical abilities needed to establish the identity of Patient Zero, the focus of the culminating project challenge. Mathematical objectives specific to these activities include the following. Students will:

- Compare and contrast various growth models to determine if they are linear, exponential, or other by using multiple representations of a function (equation, table, graph)
- Analyze a sequence of numbers to determine if the fit equation is quadratic
- Develop fit equations using analysis and inductive reasoning
- Make predictions using mathematical models
- Identify and represent triangular numbers as a “picture” and in a sequence
- Use an equation to calculate the sum of the first n integers

**Conclusion**

This collaborative educational outreach initiative trains, mentors and inspires teachers to guide students toward careers in STEM.

Our use of DOD laboratory scientists and engineers in the classroom supports promising practices containing STEM content that aligns with local, state Common Core State Standards, and the Next Generation Science Standards. This provides a learning community that partners industry experts with education experts to create an exciting, effective and relevant curriculum for students. According to the outside evaluators, there was qualitative evidence that participating students grew in their ability to gather information, put information in systematic order, develop new ways of thinking, work in a team, and were very interested in pursuing STEM careers.
References


Committee on STEM Education. (2013). *Federal science, technology, engineering, and mathematics (STEM) education 5-year strategic plan*. Wash., D.C.


The Myriad of Teaching: Examining the Attributes of Long-staying Teachers

Lecturer
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Abstract

Teaching is known as the second oldest and noblest profession in this world. Teachers are the key variables in influencing student’s lives. Choosing teaching as a career path involves several factors to be considered. Globalization has brought changes in the education system. There is a need to broaden teacher’s knowledge to become a useful tool in the globalized world. The purpose of the study is to identify and describe the key attributes of long staying teachers. Teachers played so many roles in the school causing some teachers to leave early in the teaching profession. Teachers are endowed with the big task of moulding student’s personality and character. This paper will examine the key attributes of teachers who stayed long in the teaching profession. The main goal of the paper is to find out some factors impacting teacher longevity. A case study method will be utilized to have a deeper understanding of the problem. Participants are chosen purposively based on the criteria. A face-to-face interview will be conducted to the participants using the structured questionnaire and structured questionnaire. A positive working environment is one of the key attributes in retaining quality teachers. The findings and result of the study can be of great help to the educators.

Keywords: Attributes; Educators; Globalization; Longevity
Round Table Discussion Abstract

Hawaii International Conference on Education

January 5-8, 2019

Betty Ann Rember

Roundtable Discussion Abstract for: Everybody Out of the Boat?

Topic Area: Teacher Education

Keywords: Student teaching, co-teaching model, teacher shortages

Learning Objectives

Participants will be able to:

1) Discuss the impact of the teacher shortage on the student teaching experience.
2) Identify possible solutions to the conflict between the co-teaching model for student teaching and the movement toward paid internships for student teachers as a way to ease the shortage burden.

Abstract Details:

Research on best practices has guided most teacher education programs to move away from the traditional “sink or swim” student teaching model to a co-teaching model with the mentor/cooperating teacher. As opposed to the traditional student teaching experience, there is no “take over” time for the student. Instead the student’s responsibilities increase gradually until the two are sharing instructional time equally. Student teachers see effective teaching modeled every day of their experience. Having that time with a master teacher modeling effective teaching is clearly an advantage to a teacher candidate. (Highlights of this research will be shared.)

Enter—Teacher Shortages. Education students in California (and other states) are being lured away from their programs as early as their Sophomore year to fill empty classrooms. In the wake of pressure from districts struggling to find teachers to hire, Utah passed a rule making anyone with a 4-year degree (in any subject) qualified to be a teacher through an alternative route to licensing. Illinois has a bill before its congress to lower entrance requirements for college students to get in to a teacher education program hoping to get more candidates.

Immediate Results—Students are being “thrown out of the boat” regardless of what research shows. Paid Internships are becoming the more popular (and even student-expected) student teaching experience. Districts are competing for interns with higher pay, more benefits, offering scholarships, even free housing.

Is this what is best for the future of education?

Participants can share what is happening in their immediate area and/or state. We will discuss how the proposed answers to the teacher shortage conflict with what we know about preparing qualified, effective teachers for our nation’s classrooms. We will also brainstorm possible solutions, even partial solutions, to fully preparing teacher candidates in the “wake” of the pressure from “drowning” districts.

Put on your life jackets! Let’s, everybody, Get back on the boat!
1. Title of submission: Service-Learning Courses: Enjoyment, Engagement, and Entitlement in Emerging Adults
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6. Abstract:
   This research project is a work-in-progress and I would like to get feedback from others in higher education who may be able to provide it. According to George D. Kuh, service-learning is a high-impact educational practice. These activities have been shown to benefit college students from many backgrounds. I have always been an advocate of service-learning courses and try to incorporate community partnerships in as many courses as possible. Since starting at my current position, I have taught over 75% of my courses as service-learning courses and have collected data from the students in these courses. In this survey, there are many questions about students’ previous experience with service-learning as well as what they thought of the current course and project and service-learning in general. I also try to evaluate whether students believe that service-learning is beneficial to the campus and community partners and whether they believe that they learn more from such experiences. There are questions related to where they are in terms of development on the Inventory of the Dimensions of Emerging Adulthood (IDEA) and questions related to materialism, entitlement, and other values-related inventories. This research will also help to determine what types of students tend to be more engaged and interested in such experiences both from a developmental and values perspective. One of my primary goals is to contribute to the research in the area of service-learning. There are many definitions of service-learning and several peer-reviewed publications dedicated to service-learning however, there is still a lack of research in this area overall and much of the research is exploratory in nature. I believe that there will be some interesting findings in my research and am hopeful to contribute valuable information in the form of peer-reviewed publications related to this topic.
A Novel Assignment: Digital Book Club Spans Courses and Increases Understanding for Education Assistants in Training

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Abstract

This innovative online story based assignment spans two courses in a rural College curriculum designed to develop understanding and empathy among future Education Assistants.

Students choose from four novels and join a digital book club. Weekly discussions allow for in-depth exploration of sensitive issues and the development of a creative capstone project shared with local school districts and showcased with the author attending and offering feedback. Forms for the final project vary... from the development of a social media post from the perspective of one of the characters, a movie trailer for the book, a letter to the characters or to the author or some other creative presentation.

The titles address Autism Spectrum Disorder (Fragile Bones), Fetal Alcohol Spectrum Disorder (A Time to Run), Down Syndrome (Born With) and Brain Injury (Bent Not Broken). The four novels use an alternating chapter format, told in their two voices, and highlighting lived experiences of teens. The novels explore the relationship between the teens as each learns to see the world in surprisingly different ways.

Our students in the Education Assistant and Community Support Worker Program come to understand the characters and explore perspectives through two different additional contextual lenses with the two classes for which the assignment offers 30% of their grade. Classroom Support Strategies perspectives offer a glimpse into strategies and approaches used
with varying circumstances in school contexts. Foundations of Practice focuses more on the philosophy, value base, language and etiology of the four types of differences addressed in Lorna Nicholson’s award winning novels.

Many of our students choose to read all four of the books, as a result of their readability and the relevance of the message they communicate. The poster session will share assignment details, mechanics, student perspectives and opportunities to connect with both instructors and the author.
Title of submission: "Reading to Succeed: An Examination of Interests and Motivations of Struggling Pre-Adolescent Readers"

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Abstract

As students’ progress academically and are faced with more complex texts, there becomes a growing disparity between struggling readers and students who develop on a typical trajectory, producing a performance gap between successful and underachieving students (Honig, Diamond, & Gutlohn, 2013). Struggling readers often lack motivation due to learned helplessness and low self-efficacy, which results in difficulties in the classroom (Casey, 2008 and Paige, 2011). Most struggling readers would be willing to read more if given their preferred reading materials on their reading level; specifically, interesting reading materials were the main component behind students’ reading motivation. However, despite this conclusion, there is often a discrepancy between what students prefer to read, what is age and reading ability appropriate, and the available materials in a classroom (Broaddus & Ivey, 2002).

Previous research studies examine the centrality of interest to the motivation of students; however, there is a lack of research regarding the influence of interesting reading materials on the motivation of struggling pre-adolescent readers who are 2-3 grade levels below their peers. Particularly, not only is there a lack of research regarding the efficacy of interesting materials, but also there is a scarcity of interesting reading materials for these struggling readers that are written on their reading level and correspond to their interests. This study investigated the impact of interest-centered leveled readers on the motivation, engagement, and interest in reading of struggling fourth and fifth grade readers. Through pre-surveys, the creation of leveled readers catered around student interest, implementation of interesting reading materials in intervention sessions, and post-surveys, the engagement and motivation of struggling fourth and fifth grade readers were analyzed. The data from this study will show the necessity of interesting reading materials for this population of students to inform book publishers and pedagogical practices for reading intervention sessions. This research project recognizes the impact of high-interest low-readability leveled readers on the engagement of struggling fourth and fifth grade students in reading intervention sessions and after-school tutoring programs. Moreover, this research will show the benefits of student input in the writing and publishing process for classroom reading materials. The collected
Evidence will be used to provide suggestions to school systems regarding pedagogical practices in reading instruction for struggling readers, as well as, provide evidence to publishing companies of the importance of publishing high-interest low-readability leveled readers.

Works Cited


Title of the submission.

SPECTRUM Lifespan Autism Resources and Training: an exciting and innovative online course consisting of 12 modules that cover the landscape of ASD using a story-based multimedia approach.

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Abstract

SPECTRUM: Lifespan Autism Resources & Training is an exciting, innovative and flexible online course, developed collaboratively with stakeholders from across the Columbia Basin. Almost four years in the making, it offers perspectives about Autism Spectrum Disorder (ASD) across the lifespan, using a story-based multimedia approach.

Lessons are presented through video interviews and real-life case example stories that elaborate on the content while bringing information and insights into context. By using real-world conversations with individuals and professionals, the curriculum is grounded in the community.

SPECTRUM uses illustrated stories about fictional characters to make stronger connections for students as they gain perspective on sensitive topics like neurodiversity, diagnosis, education, parenting, independence, transitions and use of language – all in the context of Autism throughout the lifespan.

Built within Moodle – but not limited by it – SPECTRUM is designed to appeal and cater to a broad variety of learners. All video is closed captioned and images have alt-tags to
be read by screen reading software. Support is available for students to install and use browser plug-ins for text-to-speech capability.

Selkirk’s Lightboard – a glass chalkboard that allows the presenter to face the audience while writing in what appears to be the air – was built to be used for the introductions for each lesson and instructional content videos. Accessibility is not just reflected in the technology, however. The course is offered with monthly intakes and can be completed at the student’s own pace. SPECTRUM’s appeal is summed up in this testimonial:

“Wow. I am just floored by this Spectrum course...I feel really grateful to be learning such important information. The flavour of your course really reminds me of Jean Vanier's approach with people who are different - that we are all human and being a good human means respecting and helping one another as best we can.”
1. **Title:** Practical Study of Media Literacy Education using Life Insurance as a Teaching Material

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6. **Abstract**

   **Introduction:** When choosing life insurance, consumers receive lots of “information.” However, in recent years, we have been subject to “information overload,” and thus, in some instances, we receive incorrect information. Consumer education aimed at nurturing the media literacy of college students is being used to prevent distraction by too much, and sometimes erroneous or misleading, “information.”

   Media literacy is the ability to objectively understand the contents of various media texts from among competing sources, and to extract and utilize necessary information. By nurturing this skill, it is possible to acquire an appropriate, discerning attitude as a consumer.

   Therefore, in this research, we aim to develop and implement practical programs of media literacy education geared to nurturing the ability to read and understand information of college students as subjects and analyze the results of that implementation.

   **Methods:** To achieve the purpose of the study, we conducted the research in three steps.

   (1) Development of lesson program

   This step involved the preparation of teaching materials and lesson programs on the basis of the educational training of media literacy which in turn would nurture the “ability to read and understand information” with specific reference to life insurance advertising.

   Specifically, we decided to prepare “educational materials that replicated insurance company leaflets” (Fig.1) and use it as a lesson program. In addition to activities that allow students to select life insurance policies that they think are necessary for themselves in their present situation, we let
them choose the life insurance that they think will be necessary for “them 20 years later” and then allow them to discuss their reasoning for this choice with the group.

Fig. 1 Educational material that imagines insurance company’s leaflet

(2) Implementation of lesson program

Practice with university students using the developed lesson program. For desirable college students, we target students of the faculties of Education, who are considering future school education.

(3) Evaluation of the lesson program

We conducted a questionnaire survey of the university students before and after the implementation of the lesson program, analyzed the results obtained there, and examined the effects.

**Results:** Table 1 presents the results of a questionnaire survey conducted on a five-point scale. The questions were the following:

- “Do you have the confidence to critically read life insurance information in advertisements?”
- “Are you interested in life insurance?”
- “Do you think that it is important to learn how to critically read life insurance advertising at university?”

These would indicate that the university students recognized the significance of acquiring life insurance information and its general importance. Possibly, the awareness of the relation between life insurance and my individual life and therefore the importance of preparation was also deepened.
### Table 1 Pre- and post-implementation comparison (n = 67)

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Post</th>
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<tbody>
<tr>
<td><strong>Confidence to read information</strong></td>
<td>1.91</td>
<td>3.64</td>
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<tr>
<td>(0.83)</td>
<td>(1.03)</td>
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<tr>
<td><strong>Interest in life insurance</strong></td>
<td>3.25</td>
<td>3.85</td>
</tr>
<tr>
<td>(1.22)</td>
<td>(0.94)</td>
<td></td>
</tr>
<tr>
<td><strong>Necessity to study life insurance at university</strong></td>
<td>3.90</td>
<td>4.73</td>
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<td>(1.00)</td>
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**p < 0.01, *p < 0.05, ( ) SD

**Conclusion:** The following three points can be cited as the main research outcomes received via this research project. First, we developed a lesson program for college students on the basis of life insurance. The effectiveness of the lesson program developed in this research was verified by a questionnaire survey both before and after the lesson.

Second, the university students’ image and understanding about life insurance was clarified. This particular outcome is considered an effective reason for developing future insurance and media literacy lessons.

Third, the possibility of using life insurance as an example for media literacy learning materials was clarified. In this study, it was clear that the subject of life insurance as a theme for college students’ media literacy education was the ability to recognize the importance of learning self-confidence in critical reading for information extraction. In future, school education utilizing the theme of life insurance is expected, in not only media literacy education but also curriculum education.

Comment [Editor1]: Remark: Please check if this edited part retains the intended meaning.
1. **Title:** Online Accounting Education for Nontraditional Learners

Description: In the current economic climate, accounting for a second career looks promising with the job outlook surpassing the average for all occupations according to Bureau of Labor Statistics. Obtaining quality education is a first step for the career switching, nontraditional learners to prepare for a successful transition to accounting careers. This paper discusses teaching strategies and ongoing efforts needed to support nontraditional learners to achieve successful academic outcomes in online accounting education.

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6. **Abstract:** As people live longer and the environment they live in constantly evolves and changes, increasingly more people are changing careers during their lifetime. According to the Bureau of Labor Statistics National Longitudinal Survey, people born from 1957 to 1964 held an average of 11.9 jobs from ages 18 to 50. The careers people chose when they were 18 rarely last them for the rest of their lives. Easier access to learning with aid of technological advances, people are coming back to school to acquire professional knowledge and skills needed for a new profession. Nontraditional learners, generally characterized as adult learners being over the age of 24, are outpacing the traditional college students and are setting a new trend of the majority at colleges and universities. Older and more experienced in life, adult learners are internally motivated to learn with specific goals in mind; they are interested in learning subjects that have immediate relevance and impact to their job or personal life. In the current economic climate, accounting for a second career looks promising. Job outlook, reported by Bureau of Labor Statistics, projects a 10% growth from 2016 to 2026, and it surpasses the average for all occupations. It was further reported that as the economy grows, more accountants would be needed to offer financial services. Obtaining quality education is a first step for the career switching, nontraditional learners to prepare for a successful transition to accounting careers. Learning online, however, poses challenges to adult learners with learning curves associated with the technology used in classrooms. Navigating the new online learning environment and adjusting to new teaching methods with technology may be overwhelming for those who have been away from school for a prolonged period of time. It is important for educators to recognize and support adult learners’ various needs to help them make smooth transitions to the learning environment. Institutional support including academic advice, career services, and faculty mentor could ease the initial difficulty; a well-designed course with teaching strategies focusing on student engagement and interaction delivered with sound technology will be sure to bring success to both faculty and students. This presentation
discusses teaching strategies and ongoing efforts needed to support nontraditional learners to achieve successful academic outcomes in online accounting education.

References


NLS FAQs (no date). Available at: https://www.bls.gov/nls/nlsfaqs.htm#anch41.

Nontraditional Undergraduates / Definitions and Data (no date). Available at: https://nces.ed.gov/pubs/web/97578e.asp.

Online Report Card - Tracking Online Education in the United States, 2015 (no date) OLC. Available at: https://onlinelearningconsortium.org/read/online-report-card-tracking-online-education-united-states-2015/


Building Learning Organizations: Emulating Business Organizational Structures in Academic Environments

Educational Administration

Paper Session

Administering academic institutions by adhering to common business principles and organizational structures can provide a template for effective leadership and management practices. Applying these corporate ideologies in academic environments offers a roadmap for effective learning outcomes and positive pedagogical institutional paradigms.

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Abstract: This paper will explore the underlying concepts and foundations upon which to build effective learning organizations, principally through emulation of corporate organizational structures. Business modeling applied to learning organizations can yield effective academic and administrative reporting structures, curriculum design and classroom teaching paradigms. By examining corporate industry strictures in terms of academic learning, a case analysis uncovers learning disabilities through system archetypes. Consequently, recommendations for a corrective action plan can initiate academic solvency and positive learning outcomes. This specific educative stratagem will apply Peter Senge’s five “Disciplines” as curative remediation. A final review applies a personal mastery plan to the organization that will employ a declaration of purpose, mission statement and sustaining vision for enduring and maintainable success.

Keywords: Building Learning Organizations, Personal Mastery Plan, Peter Senge, Academic Structuring

Introduction
Academic institutions and business organizations alike can stifle growth and inhibit positive change. By succumbing to common disabilities that invasively plague inert companies, academic institutions may also passively allow internal infirmities to riddle and ultimately incapacitate their organization from thriving. Identifying and addressing debilitating inefficiencies are only initial steps in rectifying an academic institutions’ deficiencies and forging a counteractive blueprint for achievement. Explicit recommendations and thorough planning are integral to gauge accomplishments and attain scholastic success. Therefore, unremitting sustainability for any business organization is only possible with a clear and unobstructed statement of purpose and persisting vision for the company’s future. Likewise, any learning organization’s mission statement should focus on measurable goals and institutional growth. Whereas a corporation should be client-centric, an academic institution must also craft their own mission around their student constituency. A vision statement is similarly integral to maintaining a concentrated trajectory that affirms dedication to student learning while also advancing its pedagogical reach. Senge (2006) maintains that the “art of systems thinking lies in seeing through the detail complexity of the underlying structures generating change” (p.124). This systematic thinking is an attribute of successful business leadership whereby upper management and institutional leaders chart a course for the company by identifying business trends, institutional patterns and industry development. For an academic institution to successfully engage shifting student populations, they must, as Senge (2006) affirms, “…make the shift from seeing the world primarily from a linear perspective to seeing and acting systematically” (p. 125). Instituting systematic thinking into curriculum building fuses student engagement with academic organization. Forecasting for this evolution involves primarily identifying the limitations and “disabilities” that stifle an academic institution and cause it to disengage with its primary “client,” the student. Thus, identifying these limitations and obstacles must be the initial first steps in curative remediation. These institutional confines are analogous in both business and academia. This study will assess organizational confines inclusive of both paradigms and then recognize a path to rectify these impediments to organizational success and institutional development.

Analysis
Learning disabilities evident in academic institutions are often reflexive of weak leadership. Consequently, weak leadership causes ineffective administrative management and yields dogmatic institutional policies which bear archaic teaching models. This in turn results in disaffected faculty and ultimately, reveals a disengaged student body. “A reinforcing (amplifying) process,” as Senge (2006) states, “is set in motion to produce a desired result. It creates a spiral of success but also creates inadvertent secondary effects (manifested in a balancing process) which eventually slow down the success (p. 94). Successful leadership promotes effective management.
Effective management achieves measurable benchmarks through staff participation. Staff participation facilitates best practices for positive faculty instruction. Positive faculty instruction engages student active participation. Active student participation promotes receptive learning.

Meadows (2008) states, “To be a highly functional system, hierarchy must balance the welfare, freedoms, and responsibilities of the subsystems and total system—there must be enough central control to achieve coordination toward the large-system goal, and enough autonomy to keep all subsystems flourishing, functioning, and self-organizing” (p. 85). She goes on to say, “Resilience, self-organization, and hierarchy are three of the reasons dynamic systems can work so well. Promoting or managing for these properties of a system can improve its ability to function well over the long term—to be sustainable” (Meadows, 2008. p. 85). Academic institutions must be aware when crafting their own internal structural systems that leadership teams and managers are inclusive of existing subsystems and hierarchical structures within the organization.

In corporations when there is a lack of new product development or profits languish, participant constituencies can, as Senge (2006) asserts, “shift the burden” (103). Senge (2006) goes on to explain, that “The underlying problem grows worse…and the system loses whatever abilities it had to solve the underlying problem” (103). In this way, companies are stymied with an anathetic work force and “eroding goals” (Senge, 2006. P. 107). Senge (2006) warns, “Whenever there is a gap between our goals and our current situation there are two sets of pressures: to improve the situation and to lower our goals” (p. 107). This model plays out in academia as well. “Improving the situation” and “lowering goals” can be diametrically opposing objectives. Thus, a lack of real purpose and a muddled vision couples with inefficiencies in both time and purpose.

Results and Discussion
Senge’s (2006) “Five Disciplines” establish a substantive foundation upon which to formulate an actionable method for academic “systems thinking.” “Systems thinking,” according to Senge (2006), “…is a discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static ‘snapshots’” (p. 68). This shift of thinking is of primary importance if there is any desire to rectify a downward trajectory in teaching effectiveness. Because there is in its genesis a pattern of behaviors and not just individual exclusive events, an academic organization is best served to conceptualize the “mezzanine view” of its state of affairs, both leading up to its current state as well as where this trajectory will likely end up. In this sense, “Systems Thinking” is the “conceptual cornerstone that underlies all of the five learning disciplines,” and thus pertinent to address first and foremost (Senge, 2006. p. 69). Senge (2006) goes on to say, “Without systems thinking, there is neither the incentive nor the means to integrate the learning disciplines once they have come into practice” (p. 69).

Remaining cognizant of changing patterns and emerging trends, whether positive or detrimental, is central to preparing for change and tracking effectiveness of corrective measures. This self-awareness of over-arching principles, policies and practices is the essences of “seeing wholes” as a means to “learn how to foster health” (Senge, 2006. p. 69). Senge (2006) calls this awareness “seeing circles of causality” (p. 73). “If we want to see systemwide interrelationships, we need a language of interrelationships, a language made up of circles” (Senge, 2006. p. 73). In practice, an academic institution as an entity must simply be aware of the parts as well as the sum of those parts, both in administrative dealings as well as in operational acuity. Specifically, it is not solely the business outcomes or transactions, but also the mental causality precipitating those behaviors, decisions and responsibilities of the subsystems and total system—there must be enough central control to achieve coordination toward the large-system goal, and enough autonomy to keep all subsystems flourishing, functioning, and self-organizing” (p. 85). She goes on to say, “Resilience, self-organization, and hierarchy are three of the reasons dynamic systems can work so well. Promoting or managing for these properties of a system can improve its ability to function well over the long term—to be sustainable” (Meadows, 2008. p. 85). Academic institutions must be aware when crafting their own internal structural systems that leadership teams and managers are inclusive of existing subsystems and hierarchical structures within the organization.

“Personal Mastery,” as Senge (2006) avows, “means approaching one’s life as creative work, living life from a creative as opposed to reactive viewpoint” (p. 131). In this sense, academic institutions must become the creative talent it professes to be by creatively thinking outside of restrictive and outmoded teaching models. In this regard, that means providing new, novel and emerging learning paradigms within the scope of its pedagogy. By refusing to be constricted, passe modes in the creation of instructional learning academic institutions must provide a unique product and experience for both its clients and its students, which the institution should perceive as one in the same. To reiterate, in today’s landscape of higher learning, the student is also the client. The value, and in fact the monetary value in this case, is the message, how this message is taught and delivered, and also how it is received and perceived. In practice, this delivery mechanism is the creative transmission of erudition.

“Mental Models” come into play then, to discredit preexisting notions and resulting stereotyped, deeply held views that serve to limit growth and change. Senge (2006) concludes, it’s “why the best ideas fail” (p. 163). Conversely, he observes, “if mental models can impede learning—why can’t they also help accelerate learning” (Senge, 2006. p. 167). Here, what Senge (2006) suggests is, “…the impetus for the discipline of bringing mental models to the surface and challenging them so they can be improved” (p. 167). To accomplish this task, Senge
logical, the next step is to recruit Senge’s (2016) discipline of “building a shared vision” (p. 192). Senge (2006) asserts, “When people truly share a vision they are connected, bound together by a common aspiration” (p. 192). He contends, “Shared vision is vital for the learning organization because it provides the focus and energy for learning” (Senge, 2006, p. 192). In reality, this shared vision is problematic because at this stage of the “five disciplines” a leader must recruit the subordinate support structure where the rest of the organization buys into the message. In academic institutions, this often comes across as vapid proselytizing and unidirectional lecturing. Instead, administration must take the example from business models and empower organizational leaders to be “classroom” leaders to create and deliver a bold and identifiable message to their constituencies that is both new and creatively conceived and creatively deliver that message that is also creatively understood.

Once these disciplines are understood and the vision is shared by all, the academic leadership team must be molded to sustain the direction and viability of the enduring mission and that new vision. Concepts must be learned and repeatable, and not so stringently constricted. Instead, these notions must be adopted fully by the organization and continually adaptable to the changing needs of the marketplace. Senge (2006) writes, “Team learning is the process of aligning and developing the capacity of a team to create the results its members truly desire. It builds on the discipline of developing shared vision” (p. 218).

John Moorecraft (2007) notes, “The idea of rehearsing alternative futures is fundamental to contemporary strategic modeling and scenario development. The purpose of models and simulations is to prepare organizations and individuals for alternative futures by bringing these futures to life so they are imagined more vividly than would otherwise be possible” (p. 6). This notion assumes that modeling standards are necessary prerequisites functioning in academic modeling and business organizational structuring.

Relatedly, “team learning has three critical dimensions. First, there is the need to think insightfully about complex issues. Second, there is the need for innovative, coordinated action. Third, there is the role of team members on the other teams” (Senge, 2006, p. 219). In practice, this translates as the academic organization to explore new, but related avenues for innovative learning opportunities, to work collaboratively within a creative workspace, and finally, to work across cross-functional groups and amongst external departments with colleagues as well as the student/client both within and outside the organization.

Senge (2006) refers to these thinking paradigms as “metanoia” or a “shift in mind” (p. 219). “To grasp the meaning of metanoia is to grasp the deeper meaning of learning, for learning also involves a fundamental shift or movement of mind” (Senge, 2006, p. 13). As Senge (2006) concludes, “This then, is the basic meaning of a ‘learning organization’ – an organization that is continually expanding its capacity to create its future” (p. 14). Extrapolating these concepts necessitates that academic organizations require a revived “shift of mind” and recommitment to embracing and incorporating change as a core tenant of doing business in the field of education.

Pragmatically, these disciplines espouse a plan of action that outlines feasible specific tactics that are easily implementable. Monthly reports by academic leadership should be instituted surveying how each department group interacts and integrates with the organization and across cross-functional teams. Additionally, upper administration must develop and regularly adhere to a primary and consistent purpose of business that provides a vision for continued success. At the same time, the organization should discard outdated mental models and instead embrace new mental models that allow adaptability of the unit to thrive in a changing academic landscape. Finally, care should be given to enlist the help of other members of this “new” organization to enact change and share this renewed vision for the company. In this case, the leadership team must sell the idea of creative change in the creative realm. Most importantly, however, academic leaders must provide personalized mentorship throughout the organization by measuring successes and quickly enacting corrective measures as a means of affecting institutionalizing effective learning practices and ingratiating new learning practices into the culture of the organization across all constituencies.
Conclusion
To most effectively adhere to these principles is to review personal mastery in the context of leadership organization and development. Developing a plan for personal mastery is contingent upon a clear understanding of that concept.

Bearing in mind, aspects of the “personal mastery” notion must be clearly understood by all individuals across all levels of the organization. In this definition, “Personal mastery is the discipline of continually clarifying and deepening our personal vision, of focusing our energies, of developing patience, and of seeing reality objectively” (Senge, 2006, p. 7). As Sweeney and Meadows (1995) state, “Words are sometimes ill-equipped to convey the power, strength and dynamism of a clearly visualized goal or objective,” (34). Precisely for this reason, it is imperative that all members of the organization, and especially the leader, clearly understand how each member of the organization is crucial to implementing and furthering the institution’s message in accordance with the mission statement and in harmony with the outlined vision for the future.

To enact this fundamental alteration, an elemental approach to transformation must be embraced by the institution. In a sense, the company becomes an individual entity defined by values, purpose, vision and ultimately practice. A statement of purpose, therefore, is the most basic and primary foundation of which to build any organization, whether that be a business unit or academic institution. In the case of the academic model, the business at hand must exist outside of and exclusive of any one department head, and instead shared amongst administrative leaders as well as with faculty, staff and student constituencies. Consequently, the mission statement in its most rudimentary form should be to provide personalized, innovative and creative messaging that promotes erudition and inspired reception by the desired recipients, primarily the students in this scenario. Senge, Kleiner, Roberts, Ross, and Smith (1994) assert that this should be collaborative in an organization by “co-creating places [for] every member in a creative orientation. Every step involves choice. Individuals begin by drawing forth aspect of their personal vision” (p. 322). Therefore, an enduring vision can follow to subsist as a sustaining and positive creative force for learning effectiveness. Fundamentally, it is therefore the duty of an academic institution and its leadership to ratify and enthusiastically maintain positive change incorporating the values and disciplines outlined, in all future iterations and successive generations to continually adapt and reassess teaching practices for primary efficacy on an ongoing basis and in perpetuity.

Acknowledgements
I would like to pay special thankfulness, warmth and appreciation to the all the faculty, staff members and students of Chapman University’s Dodge College of Film and Media Arts, who provided support, guidance and insight into this topic.

References
Recruiting and Preparing the Next Generation of Bilingual Teachers

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Topic Area: Teacher Education

Presentation Format: Paper Presentation

Description
This mixed-methods study increases our knowledge base about bilingual teacher recruitment and preparation, and examines how we and others may learn from California’s Mini-Corps as a pool of potential bilingual teachers in this critical teacher-shortage era. Using a community cultural wealth model, we worked alongside California Mini-Corps to identify the assets that graduates of the program would bring to teacher education programs as well as needed supports that would increase their retention.

Introduction
Currently, there are 1.3 million English Learners (EL) in California public schools that comprise 21.4% of the total population. Of the total number of EL students, 83% speak Spanish. Further, 54% of all public school students are Latinx (California Department of Education, 2018). California's demographics combined with a shift in viewing bilingualism through an asset lens, helped pass Proposition 58 in late 2016, now referred to as California Education for a Global Economy Initiative, or CA Ed.G.E. in state Education Code. CA Ed.G.E. went into effect on July 1, 2017. The overall impact of CA Ed.G.E. was to lift the previous restrictions on bilingual education programs and spur on a rapid increase of demand for both programs and bilingual teachers. As a concrete example of the impact of CA Ed.G.E. the California State Department of Education launched in September 2018 a new initiative: Global California 2030 (California State Department of Education, 2018). A key component of the initiative is the goal of half of all K-12 students in programs leading to proficiency in two or more languages by the year 2030. Another goal directly related to our study is to provide credentials to an additional 1,190 bilingual teachers.

A number of recent studies have examined knowledge related to increasing the number of bilingual teachers, including research from our home UC Davis School of Education (Athanases,
Banes & Wong, 2013). The general consensus among all scholars is, however, that "… too little has been studied about varied knowledge and resources of bilingual PSTs [pre-service teachers] of color" (Athanases et al., 2013, p. 84). This body of research combines with current reports from California state policy institutes (Californians Together; Learning Policy Institute), as well as recent legislation (AB 952, 2017), to send out an urgent call for evidence-based practices to increase the number of well-prepared bilingual teachers in California Public Schools.

The present study responds to the pressing need for studies of bilingual teacher recruitment and preparation. Specifically, we sought to add to the knowledge base of bilingual teacher recruitment and preparation by examining the assets and needs of a state-wide cohort of Latinx undergraduates in four-year universities and community colleges (n=approximately 400). Our study rests upon research conducted in three main areas: the need for more bilingual teachers, the bilingual teacher pipeline, and the California Mini-Corps program (bilingual undergraduates serving as tutors to Migrant children). The following sections review those three areas of research.

**Shortage of Bilingual Teachers**

A state-wide study of California school districts in 2017 showed that 58% intend to begin or expand bilingual education programs (Harris & Sandoval-González, 2017). At the same time, "… an overwhelming majority (86%) reported facing a shortage of bilingual teachers as a hurdle to realizing those plans" (p.4). In a parallel policy report, Carver-Thomas & Darling-Hammond (2017) expanded further: "As districts and schools attempt to create or expand bilingual programs, they will have to vie for an already limited supply of fully prepared teachers, in addition to recruiting teachers with bilingual authorizations" (p. 10). These same authors emphasize that with only 30 out of more than 80 California institutions offering the bilingual authorization, our state is currently unprepared to meet the significant increase in demand for bilingual teachers.

In response to wide-spread acknowledgement of the bilingual teacher shortage, policy recommendations specifically cite the need to: "Work with teacher preparation programs at UC, CSU and private universities to expand the number of universities offering bilingual certification along with credentialing" (Harris & Sandoval-González, 2017, p. 8). Others caution, however, that California needs to learn from its previous implementation of bilingual programs-- i.e., before Proposition 227 and the accompanying restrictions on bilingual education--, and recall that "… successful program models require well-prepared teachers, and teacher shortages can undermine the program's effectiveness" (Carver-Thomas & Darling Hammond, 2017, p.11). We have designed the present study keeping in the forefront of our work the dramatic need to increase the number of bilingual teachers, while assuring that our bilingual teacher candidates emerge from our teacher preparation programs highly-qualified to anchor effective bilingual education programs throughout the state.
Our title for this literature review section-- *Nuestro Camino*-- derives from an article by Ocasio (2014) where she summarizes the literature on the teacher pipeline with a specific focus on Latinx students. One of Ocasio’s central points is that Latinx students’ narratives through the teacher pipeline are very different than those of the dominant group, i.e., White women. We believe, then, that our borrowing of Ocasio’s term *Nuestro Camino* in this paper (used interchangeably with *pipeline*) highlights those different narratives, including the linguistic wealth-- bilingualism--, that Latinx students bring to the teaching career. Further, we believe that the metaphor of Camino highlights the agency of those “walking the path” instead of passing through a pipeline, as well as the twists and turns that path may present on the way to becoming a bilingual teacher. Finally, as the Andalucian poet Antonio Machado wrote in a poem in the early part of the last century, *Caminante, no hay camino/se hace el camino al andar* (“Wayfarer, there is no path/the path is made by walking”), the way to becoming a bilingual teacher is still being dynamically constructed as the field comes to terms with the accelerated need for more bilingual teachers, the severe underrepresentation of Latinx in universities and the teaching field, and the dearth of research on recruitment of future bilingual teachers.

Before turning to empirical studies of the Latinx teacher Camino, there are several points made in Ocasio’s (2014) literature review with direct relevance to our own research. First, Ocasio summarizes previous studies that document the benefits that Latinx teachers offer their students: (a) serve as role models; (b) hold higher expectations; (c) make cultural and linguistic connections; (d) strengthen home-school links; (e) value home and community funds of knowledge; (f) enter the profession with heightened socio-political awareness; (g) work in hard-to-staff schools; and (h) show greater retention rates in the teaching field. In addition, Ocasio (2014) highlights the need for our particular study of college Latinx students *before* entering a teacher preparation program. She points out that studies of Latinx students who are already in a teacher credential program, while valuable, are limited because of the group’s low representation in such programs. The question that arises in our minds in relation to these previous studies of current teacher candidates is “Why did other Latinx college students choose not to enter teaching?” We believe that the answers to that question carry a high degree of importance for Latinx teacher recruitment, and we have made sure to directly pose that question in our study.

Within the corpus of empirical studies of Latinx teacher recruitment, work by Irizarry and Donaldson (2012) is very informative. These researchers undertook the first study to look at three junctures in Nuestro Camino-- high school, undergraduate education, and beginning teaching. The first two groups were part of a future teacher club or organization (n=12), and the latter were a nation-wide sample of Latinx teachers participating in *Teach for America*. The authors highlighted several differences in the Latinx students’ and teachers’ narratives. First, in contrast to white pre-service teachers’ positive experiences as the primary motivation to go into teaching, the Latinx participants sought to reverse the negative experiences that they had in their own K-12 education. In the words of one Latinx high school student, “I want to be that teacher
that I never really had” (p. 167). Another theme arising from the data was the impetus to give back to their community. Irizarry and Donaldson capture this theme by summarizing the college students’ feelings regarding a career in teaching: “[The Latinx students] embarked on their journey to become teachers with a sense of *fierce urgency* to transform the schools in their community for Latina/o youth and all students” (p. 169; italics added). This motivation sustained all three groups as they faced myriad obstacles on their Camino towards teaching, including antagonism towards people of color, educational tracking, passing licensure exams, etc. In short, participants in this study held strong beliefs “… on the potential for teaching to serve as a platform for personal and community uplift” (p. 172).

Ramirez (2009, 2010) has also conducted research on Nuestro Camino. In particular, his study of 75 ethnic minority college students, including 25 Latinas (A. Ramirez, 2010) sheds light on the factors that both “pull in and push out” (Irizarry & Donaldson, 2012) Latinx students from the teaching profession. In a series of interviews, Ramirez found that the participants cited the following as benefits of a teaching career: (a) a “Peace Corps” attitude to give back to their community; (b) a career that would provide additional vacation or “time off”; and, (c) employment benefits such as a pension and health insurance. Unfortunately, the list of perceived drawbacks was longer: (a) a fifth year of college for the credential program that delayed both paying off loans and entering the workforce; (b) insufficient scholarships for support during the credential program; (c) the need to take out additional loans for the credential year; (d) student teaching far from their home community; (e) licensure exams; (f) an additional year of induction after beginning teaching; (g) low pay; and, (h) lack of respect for the teaching profession.

**The Study**

Our focus in study was to increase both our knowledge base about bilingual teacher recruitment and preparation and examine how we and others may tap into Mini-Corps as a pool of potential bilingual teachers.

**Research Questions.** Our research activities were guided by these questions.

1. *How do bilingual undergraduates and pre-service teachers view a potential teaching career in general?*
2. *How do they view a potential teaching career in bilingual education?*
3. *What is their perception of their community cultural wealth (based on Yosso, 2005) related to entering bilingual education?*
4. *What is their perception of their academic preparation related to entering bilingual education?*
5. *If they were to enter a credential program, what would be desired features of the program? In other words, what supports do potential bilingual teacher candidates identify as needed to enter both a credential program and the K-12 bilingual teaching profession?*

6. *In what ways could teacher education programs restructure to best support teacher candidates pursuing a Bilingual Authorization?*

**Key Participants**

**Partnership between UC Davis and California Mini-Corps.** As the UC campus closest to the capital, we are uniquely situated to collaborate with the California Department of Education (CDE) and articulate with its state-wide programs. One untapped resource for bilingual teacher preparation is *California Mini-Corps*. California Mini-Corps is a CDE program within the English Learner Division (Migrant Education). Through Mini-Corps, over 400 undergraduate students from Migrant backgrounds work as tutors in approximately 1500 schools throughout the state. California Mini-Corps was honored last year at the Obama White House as a “Bright spot in Hispanic Education.” Yet to date, universities have not partnered to learn from Mini-Corps college students regarding factors related to their selection of teaching as a career or credential programs. Further propelling us to work specifically with Mini-Corps students is our university's long-time ties to agriculture. We feel the need to collaborate with and potentially contribute to the well-being of students who come from Migrant families, and who bring uniquely valuable assets to the field of bilingual education. Using Yosso’s (2005) community cultural wealth as a conceptual model, we will examine the aspirational, linguistic, familial, social, navigational, and resistance capital that this pool of students can bring to teacher education and the school communities they may serve. Mini-Corps students will participate in both an electronic survey and in various focus focus groups as part of the proposed project.

**The UC Davis Teacher Education Program.** UC Davis is already one of the 30 California institutions preparing bilingual teachers. Spanning both the Multiple and Single subject programs, we typically enroll 170 students and recommend approximately 25 teachers candidates per year for the bilingual authorization. We have a combined credential/MA program that occurs over 6 quarters with a summer quarter start, followed by one academic year of credential courses. Master's courses begin in the third quarter of the credential program, and continue for an additional three quarters, with MA candidates typically completing their inquiry projects by the end of Winter quarter of their first year of K-12 teaching. All candidates will participate in a survey to determine whether any potential bilingual teachers chose not to pursue bilingual authorization. Current and incoming bilingual teacher candidates, approximately 45-50, will also participate in this project's focus groups. Interestingly, we have noted that some of our Latinx applicants who speak Spanish as a native language do not initially apply for the bilingual authorization, citing doubts about their Spanish writing or other aspects of their academic writing. This trend is an example of the impetus for us to further explore bilingual PSTs' perceptions of their preparedness for teaching in bilingual programs.
**Research Activities**

As stated previously, we are conducting this mixed-methods study as a seed money project to pursue larger grants and therefore, we have begun with a thorough literature review of the research on recruiting and preparing bilingual teachers with a specific focus on California and our post-Proposition 227. This literature review has informed this project. In addition, we are conducting a survey of UC Davis’s current teacher education students to determine interest in pursuing a bilingual authorization and why they chose to pursue or not pursue it. Students currently pursuing a bilingual authorization will be given a longer survey to address research questions 2-5 above. Working in collaboration with the Mini-Corp director in Sacramento and Mini-Corp regional leaders throughout the state (see Appendix A), surveys will also be administered to the approximately 400 students enrolled in Mini-Corp. Quantitative data will be analyzed using standard descriptive and inferential analytic techniques. We will also conduct three focus group interviews of UC Davis teacher education students, two of multiple subject candidates and one of single subject candidates seeking bilingual authorization. In addition, we will conduct six focus groups (2 in southern, 2 in central, and 2 in northern CA) of Mini-Corp students to address research question 1-5 above. Qualitative data sources will be analyzed using constant comparison and analytic induction methods to identify and extract common themes across participants and data sources (LeCompte & Preissle, 1993). Several techniques will be used to support the trustworthiness of the data, including data triangulation, peer review, member checking, and a search for negative cases. Once survey and focus group data is analyzed, we will meet with UC Davis teacher education faculty to address research question 6 listed above. We will then share our results with Mini-Corp personnel and our UC and CSU partners.

Preliminary results indicate that Mini-Corp graduates would consider seeking bilingual authorization in teacher education if more supports were available in developing the academic Spanish needed to lead instruction. In addition, a cohort model would be most attractive to this potential pool and continued contact with their Mini-Corp coordinators is also desired. Complete results will be shared at our presentation.

**References**


https://www.cde.ca.gov/ds/sd/cb/cefelfacts.asp


Determining Capacity to Prepare Teachers to Meet the Needs of Complex Learners and English Learners within General Education Classrooms

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Introduction

Over the past few years, the California Commission on Teacher Credentialing (CCTC) has increasingly emphasized the need for all general education teachers to be prepared to meet the need of our state’s diverse learners. In the Statewide Special Education Task Force Report released in 2015 and used as a guiding document by CCTC, educational leaders called for a unified education system in which all children, including students with disabilities, are considered general education students first and foremost. While their focus was on complex learners receiving special education, they also advocated for a unified system in which the needs of English learners (ELs) are addressed.

The purpose of this study is to determine how we are currently preparing our students in our School of Education’s Teacher Education Program to meet the expectations put forth by CCTC. In addition, we will identify the gaps in our students’ preparation and any professional development needed by our current faculty that will enable them to better infuse knowledge about meeting the needs of complex learners and ELs into general education teacher education courses. The research questions guiding this study are the following:

1) How and to what extent are our teacher credential students and recently credentialed teachers in our master’s degree program prepared to meet the needs of complex learners and English learners?

2) How and to what extent do mentor teachers believe that our teacher credential students are prepared to meet the needs of complex learners and English learners?

3) How and to what extent are our teacher education faculty equipped to prepare teachers to meet the needs of complex learners and English learners?

4) To what extent is there an interest among our key stakeholders in developing a special education program at UC Davis SOE? If so, what type of program would generate the most interest?

The impact of this study includes programmatic reform as well as data for larger grant applications. This study directly advances our School of Education’s mission of “preparing and mentoring high quality teachers and educational leaders who serve as advocates for all learners.”
**Background and Significance**

In regard to complex learners, over 6 million students (8.9%), ages 6 through 21, are currently being served under IDEA (U.S. Department of Education, 2017). Of these students, 94.8% are educated in general education classrooms for some portion of their school day; 62.7% access the general education classroom 80% or more of the school day. In CA, 40,138 (7.9%) students between 6 and 21 years of age are currently being served under IDEA, with a disproportionately higher rate of Hispanic/Latino students receiving special education support than students from other racial/ethnic backgrounds (361,449 Hispanic/Latino; 162,751 White; 58,953 Black/African American).

Students with disabilities are increasingly accessing general education curricula although teachers report feeling underprepared to develop and deliver effective educational programs that meet complex learners’ needs (Jones, 2015). Sadly, this is reflected in the low rate of academic achievement observed in individuals with exceptionalities, with only 12% of 4th grade students with disabilities performing at or above a proficient level of reading and 67% failing to achieve even a basic level of reading (NAEP, 2018). These low rates of academic achievement place students at an increased risk for grade retention, peer rejection, conduct problems, and school dropout (Reynolds & Ou, 2004).

During the 2014–2015 school year, the Department of Education reported that only 45.2% of students (14–21 years of age) served under IDEA received a high school diploma; 25.6% had moved prior to graduation, and 11.5% dropped out of high school. Evidence has suggested that dropout rates differ among disabilities categories, with substantially more students with emotional disturbance (35%) dropping out of high school than all other categories. These data highlight the critical need for increased training within teacher preparation programs in order to improve educational experiences for complex learners (NCES, 2015).

Turning our focus to English Learners, there are 1.3 million English Learners (EL) in California public schools (California Department of Education, 2018). California's demographics combined with a shift in viewing bilingualism through an asset lens, helped pass Proposition 58 in late 2016, now referred to as CA Ed.G.E. in state Education Code. Furthermore, a number of recent studies have examined the need to prepare all teachers to work with English learners (e.g., Martínez-Alvarez, Cuevas & Torres-Guzman, 2017). This body of research combines with current reports from California state policy institutes (Californians Together; Learning Policy Institute), as well as recent legislation (AB 952, 2017), to send out an urgent call for evidence-based practices to increase the number of well-prepared teachers of English learners in California Public Schools. For example, Public Policy Institute of California's Report on California's English Learners points to the need to address, among other issues, low academic achievement among this population. According to this report, while scores on standardized tests have been rising for all students over the past nine years, ELs’ scores are substantially lower on the California Standards Test (CST) than for other groups of students. Students who have transitioned out of EL status are the most likely to achieve scores of Basic or above in English Language Arts (ELA) on the CST.

Furthermore, as mentioned previously, CCTC specifically requires that general education teachers be prepared to meet the need of complex learners and English learners. The CCTC has incorporated language that significantly strengthens the preparation to teach English learners into six sets of educator preparation standards. Their accreditation system began ensuring alignment with these revised standards during accreditation site visits in spring 2015.
The UC Davis School of Education will be submitting its next accreditation report in 2020 with a site visit in 2021. In addition, requirements for Multiple Subject and Single Subject programs specifying English learner content and quantifying Support and Supervision expectations were adopted by CCTC. More specifically, the following questions will need to be addressed in our report:

Does your program prepare teachers (general and special education) to:
- teach students with disabilities effectively?
- participate as a member of individualized education program teams?
- teach students who are limited English proficient effectively?

In addition, we will be asked to provide a description of the evidence our program uses to show that it prepares general education teachers to teach students with disabilities effectively, including training related to participation as a member of individualized education program teams, as defined in section 614(d)(1)(B) of the Individuals with Disabilities Education Act, and to effectively teach students who are limited English proficient. We will be required to include planning activities and timelines if any of the three elements listed above are not currently in place.

In regard to opportunities for future external funding and anticipated sources of funds, the results of this study would provide data that would be used to apply for larger grants focused on professional development of our teacher candidates, master program students, mentor teachers, and teacher education faculty including partnerships with LEAs. Possible grants include the US Department of Education Teacher Quality Partnership Grant which currently has a RFP with a June 26, 2018 deadline and which is prioritizing studies that reform teacher education programs to “meet the specific learning needs of all students, including students with disabilities, students who are limited English proficient, students who are gifted and talented, students with low literacy levels.” Preliminary data collected through June 21 would be used as part of our submission. In addition, we would explore WT Grant foundation grants, Spencer Foundation grants, other US Department of Education grants through the Office of English Language Acquisition (specially, their National Professional Development Grant) and the Office of Special Education Programs, as well as IES grants.

Our goal is to further develop our field’s understanding of how to prepare teachers to meet the needs of complex learners and English learners in California’s K-12 general education classrooms a programmatic perspective with implications for teacher education programs across the country.

Research Methods/Procedures

We have begun conducting a syllabus analysis of all the required courses in our multiple subjects and single subjects programs to determine to what extent the courses prepare teachers to work with complex learners and second language learners. We are systematically examining course objectives, required readings, and assignments and coding for whether references are made to complex learners or English learners. This method has been used previously for a number of studies conducted by Jimenez-Silva (e.g. Jimenez-Silva, Hernandez, Thibault, 2016). We are also adapting the Teachers’ Sense of Efficacy Scale (Tschannen-Moran & Woolfolk, 2001) and the Knowledge-Use-Self efficacy Survey (Thibault, 2017) that address participants knowledge, how useful they believe a concept to be, and self-confidence in using a concept (e.g. working with IEPs) to administer to the following participants:

2018/19 Teacher Education Students (n=150)
These surveys will also ask questions about interest in special education as a potential emphasis in our teacher education program with future opportunities for a specialized program. At this point, we have collected the syllabi and have begun conducting a matrix to document how syllabi are documenting how we are preparing students to meet the need of complex learners and English learners. We will be completing the syllabi analysis over the next few weeks. We are currently in the process of adapting the surveys and will be administering the surveys before our winter break.

In addition, we are developing and administering a survey to current faculty teaching in teacher education program to determine their own levels of knowledge and confidence in preparing teachers to work with complex learners and English learners within general education course with the understanding with participants that this is not meant to be evaluative but rather, to help determine the types of professional development that would merit our limited time and resources. This survey will be administered by the end of November.

To gather qualitative data that allows for deeper understanding, we are developing an interview protocol for focus groups with our teacher education students across the credential and master’s degree year as well as with faculty to further unpack survey results. We will also be conducting interviews with mentor teachers (n=10) and with our teacher education advisory group members to better understand the needs of these various stakeholders in regard to preparing teachers to meet the needs of complex learners and English learners. We are planning to collect this information by December 15, 2018.

All survey data will be analyzed using descriptive and inferential statistics to determine if differences exist in self-reported knowledge, self-efficacy and use levels by the type of courses that teacher candidates completed and if course syllabi differ by type of course. Multiple regression be used to examine differences, if any, and control for variables such as semester that the course was offered, time of day, and other possible effects such as instructor.

All focus group and interview sessions will be recorded and transcribed verbatim using a transcription service. We will then engage in various coding cycles in which we will use a combination of In Vivo and Values Coding (Saldaña, 2016). In Vivo coding is what Saldaña (2016) refers to as “literal” or “inductive coding” in which participants’ own words are used to code the data as a means to “prioritize and honor the participants voice” (p. 106). Values Coding, on the other hand, seeks to accurately portray participants’ worldviews, attitudes, beliefs, values, or ideologies (Saldaña, 2016). We will then engage in a second cycle of coding (Saldaña, 2016) where we will code the data inductively moving from specific codes to more general categorizations until we reach a point of saturation in which larger themes, interpretations, and analyses emerge (Corbin & Strauss, 2008). All data will be used to make programmatic recommendations.

In laying the groundwork for this study, we accomplished a number of steps. We held a two-day faculty retreat in June of 2018 where we discussed the content of individual courses in both our multiple subjects and single subject teacher education programs. It provided an overview of the course sequence that will inform how we can think about what knowledge and dispositions about working with ELs and complex learners. We also began initial conversations with faculty members about how as a program we are preparing teachers to work with these populations. We will also be attending a professional development session with mentor teachers and Dr. Sparapani will be delivering the keynote titled “Ingredients for Success: Helping
Complex Learners Succeed in the Classroom.” We will introduce the idea of the surveys and upcoming focus groups and interviews at that time. Our timeline for completing this study will take us through the spring of 2019. We look forward to sharing this work in progress with participants of HICE 2019.

References (Some citations above are linked to URLs)


REYNOLDS. http://nces.ed.gov/nationsreportcard/


Title: How to Increase Father Involvement in the Lives of Young Children

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Full Abstract:

Family participation in early childhood education programs have frequently left out the father role figure when engaging in family involvement. Most often, the child’s mother is invited to participate and make decisions related to the child (Turbiville & Marquis, 2001). Even though research indicates that fathers’ play interactions with their children show an impact on the child’s emotional, cognitive and social development (Fletcher, May, George, Morgan, & Lubans, 2011) service providers focus their interactions on mothers more than fathers.

Throughout the years, much research has been dedicated to documenting the positive benefits fathers bring to the lives of their children and studies indicate that fathers are important contributors to child development (Weinraub, 1978). As fathers understand the growing need to become actively involved with their children, programs need to be developed to educate fathers who want to be more involved but don’t know how. Both fathers and mothers need to learn how to play an active role in their child’s education and understand that involvement includes more than just spending time with their children. Being a good parent is difficult for anyone and parents understand the importance, but the key is to learn the basic strategies and understand how to actively engage with their child to provide a secure and stable environment.

The purpose of this proposed presentation is to provide a “how to” increase father and child interaction and involvement, especially in the early years. Specifically, the objective for this session is to present simple approaches and strategies that will effectively increase father participation in early childhood programs and create successful positive interactions between fathers and their children.
Upon completion of this session, the participants will be able to:

- Understand the importance of the father role figure and how father involvement improves the well-being of children.
- Identify strategies and methods on how to help fathers to get involved.
- Discuss proper support and preparation for engaging fathers in early childhood programs.

The presenter will begin the session with a group activity to identify the current knowledge educators of children have about the different types of “Father” figures. Next, the presenter will summarize the findings from a recent review of literature related to the role of the father and involvement in their children’s lives. Following the review of literature discussion, the presenter will share ideas on how to implement instructional approaches and strategies that will effectively help fathers to become involved in their children’s lives and to play an active role in children’s education. Questions from the audience will be answered and discussions will follow if needed.
Title: Teaching digital scholarship in academic libraries

Topic Area: Libraries and Learning Commons

Presentation format: Paper session

Description: This presentation will discuss the challenge of teaching digital scholarship in an academic library setting, using examples from the McGill University Library and the Concordia University Library in Montreal, Quebec. To support students working on digital scholarship-related research projects, workshops were developed at both libraries on the subjects of text mining, text analysis and data visualization. This presentation will provide advice for other libraries developing similar digital scholarship workshops or classes.

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Abstract

This paper explores the challenges of teaching digital scholarship in an academic library setting, using examples drawn from two university libraries in Montreal, Quebec, Canada. To support students working on digital scholarship-related projects, workshops were created involving the subjects of text mining, text analysis and data visualization. Additional workshops were also developed that provided instruction on using library-hosted technologies such as data visualization walls, 3D printers and virtual reality.

Based on student feedback, attendance statistics, and problems encountered while conducting the workshops themselves, the paper will explore issues encountered while developing a library-based, digital scholarship program. These issues include the challenge of promoting and supporting a digital scholarship program, ensuring that the program has a lasting life span, and building a viable user to justify the program’s existence. The paper also documents common technical issues faced when offering digital scholarship workshops—such as students who are unable to install required libraries for Python or R, or students who receive different results when using example code—and provides advice for resolving these technical issues in ways that minimalize disruption.

Following this discussion of the challenges of offering digital scholarship workshops, the paper will explore the user base for these workshops. Drawing from collected attendance statistics, the paper will provide an overview of the departments whose students have been the most active attendees of the workshops, and what percentage of attendees were in undergraduate programs vs graduate programs vs faculty. Using feedback provided by workshop attendees, the paper will also discuss common requests for new workshop subjects, as well as criticism attendees provided for how they wanted to see the workshops improved.

Lastly, the paper concludes by offering recommendations for other libraries either offering digital scholarship workshops or thinking of going down this path, discussing the challenges of building a sustainable digital scholarship program while working with limited staff resources.
**Introduction**

Digital scholarship is a quickly growing area within academic librarians, and digital scholarship librarian positions are becoming increasingly common too (Chabbot et al., 2016). Defining what digital scholarship is, though, is not an easy task (Martin, 2016, p.6). The Association of Research Libraries (ARL) loosely defines digital scholarship as something that spans all academic disciplines and digital evidence with the purpose of creating scholarly communications. As one of the examples they provide for how libraries can offer digital scholarship services, the discuss creating training sessions designed for students, faculty and other librarians that would enable them to use tools in data science, design education and interdisciplinary technologies, as well as open the possibility for new collaborations (ARL, 2018).

In looking at how to begin building out digital scholarship services at two university libraries in Quebec, Canada, the idea of training sessions involving digital scholarship-related subjects was one area where it was thought the libraries could make inroads. There were reports of questions being received through library chat and desk reference services on the subject of the availability of training for the R and Python programming languages and 3D modelling software. It was therefore decided that a series of workshops would be created in order to get a better sense of how large this demand was, and also to determine whether or not it was feasibly for the related library to support student needs in this area.

**Literature Review / Environmental Scan**

As can be seen from the ARL Spec Kit on digital scholarship, a number of university libraries have begun building out digital scholarship services and related library units. While the types of services offered varies greatly, commonly offered services include data management and data preservation, assistance working with geospatial and numeric data, and help visualizing data (Rikk, 2016).

A recent article on the subject of academic library trends notes the significant growth of digital scholarship initiatives (Chabbot et al., 2016). This article summarizes services typically offered through these initiatives as involving training related to manipulating and visualizing data. Other common services related to managing digital assets and
digital preservation. Then there were classes and other training sessions explaining how to use related tools in these subject areas.

In looking at the evolution of library digital scholarship centers and their state today, another recent paper argues that the success of these centers has been a result of two core strategies: building campus relationships and offering quality learning opportunities (Hensely & Bell, 2017). The article argues that cross-campus relationships are necessary to create a sustainable user base for library digital scholarship programs. Then, beyond these campus relationships, instructional sessions that illustrate the knowledge librarians have in digital scholarship and the assistance that they can provide in this area are also necessary. The article notes that the two strategies often go hand in hand and, by demonstrating their skill sets, libraries can often improve their collaboration potential with other campus units.

Another recent article looks specifically at graduate-level humanities students need for digital scholarship support (Cordell et al., 2015). The article begins with an overview the growing importance of digital scholarship tools and methods in the research conducted by graduate students and how these students often view training in these areas as critical to their success. In exploring whether or not libraries were suitable places for graduate students to receive this training, the article’s authors concluded that librarians often already have the skills necessary to assist with digital scholarship projects. Offering training for digital scholarship-related software and other tools was one area where the authors saw libraries as being able to make significant inroads with graduate students.

Exploring how libraries can better promote digital scholarship services, an article by author John Cox takes the view that digital scholarship is an extension of work that libraries already do (2016). The article notes the importance of libraries being viewed as equal partners in any digital scholarship initiatives and that librarians need to market themselves as experts in any digital scholarship areas they work in. It also notes the challenge libraries typically have had in communicating their skills sets, though, and provides recommendations on better communicating the role of libraries within university-wide digital scholarship initiatives.
Project Overview

In an attempt to explore what the local demand for digital scholarship training was at the two university libraries involved in this project, a series of workshops were developed and offered over the course of 2017/2018. The topics of the workshops were chosen based on questions received through reference services, and also by what workshops were being offered at other academic libraries. A summary of the five workshops developed for this project follows.

Workshop 1: *Introduction to data cleaning with R*

The workshop provided attendees with a basic overview of the R programming language. Using the tidyR library, attendees learned how to subset, reshape, transpose, aggregate and merge numeric data.

Workshop 2: *Data visualization with R using ggplot2*

This workshop provided attendees with instruction on how to use R’s ggplot2 library to visualize data through different types of plots and graphs.

Workshop 3: *Web scraping with Python and Scrapy*

This workshop provided attendees with a brief introduction to the Python programming langue. This was followed by a basic overview of how to scrape webpages using the Python library Scrapy.

Workshop 4: *Visualizing healthcare data with R and ggvis*

This course specifically targeted students and faculty working with health care data. Using a subset of a large healthcare data set, attendees were shown how to visualize the data using R and the R library ggvis.

Workshop 5: *Creating Printable 3D Models with OnShape*

This workshop provided attendees with instruction on the online software platform OnShape. During the workshop attendees learned how to create simple 3D models, with the intention that these models would eventually be 3D printed or imported into virtual reality environments.
Promotional Efforts

The workshops were promoted through library social media channels such as Facebook and Twitter. Students who asked about training for R, Python or 3D modelling through library references services were directed to the workshops as well. Subject librarians promoted the workshops to students and faculty who expressed interest in the subject. Closer to the dates of the workshops, signs advertising the workshop were posted in library areas with high student traffic.

Attendance

Workshops one, two, and three were all offered twice, while workshops four and five were offered a single time over the course of the year. While attendance for each workshop was capped at a maximum of twenty students, with the exception of the visualizing healthcare workshop were—which was attended by nine people—the workshops were all attended by less than five students. The attendees were primarily graduate students. The others—four in total—were undergraduate students in their third or fourth years, all of whom were involved in a faculty research project. There were no faculty members who attended the workshops.

Attendees’ knowledge of the software and programming languages being taught in the workshops varied drastically. Some students were already very familiar with programs and were attending the workshop as a basic refresher or to learn helpful tips while others struggled getting started with the basics.

Feedback for the workshops was mixed. Some attendees said that the workshops were too advanced and that they could not follow along. Others thought that the workshops were too simple and did not teach them anything new. It was only a smaller, middle group, which made up around a third of the attendees, that enjoyed the workshop content. Overall, though, the feedback illustrated how difficult it is to design workshops of this kind that appeal to a generalized audience. In the case of this pilot project, where attendance rates were already low, it did not make sense to further divide workshops into advanced and introductory categories. The one workshop that received the best overall feedback was the one specifically involving health care data, and—for the purpose of this pilot project—workshops involving specifically defined subject areas are now being considered going
forward, as compared to broader, basic overview of a programming language or software program.

Challenges and Lessons Learned

One of the most important lessons learned from this project was that building a user base for library-based digital scholarship services is not easy. One or two questions at the reference desk about the availability of Python or R workshops can easily be mistaken for a larger demand. For this project it was very difficult in getting students and faculty to attend workshops and so promotion became a much more work than was originally expected. There was also an added challenge in that, though the library workshops offered unique content, there were other competing workshops being offered across the broader university campuses at a more departmental level, and it was not always easy to know what else was going on.

Another lesson learned through this project was how important it is to define the scope of digital scholarships services. Students who attended the workshops had significant differences in their comfort working with programming languages or software. Some were expecting the workshops content to be very simple, others wanted to skip over basics completely, and a large number of attendees wanted added follow-up support that libraries involved in the project were unable to provide. As a result of this workshop content was made clearer and slides were shared with attendees in advance of the workshops so that attendees could see exactly what topics would be discussed.

A third lesson was, if possible, to never do a workshop with only one instructor. In every workshop there were one or two attendees who required a lot of assistance and having a second person to move around the room aiding anybody that required help, did a lot to keep the workshop moving forward and keep attendees who were more comfortable with the content engaged.

In addition to having a second instructor to offer added support, for workshops requiring attendees to bring their own laptops, another lesson learned was to offer support to users installing software or programming languages on their laptops ahead of the workshop date. There were a number of workshop attendees, especially in relation to the Python and R workshops, who arrived unable to get libraries
installed on their laptops and required at least thirty minutes of one-on-one technical assistance before they were able to do anything workshop-related.

In terms of building relationships with other campus groups involved in digital scholarship initiatives, this was not always easy either. In some cases campus groups were very happy to collaborate with the library, while others they viewed the library as direct competition to what they were doing. These types of relationships are undeniably important in building a library digital scholarship services, but—depending on the campus environment—this can be very difficult.

Conclusion

Offering digital scholarship support is a significant undertaking and, as such, requires significant resources to do successfully. In the experience of this project, much like the experience described in the article by Hensley and Bell (2017), the two most important of these resources were the availability of staff to help with training and follow up questions and then, secondly, connections with related on-campus groups. While it is true that many librarians already have skills that lend themselves to digital scholarship, how many of these librarians are available in one location and how much time they have to devote to digital scholarship services varies greatly, and it is often not feasible to add digital scholarship services without hiring new staff. For promoting the workshops and building an active user base, this was also difficult to do and required relationships with other campus groups and departments. By not having these relationships in place when the workshops were first offered, there was a lot of overlap between topics and less referrals between groups that could have increased workshop attendance.

Overall though, in concluding this project, the main lesson learned was that, while students often ask questions about the library offering digital scholarship-related training, this does not directly translate into a user base for these kinds of workshops. To do digital scholarship workshops effectively a lot of preliminary work needs to be undertaken, in particular discussions with other departments and librarian training to build a decent level of support. Without these primarily steps completed, finding a stable user base for digital scholarship training sessions becomes very difficult.
References


Title of Submission:

EXPLORING THE INFLUENCE OF AN ARTS-BASED MINDFULNESS PROGRAM ON STUDENT BEHAVIOR AND CLASSROOM CONDUCT IN SELECT URBAN MIDDLE SCHOOL CLASSROOMS

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Abstract:

Exploring the Influence of an Arts-based Mindfulness Program on Student Behavior and Classroom Conduct in Selected Urban Middle School Classrooms

Kendall D. Wilson-Flippin

Drexel University, 2018

Chairperson: Dr. Joyce A. Pittman
According to data collected by the Office of Civil Rights of the U.S. Department of Education, there are disparities in school discipline along racial lines, students with disabilities, and geographically in southeastern parts of the United States. These identified groups have rapidly increasing out-of-school suspension rates in comparison to whites, non-disabled students, and northwestern areas of the country.

How can closing the achievement gap be a main focus of many educational institutions who serve minority groups, without considering the reasons for experienced differences in student conduct and response to disciplinary action?

The qualitative case study, with a focus on the use of arts-based mindfulness practices, is designed to explore the influence of an implemented 4-week pilot program in an urban middle school setting. Through classroom observations, teacher interviews and review of archival data, the following research questions guide the study and lead to an understanding of how student behavior and classroom conduct are affected: (1) How does the implementation of an arts-based mindfulness program in a traditional urban school affect student conduct and behavioral outcomes? (2) In what ways do the skills and strategies taught through arts-based mindfulness practices support students to self-regulate their own behavior in a traditional urban school? (3) In what ways have students in a traditional urban school with a previous record of behavior offenses responded to the arts-based mindfulness practices?

Framing the study are three streams of literature that provide mindfulness models and practices; methods for reducing student behavioral incidents; and developing home and school engagement. Each stream is rooted in the brain-based learning theory and arts-based learning. Collected data from observing teachers instruct in arts-based mindfulness practices, and interviews with four of those teachers about their perceptions of student behavior 'pre' and 'post' the 4-week program, will reveal whether any changes occur in students and classroom culture. The researcher believes the piloted arts-based mindfulness program is an innovative solution to addressing the needs of students and reducing incidents that negatively impact school and classroom culture. The findings from this study will increase the exposure level of arts-based mindfulness practices outside of a clinical setting and strengthen the recommendation for further research and implementation in urban schools throughout the United States.
Dr. Phyllis Carbonaro

Abstract

National longitudinal data indicates more than 42% of new teachers exit the profession within their first five years of entering the teaching field (Perda, 2013). A recent study showed almost one third of new teachers leave the profession within three years (Headden, 2014). Furthermore, Ingersoll & Merrill (2012) found the new teacher attrition trend has steadily grown in the last twenty years. A study by the Carnegie Foundation reports the teacher attrition rate rose 41% from 1988-2008 (Headden, 2014). The numbers reflect a serious problem in education. Since the advent of public schools, scholars and reformers have discussed the challenges met by
newcomers to the classroom with no resolution to date (Ingersoll, 2012; Desimone, Hochberg, Porter, Polikoff, Schwartz, & Johnson, 2014; Jamil, Downer, & Pianta, 2012).

With new teacher attrition rates steadily rising, a critical issue is ill-prepared student teachers enter and quickly exit the workforce. Teachers with high levels of self-efficacy stay in the field and cope with classroom challenges more successfully. The purpose of this quantitative correlational study was to examine the relationship of perceived communication style differences between the student teacher and cooperating teacher correlated to student teacher perceived self-efficacy during the student teaching experience. Based on the communication styles framework of McCroskey and Richmond (1996) and the self-efficacy theoretical framework of Tschnannen-Moran and Hoy (2001), this study gathered data from a sample of 69 education student teachers attending a Central Arizona University. Four research questions examined student teacher and cooperating teacher differences in two communication dimensions: assertiveness and responsiveness. Findings revealed differences in responsiveness showed significance in three of the four efficacy dimensions: instructional strategies efficacy ($r = -.25$), classroom management efficacy ($r = -.25$), and total sense of efficacy ($r = -.25$). Student engagement efficacy showed no significance ($r = -.20$) when correlated to student teacher self-efficacy. Differences in assertiveness only showed significance when correlated to classroom management efficacy ($r = -.30$). Age and gender had little influence on the correlations. Results supported the conclusion that the greater the gap between how student teachers perceived themselves and how they perceived their cooperating teachers, the lower the student teacher perceived self-efficacy score. This dynamic is a consideration for better preparing student teachers for a successful transition to their own classrooms.
1. Title of the submission.
   Development and evaluation of food presentation function in food education support system.

2. Topic Areas of the submission:
   Educational Technology

3. Presentation format:
   Poster session

4. A sentence description
   We developed a food education support system using MySQL and PHP that can be used in a web browser. This system have provided a function to show nutrient intake and advice, for food selected by objects. By carrying out food education classes using the food education support system, consciousness improvements to the participants’ eating habits were observed.

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9. Abstract and/or full paper.
   Full paper.
   Please receive my Proceedings paper attached to this email and the described title page.
Development and evaluation of food presentation function in food education support system.

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Abstract In Japan, children’s food education has been emphasized by the Basic Act on Food Education (Ministry of Education, Culture, Sports, Science and Technology 2005). As a result, educators are now actively promoting food education. In previous studies, by carrying out food education classes using the food education support system, consciousness improvements to the participants’ eating habits were observed. However, the need to present the excess and deficiency of nutrients was pointed out. Therefore, this study saved selected food data of the subjects. Then, we developed and evaluated a new food presentation function. In addition, we analyzed the trend of stored food data, which is aimed to identify the problem of the subjects’ eating habits. Specifically, we asked the subjects to enter a personal meal information of one day using this system. While based on that, this system presented a method of appropriate nutrient intake and specific meals to eat. As a result, it is found that the food function helps children and parents to easily understand the excess and deficiency of nutrients. As a result, subjects increased conversations with parents and children about eating habits, and they have increased interest in eating habits. In addition, it is found that Japanese elementary school students consume less calcium and more salt.

Keyword: educational system, database, nutrients etc., food education, eating habits

1. Introduction

1.1 Background

The Basic Act on Food Education was founded in July, 2005. The purpose of this law is to know the correct knowledge about food, to select the food properly, and to acquire healthy eating habits. As a result, educators are now actively promoting food education. Moreover, the items of the nutrients have been newly added by the revision of curriculum guidelines from March, 2009 (Ministry of Education, Culture, Sports, Science and Technology 2009). As a result, the need to learn about food education efficiently and effectively is increasing. In addition, “detect community health problems and analyze it and take appropriate measures is very basic ‘work’ for professionals involved in the practices and research in community health. (Snip) The role of nutrition and eating habits in order to solve the health problems of the country and the region is large”. Nakamura and Yoshida described the program related to nutrition and eating habits. They say the role of nutrition research as a regional diagnosis is considered important. From these facts, data obtained in countries and regions can be analyzed. In addition, it is considered necessary to the appropriate measures for health problems.

As part of the study, a meal image was sent to a system targeted at elementary school students in order to efficiently and effectively learn about food education. Research on nutritional guidance by nutritionists has been reported. (Hasegawa et al. 2006). Not only that, studies using a snack mapping education system for databases focusing on food education specialized for snacking have also been reported.

In addition, school education so far has been educating food only for students. However, it is considered difficult to immediately improve students’ eating habits by themselves. As a study, this research on food education classes provides mothers with correct knowledge about foods and methods of improvement aimed at improving the diet and food environment of children. In addition, Nakayama gave a food education lesson using the food education support system to target the children and their parents in Japan. Then, they investigated whether improvement of awareness of dietary education of subjects and improvement of eating habits can be observed. As a result, although subjects’ dietary habits did not improve,
the awareness of dietary habits and diet contents improved. From this, it was suggested that the system might have an effect of improving consciousness. (Nakayama, Takahama, 2014).

However, in the study reported so far, only the total value of the nutrients of the foods selected by the subjects was stored as data. Therefore, from the stored data, they did not know which foods caused excess or deficiency of nutrients. As a result, nutrition administrators pointed out that it was not possible to present to subjects, which excessive or deficient nutrients would occur by ingesting which food. From the above points, it is considered necessary to have a function capable of presenting food that is causing the excess and deficiency of nutrients. It is also thought that a function of saving selected food data is necessary.

1.2 Purpose
In this study, the selected food data of the subject was saved. Then, the food presentation function was developed and evaluated. In addition, all the data was collected and analyzed by classification (grade, age, gender, region, etc.). Then, when the excess or deficiency of nutrients occurs, food trends and problems were clarified.

2 System and experiment
2.1 Prerequisite system and environment
In this study, we have developed content based on the system of the food education software for elementary school upper grades in Japan “Let's what Eat”(Takahashi et al. 2011). Further, in developing this system, we thought that it would be desirable to be able to use it in any country environment. Therefore, we developed a system using MySQL and PHP that can be used in a web browser. This allows everyone to use this system with a computer, smartphone, tablet, etc. that can connect to the internet.

2.2 Food classification
In the Japanese version system, 162 kinds of food were divided into six cuisines (staple food, main dish, side dishes, fruits, dairy products, soup). After that, nutritional analysis is performed for each food, and it is used in the system.

2.3 System features and overall structure
Figure 1 shows the outline of this system and the operation procedure of the education lesson. The operation screens in Figure 2 to 9 are supplemented as a description of the system.

![Fig. 1: The overview of this system and the procedure of the operation of food education class](image)

※ If there is a " " in the number, it is the work of children and parents side.
① The teacher assembles the class plan before the food education class (hereinafter referred to as "before class") and prepares teaching materials.
② At the beginning of the class, the teacher explains and instructs how to operate the system and tells the personal ID to subjects.
②’ When subjects access this system, the ID input screen is displayed. (Fig. 2).
③’ Subjects enter a personal ID, district, and personal information (gender, age, grade, height, weight) (Fig. 3).
③ Teachers grasp the subject’s persona information.
④ Subjects enter the meal situation on the food setting screen (Fig. 4).
④’ Teachers grasp the meal situation of subjects.
⑤’ In the nutrition evaluation screen (Fig. 5), a floating bar graph whose display of the face mark changes according to the intake amount is displayed for easier understanding by elementary school students (For details, see 2.4.1). The advice screen (Fig. 6) displays advice on how to take specific foods based on the results of the nutritional evaluation screen (Fig. 5) (For details, see 2.4.2). In addition, the food presentation screen is displayed when it is not enough (Fig. 7) and when it is overdosed (Fig. 8) (Details 2.4.3).
⑥’ Subjects confirm their own results and make the necessary judgment for individual learning.
⑥ Teachers check the meal situation from the entire aggregate results of the class (Fig. 9), make the necessary judgment as to the progress of the class.
⑦ Teachers give advice and supplementary explanation to subjects on the basis of the aggregate result of the determination of ⑥.
⑦’ Subjects listen to the advice and supplementary explanation from the teachers of ⑦. Then, the subjects compare the nutrition, such as intake and Dietary Reference Intakes of Japan, on their own, and make the necessary judgment to individual learning.
⑧’ The subjects answer a questionnaire on dietary education classes.
2.4 Nutritional value indicators and conditions

2.4.1 Nutrition evaluation screen

The nutritional assessment screen (Figure 5) has adopted a floating bar graph. Moreover, 14 items such as nutrients were graphed based on Dietary Reference Intakes of Japan (Ministry of Health, Labor and Welfare Ministry 2015). If the nutrient intake of the input meal is within the proper intake range, a "Smile mark" is displayed. When it falls below the lower limit value, an insufficient "Crying mark" is displayed. When it exceeds the upper limit value, an excessive "Angry mark" is displayed. This allows elementary school students to conceptualize the nutritional data. The proper intake range is set according to the age and gender registered in Figure 3.

2.4.2 Advise judgment processing of the advance screen

The advice screen (Fig. 6) hides the advice if it is within the proper intake range of the intake amount of the meal nutrient input, which is based on the result of the nutrition evaluation screen of 2.4.1. In addition, when it falls below the lower limit value, the advice is displayed in blue letters, and when it exceeds the upper limit value, the advice is displayed in red letters. The contents of the advice were designed with reference to the commentary on the teaching guidelines for elementary school education in the home (Ministry of Education, Culture, Sports, Science and Technology 2009).

2.4.3 Food presentation screen

For the food presentation screen, there are two types (Fig. 7, Fig. 8). Based on the result of the advice screen of 2.4.2, the first type displays recommendable food if it is below the proper intake range of nutrients, such as nutrients of the input meal (Fig.7). At this time, from the food incorporated in the system, four items were displayed, based on the nutritional target value. Then, in the case of excess intake range, cause food is indicated (Fig. 8). In this case, the ranking at the time of overdose shows the top three products whose subjects had the highest nutritional value among the foods selected by the subjects.

2.5 Evaluation experiment

2.5.1 Experimental method

The experiment was carried out in two places. In the following, each experiment subject was set as object A or object B (for details see 2.5.3). After using this system, object A was evaluated using a questionnaire about food presentation function. The experiment in object B was conducted on the day of class attendance. Specifically, after all the children were seated according to the instruction of the faculty, and the parents were seated next to them. We then distributed
individual IDs prepared in advance for the children and their parents. After that, we conducted a food education lesson by computer using that personal ID. In addition, we saved the results entered into the system input in the database. By doing so, we collected information to clarify the differences in dietary intake situation.

2.5.2 Content of the questionnaire

Evaluation items of the questionnaire were rated in 5 grades (5: I agree so much, 4: I think so, 3: Neither, 2: I do not think so, 1: I do not think at all so). In addition, with respect to question 1 of object A, it was subjected to statistical analysis (t-test). The questionnaire content of object B was the same for the children and for their parents. Each question’s contents are as follows.

[Object A]
Question 1: What about the evaluation of this system with “with food presentation function (hereafter, and this function)” or not?
Question 2: In this function, and food that is causing the overdose, do you think that the recommended food at the time of shortage had been presented and was easy-to-understand?
Question 3: Did you feel the advice content is easy to understand on the “advice screen”?
Question 4: If the system was used on the general public, do you think that there would be a change of awareness of of peoples’ eating habits?
Question 5: As the viewpoint of a registered dietitian, do you think I want to use this system to the general public?
[Object B]
Question 6: Was this system easy to use?
Question 7: Through this system, do you think will be able to think well about your meal choices?
Question 8: Think back to when you were using the system. Please circle all of the answers that applied to your experience.
- The food of the illustrations were easy to understand.
- The food was fun a lot.
- The advice on how to eat was helpful.
- The face mark displays were easy to understand.
Question 9: When looking at the screen that displays when too much food is taken (Fig. 8), if you had taken too much food, did you know?
Question 10: When looking at the screen that displays when there is a lack of food (Fig. 7), did you know what food you needed more of?
Question 11: Did you understand the nutrient, which is taken by myself, when you are comparing yourself with other people in the elementary school in the graph screen?

2.5.3 Experiment object

Study subjects were from the following two schools.
[Object A]
School name: University majoring in nutrition of the Kanto region S City
Target audience: 142 students
[Object B]
School name: Kanto H City public elementary school S
Target audience: 31 parents and 44 children (5-year elementary school)

3.1 Results and Consideration

3.1.1 Evaluation of food presentation function in the object A

The results of the survey for Question 1 of object A is shown in Figure 10. As a result, the evaluation of "with food presentation function" than "without food presentation function" was significantly higher. In addition, as a result of the investigation for Question 2, the average value of 4.0 (standard deviation: 0.82) or more of the evaluation was obtained. From these, it is considered the the food presentation function is an easy-to-understand function for students to access.
Fig. 10: Evaluation of food presentation function in object A

### 3.1.2 Evaluation of food presentation function in object B

Table 1 shows the result of investigating questions 9 and Question 10 of target B. As a result, we have obtained a rating of 4.0 or more on average, either in the question of the child or the guardian. From this fact, presenting function of the excess and deficiency food of this system is considered to have been evaluated.

#### Table 1: Evaluation of food presentation function in the object B

<table>
<thead>
<tr>
<th></th>
<th>children</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>average</td>
<td>standard deviation</td>
<td>average</td>
<td>standard deviation</td>
</tr>
<tr>
<td>excess</td>
<td>4.55</td>
<td>0.71</td>
<td>4.13</td>
<td>0.92</td>
</tr>
<tr>
<td>lack</td>
<td>4.45</td>
<td>0.88</td>
<td>4.29</td>
<td>0.86</td>
</tr>
</tbody>
</table>

### 3.2 Intake of nutrients and results of intake food, Results and Consideration

This section shows that from 14 types of nutrients that are stored in the database, four were discussed (energy, carbohydrates, calcium, sodium chloride equivalent). The four types are what falls below the Dietary Reference Intakes. On the other hand, it is what exceeded the Dietary Reference Intakes.

#### 3.2.1 One day's worth of food intake

1 day (breakfast, lunch, dinner) the nutrient intake of total is shown in Table 2. Also shown are the upper 10 kinds that were often selected number as ingested food in Figure 11. As a result, it can be seen that energy, carbohydrates, and calcium are insufficient. In addition, it can be seen that the salt is excessive.

#### Table 2: Nutrient intake for one day

<table>
<thead>
<tr>
<th>nutrient</th>
<th>average</th>
<th>standard deviation</th>
<th>dietary intake standard</th>
<th>excess + lack -</th>
</tr>
</thead>
<tbody>
<tr>
<td>energy (kcal)</td>
<td>1731</td>
<td>355.4</td>
<td>1900~2300</td>
<td>-</td>
</tr>
<tr>
<td>carbohydrate (g)</td>
<td>237.9</td>
<td>47.1</td>
<td>263~341</td>
<td>-</td>
</tr>
<tr>
<td>calcium (mg)</td>
<td>499.7</td>
<td>189.5</td>
<td>600~2300</td>
<td>-</td>
</tr>
<tr>
<td>salt (g)</td>
<td>12.7</td>
<td>4.3</td>
<td>~7</td>
<td>+</td>
</tr>
</tbody>
</table>
3.2.2 About meals for breakfast, lunch and dinner

Breakfast, lunch, dinner, each nutrient intake is shown in Table 3.

Table 3: Breakfast, lunch, dinner, for each nutrient intake

<table>
<thead>
<tr>
<th>nutrient</th>
<th>breakfast</th>
<th>lunch</th>
<th>dinner</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>average</td>
<td>standard deviation</td>
<td>average</td>
</tr>
<tr>
<td>energy (kcal)</td>
<td>517.9</td>
<td>198.9</td>
<td>601.4</td>
</tr>
<tr>
<td>carbohydrate (g)</td>
<td>71</td>
<td>26.8</td>
<td>85.7</td>
</tr>
<tr>
<td>calcium (mg)</td>
<td>200.1</td>
<td>120.7</td>
<td>137.9</td>
</tr>
<tr>
<td>salt (g)</td>
<td>2.9</td>
<td>1.7</td>
<td>5.7</td>
</tr>
</tbody>
</table>

① About breakfast

The top ten items were many of the selected persons ingested food of breakfast shown in Fig. 12. As a result, it can be seen that yogurt or milk, and other dairy products rich in calcium that include lactic acid bacteria, are taken by many. Furthermore, from Table 3, the breakfast category meets the calcium Dietary Reference Intakes. This is because many children who are taking dairy products for breakfast considered the calcium intake to be enough. But since the energy is small, it is considered to be a small meal.
② About lunch

The top nine items in Fig. 13 were many of the selected person’s ingested food for lunch. As can be seen, meat sauce spaghetti, noodles, and deep-fried tofu have been taken many. Furthermore from Table 3, the lunch sodium chloride equivalent is more than twice the value of the Dietary Reference Intakes. The reason is that meat sauce spaghetti or noodles, is considered to be the major cause. Further, lunch breakfast, it is seen that a small intake of calcium as compared to the dinner. This is believed to be due to a large food in calcium, such as dairy products and spinach rarely been ingested.

③ About dinner

The top nine items were many of the selected persons ingested food dinner, as shown in Fig. 14. As a result, of the staple food, main dishes, it can be seen that the eaten side dish were relatively well-balanced. Also from Table 3, we find that the energy of dinner is higher than breakfast and lunch. From this, the amount of the dinner meal is considered to be the most common trend.
4. Conclusion and Future Issue

This study was to improve the added system of food presentation function to record the food selected by participants. Clearly, both excesses and deficiencies of nutrients were observed in the participants’ food choices. Therefore, the aim of this study was to encourage the improvement of awareness of eating habits in Japanese people. Then, we tried to clarify when excess or deficiency of nutrients or the like occurs, as well as the tendency of food problems. As a result, food presentation function was found to be easy to understand, from children to adults. In addition, from the collected data, elementary school students displayed a calcium shortage, due to fewer dairy products being consumed for lunch. In addition, excessive intake of salt was found to be mainly cause by eating noodles for lunch.

As future issues, was collected breakfast, lunch, and dinner as a meal for one day in this experiment. In the future, snacks should be included when calculating the meal data for one day. Therefore, it considered that it can make the difference more clearly.

Acknowledgment

We thank all the people who cooperated in this experiment.

References


Title of the submission:
Integrating the Olive Branch Clinical and Consulting Services’, Youth Engagement, Empowerment & Enhancement Social Emotional Learning Curriculum across Secondary Schools’ Multiple Curricula

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Abstract and Curriculum

The Youth Engagement Empowerment & Enhancement Social Emotional Learning curriculum which was created by Dr. Alice Farrell and the development process will be shared. The foundational pillars are servant leader, service learning and project based strategies and interdisciplinary team support. Participants will have opportunities to discuss the curriculum within the context of the universal design framework and integration. The flexibility built into the curriculum to ensure inclusion of all youth will also be discussed.

Social Emotional Learning has become a major focus of early education, elementary and secondary institutions. A great deal of the focus has been on understanding the impact of adverse childhood and community experiences on children and their long lasting health impact. Although nationally, the focus is being promoted extensively, in various parts of the nation, educational institutions vary in the adoption of this focus.

Many schools are particularly struggling with identifying curricula that are effective in urban areas. My close to 30 years of working with children and having 8 children of my own have provided me with a wealth of knowledge and experiences that I have used to develop the below curriculum and related materials. The materials and curriculum will be shared during this workshop. As the numerous violent outburst in schools have rocked the nation I continued to develop this work.
Youth Engagement, Enhancement and Empowerment Sessions

OBCCS Youth (Young Citizens) Engagement, Enhancement and Empowerment Curriculum (YEEEC) Framework:

Young people can become strong and powerful advocates who transform their lives, their family and their communities through acquisition of and access to the following:

- relevant knowledge about service and project based learning and servant leader
- positive social and emotional as well as resiliency skills development opportunities
- effective interpersonal, communication, advocacy and negotiation skills
- understanding about the relationship between metacognition, the brain, their thoughts and their actions
- knowledge related to and opportunities to explore critical consciousness within the context of school, community and global life
- timely access to quality strength based, trauma informed, resiliency based and engaging services
- committed and supportive support system and network and dedicated mentors and interdisciplinary teams

As they develop in their awareness of local, national and global issues along with their growth in their understanding of the broad implications on individual lives, communities, nations and international strength, they will be able to identify causes to begin to form their interpretations and initiate strategic influence and extremely high impact plans. They can choose to identify potential individuals, organizations and systems to approach to engage them in discussions about developing possible short term collaborations and or of forming long term partnerships. They can choose to select the partner(s) using their established criterion including but not limited to:

(a) Those who have demonstrated a commitment to positive youth development and early inclusion into policy, program and practice development activities
(b) Those whose visions aligns with their vision
(c) Those who can support them in the development of the structure and infrastructure that is needed and
(d) Those who would commit to assist in the identification of resources, if needed, to support the effective implementation of sustainable plans

OBCCS Approach: Engage Youth to Equip and Empower them for Leadership and Civic Engagement

OBCCS Engages and Exposes the Minds, Bodies and Spirits of Young People through Positive, Service and Project Based Learning, Exploratory, Affirming and Journaling/Reflecting Experiences.

Overarching Goals:

- Prepare and Empower young citizens for service in their communities, nationally and globally
• Develop local, national and international Youth Leaders and Advocates
• Ensure that Youth who completes the OBCCS Youth Engagement Enhancement and Empowerment Training Series are: • Educated
  ▪ Equipped
  ▪ Socially and Emotionally Resilient
  ▪ Hopeful, Optimistic and
  ▪ Adaptable

Objectives: Youth will be able to:

(a) Explore, share, and discuss their understanding of the topics covered in each module (see objectives under each module)
(b) Identify and Explain at least 5 key principles of each concept that is shared in the modules
(c) Discuss and create a personal enhancement plan
(d) Explore various social issues and causes and create a proposal for involvement/action plan that focuses on school/community/national/international settings
(e) Develop the skill of observing and providing feedback using OBCCS “feedback model”

Training Strategies:
Use of multiple training strategies to engage individuals in the training sessions and to ensure the likelihood of transfer of knowledge to application and ongoing skill development. Examples of strategies:

| Co-creating with youth selective agendas and power points | didactic presentations | videos | participants present final plans
| project base learning and application | small and large group interactive activities, use of songs, rap and “open mic” activities co-presenting during large group reporting out activities | Team work, role playing and feedback processing | participants respond to a mock national and international conference request for proposal for youth presentations |
| celebrate refreshments and certificates |

Post Training Series Activities:

(a) Follow up sessions on projects – month 1, 2, 3, 5, 7, 9, 11, 12mth
(b) Booster session based on successes and challenges  
(c) Discussion on progress with youth ambassador recruitment of young citizens to attend the YEEEC Series  
(d) Youth Conference “Show and Tell Project” Sessions and Recruitment of Mentors who will work with YEEEC graduates over the 2nd year period following OBCCS Mentor Responsibility and Accountability Plan

<table>
<thead>
<tr>
<th>Modules</th>
<th>Topics</th>
</tr>
</thead>
</table>
| **Module 1** | Discuss Metacognition, Critical Consciousness, Service Leader, Service and Project Based Learning  
Development of Effective Interpersonal, Communication, Advocacy, Negotiation Skills  
Explore school related academic, social and emotional experiences  
Discuss community related experiences and impact  
Explore and understand the importance of being able to appreciate different perspectives |
| **Module 2** | Explore the power of developing reframing skills  
Discuss Emotional IQ Overview (Personal and Social Awareness; Self -Management and Maintaining Positive Relationships) |
| **Module 3** | Review Human Development Across the Life Span with Related Milestones  
Explore the implications for development of Social, Emotional and Academic skill sets and development of positive and healthy relationships |
| **Module 4** | Explore and Promote Positive Self Care Principles related to Social, Emotional, Physical, Intellectual, Financial, Spiritual, Environmental Health;  
Develop Personal Enhancement & Self Care Plan |
| **Module 5** | Explore My Brain (names and functions of different sections of the brain)  
Explore the Palm Diagram (survival- bottom of palm; emotional regulation –mid palm; executive functioning – top of extended finger tips  
Discuss Mental Health and Substance Use/Abuse 101  
Discuss Prevention, Treatment and Post Treatment in relation to Mental Health and Substance Use/Disorder  
Explore Protective Factors and Risk Factors |
| **Module 6** | Discuss Trauma-Adverse Childhood Experiences and their Life long Impact on Behavioral, Physical and Spiritual Health  
Discuss Trauma, Trauma Triggers and Trauma Reactions  
Explore The 5”F” of responses - Fight, Flight, Freeze, Fawn and Flop  
Post Traumatic Growth  
Discuss Strategies for building & Cultivating Resilience |
| Module 7 | Share on Healing from Adverse Individual Childhood and Community Experiences  
Discuss the Importance of the Mental Health and Physical Health systems and being able to speak to someone who youth is able to trust  
Growing Through the Process  
The Power of Hope and Forgiveness  
The Power of Love, Empathy, Gratitude and Smiles (L.E.G.S) |
| --- | --- |
| Module 8 | System of Care, Community Resources & Presentations – Connections to Trainings on Special Education and Legislative Processes & Testifying at the legislature – Youth Engaging – Age appropriate material and approach  
Developing High School and Post High School Plans |
| Module 9 | Discuss Data and Technology – Understanding how to make sense of the numbers and the reports about my community, about mental health and addiction and my school’s standing  
Youth review and discuss Personal Enhancement and Empowerment Plans  
Youth develop and share strategies for expanding their support system and network |
| Module 10 | 1 additional hour will be added to this session.  
Reviewing and Discussing the OBCCS ‘Student’ s Feedback Tool which is specific to sharing their thoughts about how well their school are engaging them and their family members.  
Provide Community Engagement Overview presentation  
Youth explore and create a diagram of the various committees, networks and coalitions that are in the schools as well as communities with their respective charges/vision statements/initiatives. –  
Small and Large Group Activities -  
Practice sitting at Decision Making Tables i.e., in behavioral health agencies, schools, juvenile justice, child welfare, developmental disability, community coalitions and or though connection with the legislative processes  
Role Play – scenarios related to youth participating at policy and program decision making tables  
Youth share and receive feedback from peers in a supportive environment – use of OBCCS youth role play feedback tool  
Youth sharing regarding the Youth Empowerment Training series’ experience, Youth share on a school or community related project he/she will join or plans on launching to address an identified concern within their schools and communities |
United States preservice candidate enrollment in an elementary-based arts class to develop efficacy and comfort with the arts is required by numerous states prior to licensure and certification (Arts Education Partnership, 2014). Most teacher education programs limit these compulsory experiences to an overview of the visual arts and/or music. Combined with a dearth of funding for arts curriculum in schools, the emphasis on standardized curriculum, namely the high stakes subjects of literacy and mathematics, has led to an exodus of arts educators from elementary settings (Center on Education Policy, 2007; Parsad & Spiegelman, 2012). Classroom teachers, therefore, are increasingly becoming students’ sole providers of arts instruction, typically accomplished via arts integration, a pedagogical approach which marries a core curricular concept with an art form like music, theatre, dance, or visual art (Doyle, Hofstetter, Kendig, & Strick, 2014; Russell & Zembylas, 2007; Silverstein & Layne, 2010). In this highly participatory and experiential session, participants will discover the research related to arts integration, differentiate between arts education, arts enhancement, and true arts integration, and learn a variety of standards-based arts integration lesson activities and strategies. Participants will increase both confidence and efficacy with the performing arts of theatre and dance, art forms not typically explored in required preservice arts classes. Takeaways include confidence and self-efficacy with best arts integration practices in the teacher education setting, numerous arts-integrated lesson activities and assessment adapted to curricular needs, and a toolbox of differentiated arts integration strategies for immediate use in teacher preparation programs.
Roundtable Discussion Abstract for: Building Young Learners STEM Skills and Practices

**Topic Area:** STEM Education

**Keywords:** Science and Engineering Practices, Cross Cutting Concepts, STEM, Content Integration, Problem Solving

**Learning Objectives:**
1) Describe how integrating Science and Engineering Practices and Cross Cutting Concepts into curriculum will create a community of life-long learners and problem solvers.
2) Describe how Cross Cutting Concepts and Science and Engineering Practices will help create a stronger foundation for the progression of science, technology, engineering, and mathematics (STEM), learning in the k-12 community
3) Abstract Details:
Understanding that Science and Engineering Practices and Cross Cutting Concepts from The Next Generation Science Standards, can help build a stronger foundation for STEM learning. By engaging young students in acquiring problem-solving skills in the STEM curriculum areas, we will better prepare them for the job opportunities in their future. Elementary children are innately curious about the natural world. As educators we can use this natural curiosity and inquiring spirit to enhance critical thinking and improve problem-solving skills.

By integrating the Science and Engineering Practices and Cross Cutting Concepts from the NGSS we can break down the silos of only teaching one content area at a time. This integration will create a more cohesive and real-life learning experience. Although specific skills need to be taught in each curriculum area, problems are not solved only using a single skill or concept, but by engaging the use of a variety of skills and practices. Exploring the statistics about the kinds of jobs available in today's world and even projecting into the future, students are going to need skills from the STEM content area to succeed in and ever evolving economy.

Fostering students’ curiosity about the natural world and facilitating the learning of these key skills we will prepare them to think more critically and use a more diverse range of practices and concepts, when encountering a problem to solve.

Participants will discuss key skills; practices and concepts, and how as educators we can best integrate these important ideas into current standards and curriculum. A list of Science and Engineering Practices and Cross Cutting Concepts from the NGSS will drive the discussion on how to fit these pieces into content across curriculum areas. There will also be discussion about how to prepare pre-service student teachers as well as practicing teachers on the importance of integrating these important skills into their already, “too full” curriculum load.

Some successful experiences with STEM professional development programs and projects will be shared by the presenter as well as by participants.
Online education, such as online classes or degrees, and hybrid education, for example classes and academic programs that have both residential requirements combined with online elements, have become higher education industry standards since the early 2000's. However, post-secondary education, found both in more traditional and established colleges and universities and in newer forms of less formal, more career oriented learning programs like short term, profession-specific training programs, has continued to drastically change with the varying landscape, availability and cost of technology, increase in consumer culture, and competition (Educause, 2012, 2013; Ehrmann, 1999; Hanna, 2000; Hartley & Bendixen, 2001; Lucas, 2006; Marginson, 2006; Naidoo & Jamieson, 2005; Selwyn, Gorard, & Williams, 2001; U.S. Department of Education, 2010; Zhong, 2006). Issues of quality, availability, cost, fit, convenience and reputation are all affecting student decisions in where, when, how and why to attend any specific program, degree-granting or not. These factors are forcing conventionally for-profit institutions to address issues of reputation and quality, while similarly causing more traditionally non-profit, prestigious universities to opt for more online and distance program delivery, modeled similar to that of previously successful for-profit institutions. For example, Purdue University Global recently debuted, the result of a prestigious institution like Purdue University adopting the strengths of Kaplan University's resources and history in online (Quintana, 2018). In the context of the historical contrast between online and traditional education with recent changes in the landscape, this paper will provide an exploration of this phenomenon through the analysis of a case study of a traditional university being faced with such challenges and adapting to overcome the demands.

In the 2018 HICE presentation, the author discussed a university's history of attempts with distance, hybrid and online education delivery from individual courses to
entire certificate programs, through the context of more than a decade of institutional history from an administrator at the heart of the academic and administrative coordination of such efforts, where employee turnover abounded, institutional memory had been quite short, and ephemeral decision making was rampant. This presentation will continue that discussion from the perspective after a year of feverish work moving from not conducting any online course delivery, at the time, to fully designed, developed, and deployed courses and degree programs, with actively recruited and enrolled students forming the first cohorts of 3 online graduate programs in a single year.

While there is a great amount of research in the scholarly ether discussing the benefits and drawbacks to distance learning, often synonymous with for profit education until recently, there is very little discussion of a road map or exemplar of how to successfully move an institution online, including the countless factors involved (Educause, 2012, 2013; Ehrmann, 1999; Hanna, 2000; Marginson, 2006; Selwyn, Gorard, & Williams, 2001). This paper will discuss the many factors that needed to be considered in moving online so rapidly, including project management, instructional design, student services and technical support, faculty and staff development, recruitment, and so, including describing the immense challenges and opportunities presented over that year, including overcoming biases of traditional education, faculty recruitment, incentivization and adaptation, realization of need for and adoption of technologies, personnel resources, and new policies, programmatic decision requirements, fiscal allowances, and many more considerations. The intent of this discussion is to present what has been lacking thus far in both academia and in industry, a map of how to move online, in the hopes that the lessons learned will save others hours, days, weeks and possibly even years of challenges through learning through discovery.
1. Title of the Submission:
Changing how Eight higher education institutions operate by changing a single IT tool – a case study of a service management tool evaluation and adoption process for a consortium of colleges

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6. Abstract:
Traditionally viewed as non-essential to the core mission of the institution, Information Technology (IT) support services are vital to the ongoing activity of any college or university (Goldstein, 2010; Sharer, 1998). IT organizations become involved in every facet of the educational organization from providing and supporting the systems for recruitment, to managing the lifecycle of one’s relationship with the university through the student information system (SIS) or similar human resources information system (HRIS), to the post-relationship status and services for alumni and others. Moreover, the personnel of IT become integral members of the organization through building relationships with all stakeholders – faculty, staff and students (McCord, 2002; Rust, Weiner, Harris, Sultan, 2010; Lowendahl, & Thayer, 2013). Almost no other organizational office interacts with all institution constituents. However, IT organizations can be quite expensive, and cost management continues to be a major concern for IT leadership across the nation (Goldstein, 2010). Leaders must balance that cost management with the customer satisfaction and knowledge-centric nature of IT organizations, because low customer satisfaction or lack of confidence in IT knowledge, can severely hinder organizational performance, where high customer satisfaction and elevated confidence in IT support capability has a direct impact on organizational advancement (Chester, 2011; Giachetti, and Ramirez, 2004; Guskey and Heckman, 1998; Marcella and Middleton, 1996; Sharer, 1998; Sultan, 2010). To make matters more complex, organizations do not operate in silos, and often educational organizations, and their IT departments, must work in collaboration with other institutions and IT groups, making the ability to maintain low costs but high performance and customer satisfaction much more difficult.

To aid in managing costs, knowledge and performance, IT organizations usually employ tools. An industry standard for the field of Information Technology (IT) has long
been the use of IT service management (ITSM) tools and support models and service level agreements (SLA's) dictating the quality service and support IT groups provide to their organization, regardless of the organization’s main industry such as military, healthcare, plumbing, marketing, entertainment to note just a few. IT services in higher education provide many more support services than many other industries, for many reasons including the lifelong nature of the student relationship moving from applicant to student to alumni to student again to visitor, the hours kept by students, staff and faculty, the esteem and perception of importance by mainly faculty but also some students and notable staff, the fluid nature of asset management and bring your own device (BYOD) thinking, leading to substantially higher security risks, the high costs of extremely varied software licensing, the need for both low power computer and very high power compute for big data, the residential portions of campus, and many, many other factors, requiring Higher Education IT groups to provide the support for all manner of activity far beyond any other industry-specific, particularly for profit, businesses and industries. However, this vacuous nature of services, has led to inconsistent support and support levels between IT groups amongst various colleges, even those immediately adjacent to each other, causing different cultures, different approaches, different methodologies to be employed to address the same issues. Even using cross-industry IT standard service management techniques and tools, execution of such activities can vary greatly.

This study will discuss how a consortium of Seven well known and respected small liberal arts colleges and a management entity in southern California have invested several years’ worth of resources in reevaluating their IT service management and tools. This effort has presented many difficulties, discoveries and needs for understanding between the Eight IT groups, and how they operate. Moreover, with the larger goal of creating an improved experience for all the students, staff, faculty, residence, visitors, researchers and other constituents of the Eight entities, this process has led to the colleges needing to reevaluate the way they foundationally work together – discussing the opportunities and challenges of collaboration not only within the eight IT groups but across facilities, Human Resources, Advancement and other offices. The paper will present the timeline and impetus of the reevaluation process, the selection and implementation of the new service management tool, adoption across the Eight entities, and the challenges, opportunities and lessons learned over this multiyear process.
Round Table Discussion Abstract

Hawaii International Conference on Education

Presentation Title: **A MindFULL of Stories**
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Roundtable Discussion Abstract for: A MindFULL of Stories

Topic Area: Early Childhood Education

Keywords: Mindful picture books, emotional development, early mindfulness

Learning Objectives:
1) Describe the relationship between picture books and mindfulness appropriate for children in the early years of development
2) Select and pair picture books with appropriate extension activities to help children become more mindful and demonstrate increased emotional regulation.

Abstract Details:
Driven by both the trending topic of mindfulness and the key role that children’s literature plays in a child’s early development, innovative and informed integration of carefully chosen picture books can be an effective means to enrich children’s lives while facilitating emotional development, delayed gratification, and executive function. An overview of the trending topic and practice of mindfulness across multiple disciplines will serve as the background for this presentation. Basic definitions and terminologies will help establish a basis for the discussion. We will discuss the rationale and research regarding mindfulness activities in the early childhood years and recommend a comprehensive list of picture book titles, both new and older, that incorporate and/or demonstrate mindfulness. Participants will explore a list extension activities and offer recommendations to pair them with specific picture books to help achieve specific behavioral and emotional outcomes.
College and University Libraries: An Online Graduate Course Developed Using Constructivism Theory and Active Learning Theory

Other Areas of Education

A Paper Presentation

Librarians serve students, faculty, and scholars from multiple disciplines in academic libraries of all sizes, however, there are different needs for each library type. Graduate courses focusing on College and University Libraries are needed to prepare future academic librarians. An online course entitled, College and University Libraries, was developed using Constructivist Theory and Active Learning Theory in an American Library Association accredited Master of Library Science Program.

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Introduction

Librarians in academic libraries of all sizes serve students, faculty, and scholars from multiple disciplines. While it is intuitively appealing to think they have the same issues librarians in schools, public libraries and special libraries have there are important differences. Differences include different types of organizations, management needs, missions, and users. Graduate courses focusing on College and University Libraries are needed to prepare future academic librarians. An online graduate class was needed to prepare degreed librarians to serve in College and University Libraries. A course entitled, College and University Libraries, was developed for graduate students in an American Library Association accredited Master of Library Science.
program. This article will include a selected literature review, discussion of the online course, and websites and resources of value to Academic librarians.

Literature Review

There is much about Constructivism/Constructivist Theory and Active Learning Theory in the published literature. A selected review of the literature follows.

Prof. George E. Hein presented a paper entitled, “Constructivist Learning Theory, in 1991. He defines constructivism as “a term that refers to the idea that learner’s constructive knowledge for themselves—each learner individually (and socially constructs meaning—as he or she learns” (1). He relates that we need to structure situations that are not free for learners to carry out their own mental actions, but "learning" situations which channel them into our ideas about the meaning of experience” (2).

George P. Schell and Thomas J. Janicki Published an article entitled, Online Course Pedagogy and the Constructivist Learning Model in 2012. Schell and Janicki argue that the model “applies well to the current emphasis in business schools to have experiential learning. Students construct their own knowledge, guided by their instructors, and learn how to create and extend mental processes for solutions to problems.” Additionally, they state that one “aspect of current college students is that they want to consume everything from education to music to social interaction via information technology in an ‘any/time/any place’ basis. Online course pedagogy meets the instructural needs for students to consume academic coursework, any time and place while also developing their analytical skills and extending their communication skills” (26).

Schell and Janicki state that “the constructivist model of learning is more appropriate where students have an existing level of education.” The authors state that “Learners transfer
knowledge through experiences via mental models which are used to assimilate new information into knowledge, and thus become extended mental models. This knowledge transfer emphasizes knowledge construction and problem solving in domains of increasing conceptual complexity” (28).

In their article, A Constructivist Approach to Online Training for Online Teachers, Sanford Gold looks at the issue of constructivism by focusing on the role of the teacher. He looks at the transition from in-class room instruction to online instruction. He argues that is “a complex one involving specialized training in the technical aspects of delivering quality educational materials (or environments) to students, and specialized training in how to foster knowledge acquisition within this new environment. He devised a two-week training course that exposed teachers to online teaching. His work found that “teachers exposed to the course significantly changed their attitudes toward online instruction seeing it as more participatory, and interactive that face-to-face instruction” (35). He argues that “Knowledge is not separate form by rather embedded within experiences and interpreted by the learner” (37).

Maryellen Allen in her article, Promoting Critical Thinking Skills in Online Information Literacy Instructions Using a Constructivist Approach, defines constructivism as an “approach to teaching and learning holds that the learner, through interaction and experience with an object or process, creates knowledge. Instruction based on constructivist theory places the student at the center of the learning environment, while the instructor serves as a guide or facilitator. Allen states that “Emphasis upon teaching critical thinking skills seems a natural fit with a constructivist-based approach to learning. Critical thinking involves the conceptionalization, analysis, synthesis evaluation, and ultimate application of information so the learner may reach conclusions or form independent judgements based upon what the learner has experienced.
combined with previous knowledge: (21). She believes that “the process of knowledge acquisition and creating in order to become stored in long-term memory, must be active rather than passive, and must also be applicable to the learner’s everyday world and experiences” (31).

Mapopa William Sanga in his 2017 article entitled, Designing for Quality: An Online Course Development, states that “Distance education has been around as early as the 1700s and continues to grow with the emergence of new technologies” (10) He summarizes D. B. Marks that “Central in online learning contexts is the understanding that learners must be active in their online learning experience.” (18).

The University and College Libraries Course.

Constructivist theory states that people construct their own understanding and knowledge of the world through experiencing things and reflecting on those experiences. Active learning theory states that many students retain and understand information best by doing things and thinking about the experience. Many of the students are adult learners who have spent several years working and having families. These theories support adult student learning especially well. Course readings are from. *The Changing Academic Library: Operations, Culture, Environments* by Budd, John M, 2nd edition published by ACRL Publications in Librarianship # 65. The textbook helps students understand the history of the development of academic libraries and their role in colleges and universities. Academic library organization and management, library funding, and governance are included. Communities of the academic library and user information needs and search habits are included. Academic librarian competencies needed for the 21st century are covered, as well.

The course syllabus provides the following student learning outcomes. Measurable Student Learning Outcomes: Upon successful completion of this course, students will be able to:

1. Assess and describe the structure and functions of higher education in the US
2. Analyze the information needs and uses of members of the academic community

3. Evaluate the role of academic libraries within academic institutions

4. Analyze trends and issues relating to higher education and academic librarianship

5. Relate services provided by academic libraries

6. Appraise competencies of academic librarians

The course assignments on the syllabus are:

**Discussion Forum Questions assignment** - During each module there will be one to two discussion questions given to you. Each student must post their response to each question and respond to a minimum of one classmate’s posts. Discussion question postings must be made by Wednesday at noon so it is in time for others to read and respond. Your post to each question should deliver information that is full of thought, insight, and analysis, make connections to previous or current course content, outside reading, or to real-life situations, and contain rich and fully developed new ideas, connections, or applications.

**Academic Library Director Interview** This Assignment calls for you to meet in person with a library director/dean in a library of your choice. Please make arrangements for a short meeting (30 to 45 minutes maximum) as soon as possible—do not wait for the last minute. You will:

1. Learn more about the library director’s job on a daily basis including what title do they hold in the library?

2. Who does the library director directly report to, how often, and how long are the meetings? Who else attends these meetings?

3. What is the library’s mission within the university?
4. What is one of the most challenges the director sees for a college or university library?

5. What committees or task forces the director serves on? How does this help communicate the library’s mission?

6. Is there a University Advisory Committee for the library? Who are the members and how are they selected? How could it be more effective?

7. How does the library communicate with faculty? With students?

8. What advice would this director or department head give to MLS students interesting in working in an academic library?

Report your findings in a paper with minimum of 1500 words. In addition, when anyone helps you professionally, it is important that you acknowledge your appreciation. Practice your professional writing skills by writing a “Thank you” letter to the manager with whom you spoke.

You do not need to mail it. You do need to submit it for part of the grade.

Information Needs and Behaviors of Academic Library Users – “Identify a group of academic library users and write a review of professional literature about that group’s information needs and/or information seeking behaviors. A review of literature identifies a topic (for example, the information needs of professors of biology) and then collects and discusses the relevant literature. You may establish the limits on the kind of literature you will select, but typically reviews include either the research literature, the policy discussion literature, or both. The relevant literature is organized according to some principle you select. For example, you might decide to organize the literature on biology professors’ needs by the kinds of methodologies used in the studies, or by whether it is research or policy literature, or by the kinds of issues that arise as you read it all. Remember that you are to write a paper about
information needs, not a paper about libraries. An example of a review is Melissa Karas and Ravonne Green, “The Information Needs and Information Seeking Behaviors of Community College and Lower-Division Undergraduate Students,” Community & Junior College Libraries, 14, (2): 103-109. 2007. The article is not perfect, but neither is it bad – it is just an example. It is not necessarily a model you must follow. You can find some guidance about writing reviews of literature at http://writing.wisc.edu/Handbook/ReviewofLiterature.html (accessed January 11, 2017).

“Information needs” and “Information seeking behavior” may be useful search terms – try them in Google Scholar, for example. After you select a group, you may find that the literature is too large to handle (e.g., if you select “students”) or that there isn’t much to review (e.g., if you select biology professors at small liberal arts colleges in the Midwest). If either happens, reconsider the way you identify a group. Remember that your task is to review literature, not to conduct original research. DO NOT interview a librarian or anyone else to complete this task. Support your report with citations to appropriate professional literature and data sources. Minimum 2000 words, plus charts and graphics as well as Works Cited page” (Swigger, 2014)

**Academic Librarians’ Competencies** – “The development of professional competencies has become a focus of higher education in recent years. Many professional associations have developed statements of competencies professionals should master. (The MLS Final Portfolio Exam emphasizes understanding of competencies, professional development of competencies, and demonstration of competencies through presentation of work performed during the program). ACRL has not published a single comprehensive list of competencies, as some ALA divisions have, but it has published some competency statements relating to aspects of academic librarianship, and the statements published in some other divisions of ALA are relevant.
For this assignment, identify a job that exists in academic libraries. Keep in mind the distinction between a job and a position. A job is a work task which leads to the accomplishment of some function; the same job may exist in many organizations which have similar missions. Answering reference questions, for example, is a job. A position is a defined role in a particular organization which may include responsibility for one or more jobs; a position as “reference librarian” at a university might call upon the occupant of the position to perform the jobs of answering reference questions, providing information literacy instruction, and serving as collection development liaison to a set of academic departments.

Your report will have five parts: 1, identification of a job; 2, description of the job; 3, description of the competencies required to perform the job; 4, discussion of the methods by which the competencies are acquired in the course of professional education and by which they are continually improved after graduation from a professional school; 5, discussion of the positions within which the job is normally embedded in academic libraries, including the kinds of other jobs with which it is commonly associated within a position. Use your research skills to explore published and public sources of information relevant to this assignment. DO NOT interview a librarian to complete this task. Support your report with citations to appropriate professional literature and data sources. Minimum 2000 words, plus charts and graphics as well as Works Cited page.” (Swigger, 2014.

**Final Exam** - There will be a final test, which will cover all the assigned materials. The test will be an “open book” test. The exam will be open in Blackboard in the last module.

Two assignments, the Discussions and the Academic Library Director assignment, will be discussed since the exemplify examples of Constructivism/Constructivist Theory and Active Learning Theory. In the discussions, Students are introduced to material and then are asked to respond to a discussion about
the material. The students are allowed to refer to course material, readings, outside material, or support their ideas with their experiences. Most students use their own experiences to support their ideas. This allows them to construct new meaning from both the material introduced in the course and their own knowledge and experience. Students learn to incorporate classmates’ experiences and knowledge as well as their own. They learn so much from each other. And, they form class networks that lead to a solid online community.

The Academic Library Director assignment requires that students schedule an interview with a practicing academic library director. One goal is to promote active learning since the student takes charge of selecting an academic library director as well as visiting an academic library of their choice. Their interviewee often gives them a tour of the library. Students are given a list of questions but they can ask questions about things of interest. Another goal is to promote networking with the director. The interview allows the student to integrate new information and knowledge into what they are learning in the class and their own experiences. Interestingly, some students maintain networking with the director that has let to them being offered a position after graduation.

Academic Library students need to be aware of resources beyond the textbook as they become professional librarians, as well of course. Indeed, these librarians’ continual education and professional development opportunities will serve well all their careers as they embark on a path of lifelong learning. There are many online resources for beginning professionals and seasoned professionals, but some are not valid for their use. The following resources offer valid and reliable information.

Valuable resources for Academic Librarians.

“ALA’s Association of College and Research Libraries (ACRL) conducts an annual survey of staffing, collections, expenditures, operations, and initiatives for all academic libraries in the United States”.


“ACRL is the higher education association for academic libraries and library workers. Representing more than 10,000 individuals and libraries, ACRL (a division of the American Library Association) develops programs, products, and services to help those working in academic and research libraries learn, innovate, and lead within the academic community. Founded in 1940, ACRL is committed to advancing learning and transforming scholarship).

Topic List of ACRL Standards, Guidelines, and Frameworks

www.ala.org/acrl/standards/standardsguidelinestopic

“ACRL is the source that the higher education community looks to for standards, guidelines, and frameworks on academic libraries. ACRL develops standards, guidelines, and frameworks to help libraries, academic institutions, and accrediting agencies understand the components of an excellent library.”

Association of College and Research Libraries Standards for Faculty Status for Academic Librarians

http://www.ala.org/acrl/standards/standardsfaculty

“In order to recognize formally the importance of faculty status for academic librarians, ACRL endorses these standards. Institutions of higher education and their governing bodies are urged to adopt these standards”.

Association of College & Research Libraries Guidelines for Academic Librarians Without Faculty Status

http://www.ala.org/acrl/standards/guidelinesacademic
“ACRL supports faculty rank, status, and tenure for librarians but recognizes that not all academic institutions provide faculty status to their librarians. To ensure that their rights, privileges, and responsibilities reflect their integral role in the mission of their institutions, ACRL has developed the following guidelines for academic librarians without faculty status”.

Association of Research Libraries (ARL) http://www.arl.org

“The Association of Research Libraries (ARL) is a nonprofit organization of 125 research libraries at comprehensive, research institutions in Canada and the US that share similar research missions, aspirations, and achievements. The Association’s importance and distinction are born from the ARL membership and the nature of the institutions represented. ARL member libraries make up a large portion of the academic and research library marketplace, spending more than $1.4 billion every year on information resources and actively engaging in the development of new models of scholarly communications”.


   “Numbers tell the story of the current state of higher education: the results of its diversity efforts, the decline in enrollment, and the growth in student debt. Among nearly 90 tables and charts are 30 that show which colleges have done the best on various measures, like increasing enrollment, graduating students on time, enrolling the most online students, and spending the most on research. To purchase a copy of the Almanac in print or as a downloadable interactive PDF, visit the Chronicle Store”.


“The National Center for Education Statistics (NCES) collects data biennially from about
3,700 degree-granting postsecondary institutions in order to provide an overview of academic libraries nationwide and by state. An academic library is the library associated with a degree-granting institution of higher education. Academic libraries are identified by the post-secondary institution of which they are a part and provide all of the following:

1. An organized collection of printed or other materials or a combination thereof;
2. A staff trained to provide and interpret such materials as required to meet the informational, cultural, recreational, or educational needs of clientele;
3. An established schedule in which services of the staff are available to clientele; and
4. The physical facilities necessary to support such a collection, staff, and schedule”.

Conclusion

There are different theories of use for developing an online course. Constructivism/constructivist Theory and Active Learning Theory both offer valuable information for a faculty to use when developing a graduate online course for predominately adult learner. More work is needed to provide the framework for these courses. Active Learning Theory is certainly appropriate for various ages of higher education students.
Bibliography


Swigger, Keith. Syllabus. Texas Woman’s University. 2014.
ATLAS® Instructional Design Framework: The Art of Intentioned Practice

17th ANNUAL HICE CONFERENCE

Title: ATLAS® Instructional Design Framework: The Art of Intentioned Practice

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The immense and extraordinary human capacity for learning is what sets us apart as a species; yet, many individuals have little understanding about HOW they personally go about the learning process. Moreover, there is little to no focus in the school system, in higher education, or in the workplace on teaching people how to learn. “As educators, we teach students the skills to become competent entry-level employees, but unfortunately, we often fail to teach them the one skill that will span their entire careers – that of *learning how to learn*” (McNeil, 2011, p. 4383). The purpose of this paper, therefore, is to demonstrate the efficacy of the ATLAS© Instructional Design Framework (IDF) and supplementary Toolkit in developing the art of intentioned practice in instructional design with the explicit purpose of promoting “a culture of intentioned teaching and learning” (Mocodean and McNeil, 2015, 2017).

**The History of ATLAS©**

The ATLAS IDF is grounded in decades of international ATLAS research regarding learning strategies and is based on the unprecedented self-scoring, valid, and reliable ATLAS© Instrument used to identify learning strategy preference (Conti, Kolody, 1998). The ATLAS Instrument has been translated into several languages and has been used globally to assess learning strategy preferences within diverse populations in fields such as government, business, industry, academia, medicine, armed forces, and leadership. ATLAS learners are categorized into three major learning strategy preference groups, each with a set of commonalities, general characteristics, and approaches to learning.

**ATLAS Learning Strategy Preference Groups.** The following profiles of the three ATLAS Learning Strategy Preference Groups are the result of qualitative and quantitative research projects that
used the statistical methods of cluster analysis, discriminant analysis, and analysis of variance conducted with each variable when the participants were grouped by clusters. Qualitative comments from learners within each cluster collected during focus groups and personal interviews are also included to enrich descriptions (GhostBear, 2001; Kolody, 1997; Lively, 2001). Definitions of each ATLAS Learning Strategy are located within this paper in Table 1.

**Navigators** are those learners to first make a conscious decision to create a learning plan, and they rely heavily on the learning strategies of Attending, Planning, and Monitoring/Adjusting. They readily identify the “Big Picture,” in other words the goals, objectives, and anticipated outcomes, and then map out a set of activities by which to “navigate” their way through the learning event to success. Navigators are focused learners who strive for routine, consistency, and clarity of expectations. Structure is also important to the Navigator's physical environment. These learners prefer to be in control of their surroundings and to work with others who value the same structured, well-organized setting.

**Problem Solvers** predominantly use the learning strategies of Resource Management, Generating Alternatives, and Self-Efficacy. They are abstract “possibility thinkers” and have a heightened sense of self-efficacy (Bandura, 1997), which provides them a sense of confidence to “figure it out as they go along.” They are adept at generating alternatives and seeing things from a unique perspective. Problem Solvers often report that plans and routines stifle their creativity and originality. They enjoy learning through storytelling and prefer learning environments that foster creativity, experimentation, and innovation.

**Engagers** rely heavily on the learning strategies of Confidence, Reward/Enjoyment, and Emergence. Their most distinguishing characteristic is their heightened ability to manage human resources, defined as integrating others into the social and political process of learning through dialogues, discussions, and networking (Fellenz & Conti, 1993). As such, they most often listen to and consider others’ opposing views during their decision-making processes. They demonstrate enhanced
emotional intelligence, excelling in activities such as teamwork, leadership, mentoring, relationship building, and conflict management. In evaluating their learning, the Engager's focus is on meeting their internal needs rather than meeting external standards (Conti & Kolody, 1998, 1999). The Engager’s preferred environment is one of inclusive and collaborative team dynamics, and one in which individual and team purpose is meaningful, effects change, and makes a significant difference.

The ATLAS® Instructional Design Framework (IDF)

This multi-functional framework is designed to not only address and leverage the preferences within each of the ATLAS Learning Strategy Preference Groups but to also create impactful programs that effectively capture, transfer, and transform sustainable knowledge and learning experiences.

The Five Strategic Elements

The ATLAS® IDF is comprised of five strategic elements, each with its own set of tools, essential to creating synergistic interdependencies that result in meaningful learning that encourages the
learner to sustain continued transformational exploration and application of learned concepts and practices.

**Zoned Analysis.** The first strategic element of the ATLAS IDF includes the zoned analysis tool used to conduct a thorough assessment by which to determine the scope and granularity of content. This analysis then systemically informs the remaining segments of the framework in the selection of delivery modes, learning activities, and evaluation metrics. The course content is identified, categorized, and sequenced to ensure each of the training goals and gaps are addressed.

**Experiential Design.** The proprietary lesson plan is the hallmark tool of the second strategic element. As emerging neuroscience and evidence-based learning principles (Oakley, 2018; Hamid, 2015) inform our teaching and learning practices, each component within the ATLAS Lesson Plan is designed to leverage the ATLAS Learning Strategies. Throughout the lesson plan template, practitioners are cued to include timely experiential activities intended to stimulate relevant neurochemicals which current research suggests build neuropathways that facilitate sustained engagement, long-term skill development, and learning retention.

**Innovative Alliance.** The third strategic element of the ATLAS IDF is Innovative Alliance, based on the symbiotic relationship between the teacher and learner. The ATLAS Instrument is the powerful tool administered early in the course so learners become aware of their individual Learning Strategy Preference and the implications of those preferences to their learning mastery (Conti, Kolody, 1998). As these learning strategy discussions increase metacognitive awareness, “a conscious reflective action implemented while analyzing, assessing, and managing the thought processes” (Conti & Kolody, 1999, p. 3), individuals can then learn with intention, actively participate, and make informed learning decisions, specific to their individual learning processes and goals (Yussen, 1985). It “has become evident that learners who are conscious of their learning processes exercise more control over those processes and become more effective learners” (Smith, 1983; Fellenz & Conti, 1993). As adults learn best when intensely involved and engaged in the learning process (Knowles, 1970; Conti, Kolody,
2004), ATLAS IDF designers encourage learners to engage in co-created, customized activities through which to apply the concepts in powerful ways that are meaningful to the individual learner. The ATLAS IDF Toolkit includes numerous tools and activities to build alliances between the instructor and the learner in both classroom and online settings.

Transformational Integration is the fourth strategic element of the framework. Transformation occurs only when learning is sustained and changes are integrated into one’s day-to-day practice (McNeil, 2012, 2018). Without successful transformational integration, the learning endeavor is deficient and incomplete. The tools within this element are situational, often dependent upon resources and desired performance objectives. Various ATLAS IDF tools include low cost, low tech (yet relevant) job aides, affordable mid tech gamification products, and high tech, highly resourced Augmented Reality and Virtual Reality scenarios…all designed to transform learners as they assimilate newly acquired concepts and practices into a trajectory of innovation and mastery.

Rigorous Metrics. The fifth strategic element of the framework is valid and reliable evaluation throughout the design and delivery processes, integral to assessing the value of a program both to individuals and to the organization. Evaluation tools within the ATLAS IDF guide practitioners through the steps of identifying and creating robust metrics specific to the organization, to the program, to intended outcomes, and to the sustained and measurable individual changes in performance.

Sustainability in Learning

Well executed learning activities promote learning sustainment. However, a common design challenge is finding a sustainable and transformational learning activity that is effective, affordable, easy to manage, with an automated reporting system. Scenario-based learning and applied gamification principles are emerging solutions to this challenge as they promote sustainment through spaced retrieval, a critical factor in enhanced learning, retention, and transformation (Kapp, 2014). A recent addition to the ATLAS IDF Toolkit is Creds™, a powerful, proprietary, self-authoring scenario-building learning product that meets these design challenges, adheres to neurocognitive principles, and
applies ATLAS Learning Strategies. Through distributed learning practices, this capstone learning activity also fosters continued learner participation and engagement, critical thinking, growth, and development long after the training session is finished.

**Creds**

The purpose of Creds is to deliver learning so profound, it changes people’s lives. Through the Creds Scenario-Building Methodology, real-world experiences are transformed into engaging, serious game learning. Creds brings curriculum to life as it stimulates and facilitates great technical, safety, and leadership storytelling by converting profound on-the-job experiences to interactive scenario-based learning. Imagine the power and value of Creds in learning experiences such as reviewing a potential process prior to enacting it -- or sharing the learnings of a near-miss or an incident investigation as future risk mitigation training -- or exploring preparedness procedures in emergency response plans. Organizational knowledge is captured, transferred, and transformed into authentic situational awareness that fosters critical thinking and strategic decision-making. The **Creds Team** Scenario-based game is played as a group in class. The **Creds Solo** scenarios then carry the learning beyond the classroom as Solo is played via the mobile app. Relevant scenarios are created by individuals with compelling and informative stories that provide opportunities for learners to identify and critically think about issues and interdependencies that develop wisdoms required for sound decision-making skills. Creds Solo is the platform through which a growing repertoire of scenarios provides the opportunity for sustained participation and engagement in serious game-based learning. *(Creds Brochure, 2018)*

ATLAS has selected and endorsed Creds as a premier transformational learning activity of choice for four compelling reasons: 1) both the team and solo versions of the game provide the evidence-based benefits of gamification; 2) experience is a valuable teacher and the scenarios created by Creds are based on real-life experiences that provide rich insights into profound wisdoms; 3) numerous elements within Creds adhere to emerging cognitive neuroscience principles; and 4) each of the nine evidence-based ATLAS learning strategies are reinforced with attributes embedded within the Creds scenario-based learning experiences, as outlined in the table below.
<table>
<thead>
<tr>
<th>ATLAS Preference Group</th>
<th>ATLAS Learning Strategy</th>
<th>Definition of Learning Strategy</th>
<th>Creds Reinforcing Gamification Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Navigator</strong></td>
<td>Attending</td>
<td>focused engagement; deciding to pay attention</td>
<td>learner’s decision to engage &amp; remain in game; recurring participation; repeating scenes/activities; scenarios relevant to the learner</td>
</tr>
<tr>
<td></td>
<td>Planning</td>
<td>accepting responsibility; taking control over the learning experience; directing the retrieval process (memory)</td>
<td>sequencing of events; browsing dashboard; organizing wish list; anticipating future steps</td>
</tr>
<tr>
<td></td>
<td>Monitoring/Adjusting</td>
<td>self-regulation; staying aware of progress; modifying learning plans when appropriate</td>
<td>changes to selections or performance improvement based on repetition and/or social contact; progression to advanced levels; changing selections based on feedback</td>
</tr>
<tr>
<td><strong>Problem Solver</strong></td>
<td>Resource Management</td>
<td>discerning selection of credible resources</td>
<td>identifying relevant options; selecting/initiating social interactions (other gamers or author, etc.); learning from others’ stories &amp; experiences; learning how to think about situations based on how others handled them</td>
</tr>
<tr>
<td></td>
<td>Generating Alternatives</td>
<td>critical thinking; hypothesizing; ranking solutions</td>
<td>decisions based on selecting and ranking options; mitigating risks by asking questions about the thought processes of others as their stories unfold</td>
</tr>
<tr>
<td></td>
<td>Self-Efficacy</td>
<td>confidence in one’s ability to “figure it out as you go along”</td>
<td>experimenting in a safe environment; celebrating the sense of adventure as scenarios play out</td>
</tr>
<tr>
<td><strong>Engager</strong></td>
<td>Confidence</td>
<td>re-framing the situation to develop courage; change fear into excitement</td>
<td>increased by score &amp; level progression; successful selection of influences reinforce confidence in perception</td>
</tr>
<tr>
<td></td>
<td>Reward/Enjoyment</td>
<td>anticipating the value to self or others</td>
<td>identifying benefits of acquiring the Wisdoms (It isn’t just about the score, but about the learning); ANTICIPATE winning</td>
</tr>
<tr>
<td></td>
<td>Emergence</td>
<td>mastery over the material; ability to teach or mentor others in a variety of situations</td>
<td>collaborative learning and robust discussions during the gaming experience; writing meaningful scenarios for future learners</td>
</tr>
</tbody>
</table>

Table 1
Conclusion

Today’s fast-paced world is one of constant learning. Successful individuals are those who learn with intention in order to surmount the learning curve encountered within new roles, opportunities, and expectations. Intentioned Practice is cultivated when practitioners critically reflect upon their specific actions (Schön, 1983; Mezirow, 1990). Regardless of the industry or discipline, performance is most often improved when intention informs our practice. Specifically, with the ATLAS© Instructional Design Framework and Certification, instructional designers master the art of intentioned practice, equipped with tools to foster profound and sustained individual, classroom, and workplace learning.

References


Kapp, K. (March 2014) Gamification: Separating Fact from Fiction. *Chief Learning Officer;* CLOmedia.com


The Trolley Problem: An Instructional Module

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Abstract

The Trolley Problem (Foot, 1967) has become one of the most ubiquitous thought experiments used in a range of courses to introduce and illustrate concepts relevant to moral judgment and intuitions in business ethics (e.g., Prentice, 2014; Stanwick & Stanwick, 2014). It has been generally integrated into the classroom experience by way of a variety of instructional techniques, such as narrative presentation (e.g., Troesch, 2015) or as assigned reading (e.g., Haws, 2006). Notably, these techniques have generally taken the form of direct instruction (e.g., Baumann, 1988), in which the instructor plays a central and directive role – telling and “teaching” what is supposed to be learned by the students. Given that one of the pedagogical ingredients necessary to develop mature moral judgment is the ability to understand the perspectives of others (Bienengraber, 2014), what has been underexplored is the potential for leveraging the social aspect of the classroom experience to promote moral development using the Trolley Problem.

The objective of this research is to address this gap by presenting an enhanced approach to integrating the Trolley Problem as an interactive classroom exercise into an undergraduate course, using Social Constructivist Pedagogy (SCP; e.g., Daniels, 2001). Moreover, to assess the effectiveness of using this approach, the results of an empirical study, using a quasi-experimental design, will be presented.

SCP holds that verbal interaction among students is necessary for the co-construction of knowledge and cognitive change that are, in turn, critical for learning. As a socio-cultural theory of learning, SCP argues that learning transpires within interactive groups, and participation in these groups promotes levels of understanding and performance that potentially exceed independent learning (e.g., see Vos, 2015). Drawing on SCP, Chandler and Teckchandani (2015) proposed using a four-phase model to promote analytical thinking and reflective exploration in the business classroom. Here, their model is applied to integrate the Trolley Problem into a Principles of Management class, using the four phases of the Zone of Proximal Development, Scaffolding, Cultural Phase, and Societal Phase. The results of the instructional experiment assessing the effectiveness of the module, in terms of enhancing moral awareness and moral intentions of students, will be presented. Implications and limitations of the study, as well as directions for future pedagogical research, will be discussed.
References


1. Title: Trial Study for the Development of an SNS Version of Social Skills Training Material


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6. Abstract

Introduction: The quality of information on moral learning in special support education needs to be improved. Children with special needs are often trained in social skills such as interpersonal behavior. However, to date, such guidance has primarily focused on face-to-face communication and very few studies have examined training by employing indirect methods of communication such as SNS.

Methods: The aim of this research project was to develop a social media version of social skills training material for children with special needs. An SNS-based method of communication skills training was developed. The content thereof was explained to junior high school students. In relation to development, reference is made to methods such as instruction, modeling, role-play, feedback, and generalizations in daily life that are commonly used in conventional social skills training. Among the teaching materials developed by the authors in conjunction with LINE Corporation, a scene where the conversation was not finished late at night was employed as a concrete example in the group talk. The students received an explanation about what difficulties would arise if the conversation had not been completed. Subsequently, an effective way of how to end a conversation, including a description of the characteristics of the Internet (misunderstanding by short sentence) and the "read function" specific to
LINE were described. Thereafter, the students engaged in role-play, interacted with each other, and made generalizations about everyday life.

Results: The results of the experiment demonstrated that the SNS instruction material helped to improve the communication skills of the participants and increased their self-confidence in relation to avoidance of trouble.

![Fig.1 Scenes where the conversation does not end late at night](image)

<table>
<thead>
<tr>
<th>Table.1 Comparison between pre · post (n=88)</th>
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<tr>
<td></td>
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<tr>
<td>Pre</td>
</tr>
<tr>
<td>Ability of troubleshooting</td>
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<td>Confidence for troubleshooting</td>
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**p < 0.01, *p < 0.05, ( ) SD

Conclusion: In this study, we tried employing an SNS version of social skills training materials for junior high school first graders. The results revealed that the materials were effective in improving communication skills and confidence in trouble avoidance. We intend implementing information moral education on a daily basis in special support education, using them in special support schools and classes, and clarifying outcomes and problems.
Title of the submission:
The Effects of a Self-access Center on Language Learning: How to Encourage Students’ Involvement Outside Classroom

Topic Area:
ESL/TESL

Presentation Format:
Paper Session

Description of Presentation:
The effect of a self-access center on English language learning is a topic worth examining. This study investigates how a self-access center can contribute to improving students’ test scores and oral fluency. To measure the effects of oral fluency, recorded interviews are analyzed. We will also discuss our challenges to maintain students’ motivation for their continuous learning and to maximize the use of the center.

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The Effects of a Self-access Center on Language Learning:
How to Encourage Students' Involvement Outside Classroom

Abstract

In an L2 environment, it is difficult for language learners to have opportunities to engage in authentic communication. Due to the increasing need for developing human resources capable of international communication, many Japanese universities are now offering additional English language learning support programs at self-access learning centers to offer students more authentic experience that classroom instruction cannot offer. The goal of many self-access centers at Japanese universities is to give additional support to enhance oral fluency at a relaxed, secured space where students can practice communicating in English outside the classroom and to provide opportunities to study actively for their own goals.

This is a case study of a self-access center in a Japanese Engineering University. The center was established as 1) a place for learning English where students can get study support, can have English conversations in a relaxed manner, can use learning resources, can participate in speech contests and vocabulary competitions, 2) a place for Japanese students to mingle with international students and postdoctoral fellows through parties, excursions, and cultural exchange events, 3) a place for having cross-cultural experiences where international students, PD fellows and visiting professors give presentations, or students who have participated in study abroad programs/ international internship programs report their experiences.

This study investigates how various attempts and programs or events at the self-access center contribute to the improvement of students' test scores and oral fluency. To measure the effects of the center, two groups of students, the students who used the center or participated in the activities regularly and those who did not, are compared in terms of standardized test scores and recorded interviews. In addition, attitudes toward learning English and the use of self-access center will be examined. The number of users has been increasing since the center was opened; however, it is not fully utilized because it only appeals to students who are good at or very interested in English. We discuss our challenges to maintain students' motivation for their continuous learning and to maximize the use of the center.

Acknowledgements

This work was supported by JSPS KAKENHI Grant Number 18K00892.
1. **Title of the submission:**
   A primary goal of English Education for Young People—
a discrepancy between parents’ expectation and teachers’ perspectives—

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6. **Abstract:**
   In Japan full-scale English education at elementary schools will be launched in 2020. It involves a rapid development of private English schools for young children, who are not yet attending kindergarten. They come to English classes together with their mothers to enjoy classes: singing songs along with teachers, doing rhythmic gymnastics in English, listening to reading of picture books, etc. Most of teachers who are engaged in English education for such young people want them just enjoy “English” and, at the same time, strive to develop their basic skills of intercultural understanding or to make them get interested in languages other than their mother tongue, Japanese. However, their parents have another purpose of their children’s English education: they want their children to have an advantage of English knowledge in the future, such as, in the entrance exam for universities or in the job hunting.

   The aims of the present research are to reveal such an issue or a definite gap between teachers’ perspectives and parents’ intentions, and then to clarify the reasons that cause the gap.

   In this study, a qualitative research method was conducted to collect data to inspect the conflict. Questionnaires including free writing were extended to both teachers and parents. In addition, face to face interview was given to two of the teachers and a group of parents.
These qualitative data was partly analyzed by KH Coder (Higuchi, 2016).

It is assumed that one of the reasons which triggered the dilemma is “critical period hypotheses,” advocated by Lenneberg (1967). Many people believe that we can learn the second/foreign languages very easily before “critical period” and therefore, parents want their children to start to learn a foreign language in their early childhood. However, it does not have any valid evidence as for non-native speakers’ learning. Moreover, some researchers insist that we can learn foreign languages even after critical period.

Another possible reason is a kind of social issue, namely, a university entrance examination, where some certificate examinations are introduced as part of English scores. It means that if a candidate has a qualification, it can be said that he has an advantage for passing the exam. However, it is not what most English teachers intend to convey to young learners. Teachers who are teaching English to young children may, in a sense, keep their teacher beliefs that English should be one of the useful tools for communication with others but not for taking advantages over other people.

It may be necessary for teachers to pursue the personalization of the contents of English learning, to develop cross-curriculum learning, or to collaborate with other teachers.

Finally, it is suggested that we should carefully consider the future of English education for young children in Japan: the purpose of English education for them, and its effective curriculum in the course of lifelong English education.
# Hawaii International Conference on Education

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**Human Resources Development in Fiji: – A cultural shift in developing countries**

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Abstract

Human Resources Development is a challenge in some of the developing countries. The culture in most developing countries is that Human Resources Development is not an important part of the organisation, it is seen as personnel have sufficient skills and knowledge and just right for the job. The leaders of most of the corporate company’s do not realise the importance of human resource development within their organisation. This study will utilise the documentary analysis method to answer the research questions. A face to face interview will also be conducted to some CEO’s and senior executives for the data collection. This paper examines the importance of value adding as a critical factor in any organisation that helps develop staff skills that are both beneficial to the individual self-development and organisational development. The researcher will look at some of the organisations in Fiji that are still in the traditional era of doing business and how the human resources development in any organisation add value to the human resources and its positive output and outcomes. The findings of the study will both benefit the employee and organization. Furthermore, the results of this paper will have a strong implication to the managers and leaders to understand the benefits of modern management style in the workforce.

Keywords: Challenge, Culture, Traditional, Value adding, Learning and development, Impact.
Evaluation of University of Missouri’s Instruction and Course Evaluation

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Evaluation of University of Missouri’s Instruction and Course Evaluation

The use of student evaluation of teaching (SET) is common for promoting excellence in teaching at universities. SETs are usually constructed for formative and/or summative assessment purposes although many universities also use them for important decisions, such as those regarding faculty tenure and promotion. Challenges associated with the SET assessment process include getting a good response rate, finding an appropriate interpretation of the SET score, inspecting validity from students’ perspective, and examining the association between SET scores and students’ learning. Even though the use of SETs is quite common, validity and reliability evidence of course evaluation surveys is often overlooked. Different studies have pointed out that no current literature provides strong psychometric evidence that SET scores measures instructor teaching competence (e.g., Hornstein, 2017).

At the University of Missouri (MU), a new course evaluation system was designed to provide information that would promote excellence in teaching. In 2014, MU implemented a new system designed to improve the information aggregated from student ratings with the hopes of 1) aiding faculty and instructors in their instructional design; 2) assisting administrators with decision-making; and 3) helping future students select courses.

Beginning in 2012, the Assessment Resource Center (ARC) at MU was asked to develop new course evaluations using four key constructs established by MU Faculty Council, i.e., Course Content and Structure, Teaching Delivery, Learning Environment, and Assessment. Using surveys, focus groups, and discussion sessions with MU faculty, staff, students, and administrators, ARC developed twenty Likert-scale questions to represent the four constructs. After adding a question on teaching effectiveness which was carried over from the earlier forms, Faculty Council approved the new Evaluation of Instruction and Course forms in 2013 stating, “the revised forms are a better, streamlined, and more flexible MU-specific instrument for the evaluation of teaching.” Use of the new forms and their reports began in Fall 2013 and completely replaced the previous forms by Fall 2014. In addition, a new online platform using these forms was implemented in Fall 2014, providing a choice between paper and online evaluation forms.

Student gender, requirement vs. elective class, and student status (i.e., freshman, sophomore, junior, senior, graduate, other) were self-reported. The new forms included a gender question which was deleted from all forms in August 2016 due to student concerns.

Missouri Senate Bill 389 (MO SB 389) requires public institutions of higher education to collect instructor ratings from students and to post these on the institution’s website. These institution-designed questions collect data considered “consumer” information for both current and incoming students. In 2014, the five new SB 389-compliant questions designed by ARC and approved by MU’s Faculty Council were implemented campus-wide as the Feedback for Other Students section of the new forms. To protect student confidentiality, any course with five or fewer completed evaluations will not have their SB389 evaluation results posted. These questions ask students if they would recommend this class to others according to each construct. The responses to these questions are meant to inform “consumers” and are not intended to be
used for any type of internal evaluation, e.g., annual evaluations or promotion and tenure
dossiers; however, these ratings should mirror the ratings from the twenty Likert-scale questions.

For consistency across campus, each department or program is encouraged to use one of the
three ARC-provided course evaluation forms.

<table>
<thead>
<tr>
<th>Form Name</th>
<th>Pages</th>
<th>Description of Question Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form 1: SB 389</strong></td>
<td>1 page</td>
<td>✦ Questions providing student feedback to comply with MO SB 389</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✦ One question on teaching effectiveness</td>
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<td></td>
<td></td>
<td>✦ Results reported by mean score</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✦ Three student demographic questions</td>
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<tr>
<td></td>
<td></td>
<td>✦ One question to generate comments</td>
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<tr>
<td><strong>Form 2: Standard Form</strong></td>
<td>2 pages</td>
<td>✦ All questions from the SB 389 Form</td>
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<td>✦ Key construct questions on Content and Structure, Teaching Delivery, Learning Environment, and Assessment</td>
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<td></td>
<td></td>
<td>✦ Results reported by mean score for each question and each construct</td>
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<td></td>
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<td>✦ Four student engagement questions</td>
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<td>✦ Two open-end questions designed to elicit comments</td>
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<tr>
<td><strong>Form 3: Expanded Standard Form</strong></td>
<td>4 pages</td>
<td>✦ All questions from the Standard Form including extended spaces for comments</td>
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<td>✦ 20 spaces for possible instructor-designed questions</td>
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<td></td>
<td>✦ Six small groups of course-type questions (Technology, Writing/Media, Seminar/Discussion, Creative/Applied, Labs/Focused Practice, and Multiple Instructors)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✦ Results reported by mean score for each question</td>
</tr>
</tbody>
</table>

*Figure 1.* Three forms of Evaluation of Instruction and Course developed by the Assessment Resource Center at the University of Missouri. Source: Guide to the Evaluation of Instruction and Course, 2013, revised 2017.

Individual students complete the Evaluation of Instruction and Course forms near the end of their course. Results from individual surveys are aggregated, analyzed, and reported for each class-and-instructor pair. Evaluation reports are only available in portable document format (PDF) on the course evaluation website. Each semester, evaluation reports begin to be released 36 hours after the date grades are due. All instructors can view and print their own evaluation reports including the full set of student-written comments. Department-designated support staff with myZou-security-approval can also access all reports online.

The Likert-scale response choices are *Strongly Disagree* (1), *Disagree* (2), *Neutral* (3), *Agree* (4), and *Strongly Agree* (5). Response data for the reports are stated in two ways: for a single question using response choice percentages and a mean score, and a mean score for the group of questions for each construct. One of the past SB 389 questions on general teaching effectiveness
is included at the request of Faculty Council and is now reported using a 5-point scale rather than a 4-point scale, consistent with the new questions.

Using the SB 389 questions, students report their recommendations to other students regarding the construct areas and these are reported as percentages.

ARC is responsible for maintaining and distributing the course evaluations, analyzing results, and providing official instructor evaluation reports. Working closely with the Vice Provost for Undergraduate Studies, ARC maintains up-to-date forms and reports and provides additional campus reports when requested.

The Present Evaluation

This evaluation report focuses on the four key constructs of MU’s Evaluation of Instruction and Course: Course Content and Structure, Teaching Delivery, Learning Environment, and Assessment; as well as a general teaching effectiveness item, five Missouri Senate Bill 389 (MO SB389) items, instructor’s sex and class average GPA. For short, the Evaluation of Instruction and Course system is called ICE (instruction and course evaluation).

The principal guiding question is “Is MU’s ICE reliable and valid?”

We follow the *Standards for Educational and Psychological Testing* (American Education Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 2014; hereafter the Standards) to answer this question. For validity, the Standards emphasizes collecting relevant evidence to support the intended interpretation and use of test scores. According to the Standards, there are six specific forms of validity evidence and some forms are more relevant at the test development stage. Pertaining to this report, two forms of validity evidence are emphasized: evidence regarding internal structure, and evidence regarding relationships with conceptually related constructs. Another form of validity evidence, evidence regarding relationships with criteria, which could be very useful, is not considered in this report due to lack of clearly defined criteria in the context for the use of MU’s ICE.

Throughout its development, MU’s ICE is intended to evaluate faculty’s teaching effectiveness. Some departments and colleges at MU also use ICE scores for promotion and merit-based performance evaluation. Although such use might be legitimate for specific departments and colleges, in this report, we focus on the primary intended use for faculty’s teaching effectiveness. Therefore, the validity part of the principal guiding question becomes “Can MU’s ICE be used to assess faculty’s teaching effectiveness?”? Also, we would like to point out that teaching effectiveness in this context is not equivalent to student learning. Although the ultimate goal for any teaching is student learning, research has shown that student evaluation of teaching ratings are not related to student learning (e.g., Uttl et al., 2016).

Instead of treating reliability as separate from validity, the Standards position the reliability of scores as having implications for validity because the level of reliability of scores has consequences on the intended interpretation of those scores. Therefore, the reliability part of the
principal guiding question is subsumed under the validity part of the question, specifically, validity evidence regarding internal structure.

Another concern is reliability of group means. For each class-and-instructor pair, there are usually multiple students who rate the teaching. While the items are designed for use at the student level, individual students’ ratings are evidently aggregated in order to evaluate the performance of a particular instructor for a particular class. The aggregation is usually done by calculating the mean of all students’ ratings for that instructor and class. Because not every student at MU rates every class and instructor, it is common to assume, and it can be tested, that the variation due to the sampling of students (in this context, the variation due to course selection and choice to complete the course evaluation form or not) can be a major source of error, especially if class sizes, or the numbers of students who choose to complete the evaluation, are small. In fact, the error associated with the sampling of students could be a significant source of error.

Descriptive Statistics of MU’s ICE
For this report, only courses with at least six students enrolled that used Standard Form (Form 2) or Expanded Standard Form (Form 3) were included. Across five semesters (Fall 2014, Spring 2015, Fall 2015, Spring 2016, and Fall 2016), there were 386,016 ratings by students for 16,169 unique class-and-instructor pairs. The number of students who rated the same class and instructor at a given semester ranged from 1 to 480, with a standard deviation of 32.61. From Table 1 and Figure 2, while the average ratings for the four key ICE constructs across all class-and-instructor pairs in a given semester were usually high (about 4.2 to 4.5 on a 1-5 point scale), the standard deviations of average ratings across class-and-instructor pairs were about 0.3 to 0.6. While the highest average rating for any key construct in a given semester was always the highest possible score (i.e., 5.00), the lowest average rating could be as low as 1.00 and typically at the upper end of 1 or lower end of 2 for undergraduate courses, and below 3 for graduate courses.

Students’ ratings for the same class/instructor could also vary. From Table 1 and Figure 3, the standard deviations of students’ ratings for the same class/instructor, for the four key ICE constructs, could range from 0 to 2.8, with average standard deviations typically in the 0.5-0.7 range. These indicate that the variability of ratings is more due to differences among students than due to differences among classes and instructors.

Table 1. Descriptive Statistics of Means and Standard Deviations of Student Ratings of Classes/Instructors

<table>
<thead>
<tr>
<th>Undergraduate Courses</th>
<th>Fall 2014</th>
<th>Spring 2015</th>
<th>Fall 2015</th>
<th>Spring 2016</th>
<th>Fall 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Max</td>
<td>Mean</td>
<td>SD</td>
<td>Min</td>
</tr>
<tr>
<td>Content</td>
<td>2.25</td>
<td>5.00</td>
<td>4.34</td>
<td>0.31</td>
<td>2.30</td>
</tr>
<tr>
<td>Delivery</td>
<td>2.36</td>
<td>5.00</td>
<td>4.39</td>
<td>0.42</td>
<td>2.32</td>
</tr>
<tr>
<td>Environment</td>
<td>2.29</td>
<td>5.00</td>
<td>4.42</td>
<td>0.38</td>
<td>2.50</td>
</tr>
<tr>
<td>Assessment</td>
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<td>5.00</td>
<td>4.19</td>
<td>0.47</td>
<td>1.00</td>
</tr>
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<td>5.00</td>
<td>4.36</td>
<td>0.37</td>
<td>2.47</td>
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<tr>
<td>Construct SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content</td>
<td>0.00</td>
<td>2.00</td>
<td>0.58</td>
<td>0.21</td>
<td>0.00</td>
</tr>
</tbody>
</table>

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<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Max</td>
<td>Mean</td>
<td>SD</td>
<td>Min</td>
</tr>
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<td>2.32</td>
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<tr>
<td>Construct SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content</td>
<td>0.00</td>
<td>2.00</td>
<td>0.58</td>
<td>0.21</td>
<td>0.00</td>
</tr>
<tr>
<td>Construct</td>
<td>Fall 2014</td>
<td>Spring 2015</td>
<td>Fall 2015</td>
<td>Spring 2016</td>
<td>Fall 2016</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------</td>
<td>-------------</td>
<td>-----------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Content</td>
<td>Min: 2.50</td>
<td>Mean: 4.46</td>
<td>Min: 4.46</td>
<td>Mean: 4.46</td>
<td>Min: 4.50</td>
</tr>
<tr>
<td>Delivery</td>
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<td>Mean: 4.50</td>
<td>Min: 4.50</td>
<td>Mean: 4.50</td>
<td>Min: 4.50</td>
</tr>
<tr>
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<td>Min: 4.28</td>
<td>Mean: 4.28</td>
<td>Min: 4.28</td>
</tr>
<tr>
<td>Total Scale</td>
<td>Min: 2.50</td>
<td>Mean: 4.50</td>
<td>Min: 4.50</td>
<td>Mean: 4.50</td>
<td>Min: 4.50</td>
</tr>
</tbody>
</table>

**Figure 2.** Students’ average ratings on the four key ICE constructs and the overall scale. Numbers and colored bars show average ratings and error bars represent standard deviations of student ratings.
**UNDERGRADUATE STUDENTS’ AVERAGE STANDARD DEVIATION OF RATINGS OF CLASSES/INSTRUCTORS**

- **Content**
- **Delivery**
- **Environment**
- **Assessment**
- **Total Scale**

**GRADUATE STUDENTS’ AVERAGE STANDARD DEVIATION OF RATINGS OF CLASSES/INSTRUCTORS**

- **Content**
- **Delivery**
- **Environment**
- **Assessment**
- **Total Scale**

*Figure 3.* Students’ average standard deviations of ratings on the four key ICE constructs and the overall scale. Numbers and center of circles show average ratings and sizes of circles represent standard deviations of the standard deviations of student ratings.
Internal Structure of MU’s ICE
The internal structure of MU’s ICE was examined through factor analysis. All items were treated as continuous variables. Clustering by class/instructor was taken into account when analysis was conducted.

- Are there four constructs as hypothesized? Is there an overall teaching effectiveness construct based on the 20 Likert scale items that supposedly measure the four constructs?

Confirmatory factor analysis (CFA) is a common statistical modeling technique used to test factor structure in education, psychology and other fields. In CFA, constructs are usually represented by latent factors, which are unobservable and measured by observable indicators. CFA starts with a set of hypotheses that specify the number of latent factors, the number of observable indicators, and the relationships between latent factors and observable indicators. The hypothesized model can be tested against data collected on the observable indicators to see if it is supported. Using model fit indices, if there is a model-data consistency, the researcher could conclude that the hypothesized model is supported. On the other hand, if the model-data consistency is poor, the hypothesized model is usually concluded as not being supported. Sometimes, the researcher may test several hypothesized models in order to select the one that is best supported by the data; or in the case that multiple hypothesized models are consistent with the data, the researcher may conclude that there are different ways to interpret the construct.

From the development stage of MU’s ICE, the hypothesized factor structure can be represented by Figure 4. In this figure, the four key constructs – Course Content and Structure, Teaching Delivery, Learning Environment, and Assessment – are named f1, f2, f3, and f4, respectively. These are latent factors represented by ovals. Each latent factor is measured by multiple items, corresponding to the questions on the ICE’s forms. For example, “Course Content and Structure,” or f1, is measured by four items q111, q112, q113, and q114.

Other considerations of testing a CFA model include whether the observable indicators should be treated as continuous variables or variables with other types of levels of measurement (nominal, or ordinal), whether responses from participants are independent or there is some dependency, estimation methods (maximum likelihood or other estimators), and treatment of missing values. For this project, the 20 statements that supposedly measure the four key constructs of MU’s ICE are rated on a five-point Likert scale (Strongly disagree, Disagree, Neutral, Agree, and Strongly agree). While there are arguments among researchers in terms of whether Likert-scale items should be treated as continuous or ordinal variables, for this project, we use them as continuous variables such that 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, and 5=Strongly agree. This is because students’ ratings for each class and instructor are aggregated (i.e., averaged) when results are reported to instructors and departments. Such aggregation requires that the variables be continuous and from the measurement perspective, falls under the classical test theory (CTT) framework.
Students’ responses are not independent since multiple students rate the same class and instructor. Therefore, we would assume that students rating the same class and instructor would give similar ratings to each other than students rating different classes or instructors. Such dependency is called clustering (students are nested within class and instructor) and can be accommodated during statistical analysis. Another dependency is that the same student could rate multiple classes and instructors. This is common when the student takes multiple courses and/or when the student rates different instructors (professor, TA) of the same course. For example, some students may have the tendency to always give high ratings. However, due to the anonymous nature of the data (i.e., we do not have unique or identifiable information for students), we cannot accommodate this type of dependency.

For the estimation method, the robust maximum likelihood (MLR) estimator is used. MLR is a maximum likelihood estimator with standard errors and a chi-square test statistic that are robust to non-normality and non-independence of observations for complex data structures. While the parameter estimates from MLR are the same as those from the conventional maximum likelihood estimator, the MLR standard errors are computed using a sandwich estimator. The MLR chi-square test statistic is asymptotically equivalent to the Yuan-Bentler T2* test statistic. In addition, this is a full information maximum likelihood method for missing data in that missing is assumed to be at random and that both complete (no missing) and partial (with some missing) data points are used in the estimation of model fit and model parameters.

Figure 4. Hypothesized four-factor structure of MU’s ICE.
For analysis, we tested a four-factor CFA model that corresponds to the above hypothesized structure for graduate-level courses (course numbers at 7000 levels or above) and undergraduate-level courses (course numbers at 4000 level or below) separately. Fit statistics for this model are shown as bolded in Table 2. For model fit, we use regular cutoffs for CFA models: Comparative Fit Index (CFI) > 0.95, Root Mean Square Error of Approximation (RMSEA) < 0.06, and Standardized Root Mean Square Residual (SRMR) < 0.08. The four-factor is supported by the data. Table 3 includes standardized factor loadings, which reflect the estimated relationship between each observable indicator and its hypothesized construct. Although there is no specific cutoff for factor loadings, researchers typically expect factor loadings from CFA models to be 0.40 or above.

Table 2. Model Fit Statistics

<table>
<thead>
<tr>
<th>Construct / Items</th>
<th>Graduate Four Factor CFA (n=34650)</th>
<th>GradSingleFactorCFA</th>
<th>GradTwoFactor CFA</th>
<th>Grad2ndOrderCFA</th>
<th>Graduate Bifactor Model, 4 group factors</th>
<th>Undergrad Four Factor CFA Model (n=343966)</th>
<th>UndergradSingleFactorCFA</th>
<th>UndergradTwoFactorCFA</th>
<th>Undergrad2ndOrderCFA</th>
<th>UndergradBifactor Model, 4 group factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grad Parameters</td>
<td>66</td>
<td>9328.86</td>
<td>164</td>
<td>0.04 0.04 0.04 0.95 0.94 0.03</td>
<td>66</td>
<td>77904.02</td>
<td>164</td>
<td>0.04 0.04 0.04 0.95 0.95 0.03</td>
<td>66</td>
<td>72278.85</td>
</tr>
<tr>
<td></td>
<td>Chi-square</td>
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<td>170</td>
<td>0.05 0.05 0.05 0.92 0.91 0.04</td>
<td>138227.78</td>
<td>18927.78</td>
<td>179</td>
<td>0.05 0.05 0.05 0.92 0.91 0.04</td>
<td>85743.16</td>
<td>82991.89</td>
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<td>RMSE</td>
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<td>0.04</td>
<td>0.95</td>
<td>0.03</td>
<td>0.94 0.03</td>
<td>0.95 0.03</td>
<td>0.95</td>
<td>0.03 0.94 0.03</td>
<td>0.95 0.03</td>
<td></td>
</tr>
<tr>
<td>RMSEA</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04 0.04</td>
<td>0.04</td>
<td>0.04 0.04</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>CI</td>
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<td>0.95</td>
<td>0.94</td>
<td>0.94</td>
<td>0.94 0.94</td>
<td>0.95 0.95</td>
<td>0.95</td>
<td>0.95 0.94</td>
<td>0.95 0.95</td>
<td></td>
</tr>
<tr>
<td>SRM R</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03 0.03</td>
<td>0.03</td>
<td>0.03 0.03</td>
<td>0.03</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Factor Loadings and Correlations Between Factors

<table>
<thead>
<tr>
<th>Construct / Items</th>
<th>Graduate</th>
<th>Undergraduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Content and Structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The syllabus clearly explained the course objectives, requirements, and grading system.</td>
<td>0.77</td>
<td>0.78</td>
</tr>
<tr>
<td>Course content was relevant and useful (e.g., readings, online media, classwork, assignments).</td>
<td>0.84</td>
<td>0.84</td>
</tr>
<tr>
<td>Resources (e.g., articles, literature, textbooks, class notes, online resources) were easy to access.</td>
<td>0.75</td>
<td>0.77</td>
</tr>
<tr>
<td>This course challenged me.</td>
<td>0.62</td>
<td>0.46</td>
</tr>
<tr>
<td>Teaching Delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>This instructor was consistently well-prepared.</td>
<td>0.82</td>
<td>0.82</td>
</tr>
<tr>
<td>This instructor was audible and clear.</td>
<td>0.79</td>
<td>0.79</td>
</tr>
<tr>
<td>This instructor was knowledgeable and enthusiastic about the topic.</td>
<td>0.81</td>
<td>0.83</td>
</tr>
</tbody>
</table>
Despite that the four-factor CFA model fit the data from both graduate- and undergraduate-level courses, the correlations among the factors were high, suggesting that there was too much overlap among the factors – the factor structure may be simpler with fewer factors. We tested four alternative models: a single-factor model, a two-factor CFA model, a second-order factor model and a bifactor model.

For the single-factor model, all 20 ICE items are hypothesized to measure the “Teaching Effectiveness” factor. For the two-factor CFA model, the first factor is hypothesized to be a “Course” factor and measured by the six ICE statements that start with “This Course,” and the second factor is hypothesized to be an “Instructor” factor and measured by the 14 ICE statements that start with “This Instructor.” For the second-order factor model, the four factors from the earlier four-factor CFA model are hypothesized to measure a higher- (i.e., second-) order factor, which can be called “Teaching Effectiveness.” For the bifactor model, it is hypothesized that all 20 ICE items directly measure something in
common that is called “Teaching Effectiveness,” and that there are four group factors that additionally account for relationships among items. These group factors correspond to the latent factors in the earlier four-factor CFA model, although their meanings are different now that they only account for residual covariation after the general factor supposedly accounts for most of the common variance among the 20 items.

Model fit statistics (see Table 2) suggest that for both graduate and undergraduate students, multiple factor structures were consistent with the data. Of the alternative models, particularly, the bifactor model, which has the most number of parameters and therefore is more complex than the other models, fit the data very well. In addition, the factor loadings on the general factor in the bifactor are high, suggesting that the 20 ICE items measure something in common. Nevertheless, the single factor CFA model had poor model fit for both graduate and undergraduate data, suggesting that the 20 ICE items are not unidimensional.

Based on these, we conclude that the original hypothesized four-factor model, which is consistent with the key constructs proposed for MU’s ICE, can be supported by both graduate and undergraduate data. However, the four key constructs are highly correlated (see Table 3). In addition, there is an overall construct based on the 20 ICE items. This overall construct can be best represented by the general factor in the bifactor model.

- Is the measurement model invariant across groups (grouping by semester, graduate/undergraduate classes, class size, instruction mode, student gender, requirement vs. elective, and student status – freshman, sophomore, junior, and senior)?

Measurement invariance has been increasingly a consideration during scale development and validation. The general idea of measurement invariance is that the “measure” (or scale, instrument, etc.), which is analogous to a ruler in the physical world, should function in a similar way for different groups so that these groups can be compared using this measure. For this project, measurement invariance was tested using the four-factor CFA model across various grouping variables. Consistent with measurement invariance literature, three types of invariance models were tested: configural invariance, metric invariance, and scalar invariance, by sequentially imposing cross-group constraints on model parameters. Recommendations of changes in model fit indices have been proposed for testing measurement invariance (Chen, 2007; Cheung & Rensvold, 2002). According to these recommendations, if CFI does not decrease by at least 0.01 and RMSEA does not increase by at least 0.015, the more restricted model should be chosen. For the various grouping variables, model fit indices always suggest the scalar invariance model was the best considering both model fit and model parsimony (see Table 4), suggesting that relationships between ICE items and the latent factors are comparable across groups based on the various grouping variables and thus latent factor means can be compared.

Table 4. Model Fit Statistics for Testing Measurement Invariance

<table>
<thead>
<tr>
<th># para</th>
<th>Chi-square</th>
<th>DF</th>
<th>RMSEA</th>
<th>90% CI RMSEA</th>
<th>CFI</th>
<th>TLI</th>
<th>SRMR</th>
</tr>
</thead>
</table>


<table>
<thead>
<tr>
<th>Model</th>
<th># para.</th>
<th>Chi-square</th>
<th>DF</th>
<th>RMSEA</th>
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<td><strong>0.04 0.04 0.95 0.95 0.03</strong></td>
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</tbody>
</table>

*Note: Multiple semesters. Four-factor CFA-graduate classes; n=34650 (Fall2014 n=7819; Spring2015 n=6725; Fall2015 n=7305; Spring2016 n=5858; Fall2016 n=6943)*

<table>
<thead>
<tr>
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<th>SRMR</th>
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*Note: Multiple semesters. Four-factor CFA-undergraduate classes; n=343966 (Fall2014 n=77492; Spring2015 n=65998; Fall2015 n=73016; Spring2016 n=62220; Fall2016 n=65240)*

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*Note: Multiple groups by class size 4-factor CFA-undergraduate; n=343966 (Csize<=30 n=134683; Csize 31-99 n=102535; Csize 100-250 n=49755; Csize>250 n=56993)*

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*Note: Multiple groups by class size 4-factor CFA-graduate; n=34650 (Csize<=30 n=26693; Csize 31-99 n=7957)*

<table>
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</tbody>
</table>

*Note: Multiple groups by instruction mode 4-factor CFA-undergraduate; n=343793 (Traditional with no online n=315140; E-Learning, 100% online n=5893; Web-facilitated <30% online n=14790; Blended class 30-80% online n=6500; Online >80% online n=1470)*

Five groups of instructional model: Traditional with no online; E-Learning, 100% online; Web-facilitated <30% online; Blended class 30-80% online; Online >80% online
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<td><strong>Note:</strong> Multiple groups by student gender 4-factor CFA-undergraduate; n=276230 (Male n=117215; Female n=159015)</td>
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<td><strong>Note:</strong> Multiple groups by required/elective 4-factor CFA-graduate; n=32858 (Required n=24188; Elective n=8670)</td>
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</table>

From the scalar invariance models, we also found the following group differences on the latent factors. All reported group differences were statistically significant at the 0.05 level.

- For graduate-level courses, latent factor means are comparable across semesters.
- For undergraduate-level courses, latent factor means for later semesters are higher than for Fall 2014.
- Ratings for graduate-level classes tend to have higher latent factor means (all four factors) than ratings for undergraduate-level classes.
- For undergraduate courses, compared to small classes (enrollment <= 30), classes with size 31-99 were rated lower on F2 "Teaching Delivery", F3 "Learning Environment", and F4 "Assessment"; classes with size 100-250 and classes with sizes > 250 were rated lower on all four factors.
- For graduate courses, compared to smaller classes (enrollment <= 30), larger classes (enrollment > 30) were rated lower on F1 "Course Content and Structure".
- For undergraduate courses, compared to Traditional classes with no online component, ratings for E-Learning and Online classes were lower on F2 "Teaching Delivery" and F3 "Learning Environment"; ratings for Web-facilitated and Blended classes were lower on all four factors.
- For graduate courses, compared to Traditional classes with no online component, ratings for E-Learning classes were higher on F1 "Course Content and Structure," and lower on F2 "Teaching Delivery"; Online classes were rated lower on F2 "Teaching Delivery" and F3 "Learning Environment";
- For undergraduate courses, female students gave higher ratings than male students for all four key ICE constructs.
- For graduate courses, female students gave lower ratings than male students. However, gender difference was only statistically significant for F4 "Assessment" factor at alpha = .05.
- For undergraduate courses, when the course was elective, the student gave higher ratings on all four factors than when the course was a requirement (all significant at alpha = .05).
- For graduate courses, when the course was elective, the student gave higher ratings on all four factors than when the course was a requirement (all significant at alpha = .05).
- Compared to freshmen, juniors rated higher on F4 "Assessment", and seniors rated higher on all four factors.

- Reliability

For reporting purposes, we rely on the classical test theory due to its simplicity and straightforward way to calculate scale and subscale scores. Specifically, for each class-instructor pair, we calculated the average student rating on each item; next, we calculated the scale scores and subscale scores for each class-instructor pair. The scale score is the mean of the 20 ICE items and the subscale scores for each construct is the mean of the items that supposedly measure the construct. We checked the internal consistency of items for the total scale and subscales using Cronbach’s alpha. These Cronbach’s alpha coefficients are high (Table 5 and Figure 5), suggesting that there was high internal consistency among the items for each of the subscales and the total scale of MU’s ICE.

<table>
<thead>
<tr>
<th>Table 5. Reliability for Total Scale and Subscales of MU’s ICE</th>
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</thead>
<tbody>
<tr>
<td># items</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Course Content and Structure</td>
</tr>
<tr>
<td>Teaching Delivery</td>
</tr>
</tbody>
</table>
Learning Environment 6 0.967 0.965 0.967 0.965 0.968 0.971 3 0.898 0.892 0.901 0.890 0.900 0.903 20 0.980 0.978 0.980 0.979 0.981 0.982

All All Graduate Classes

<table>
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<tr>
<th></th>
<th>Fall2014</th>
<th>Spring2015</th>
<th>Fall2015</th>
<th>Spring2016</th>
<th>Fall2016</th>
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<tr>
<td>Course Content and Structure</td>
<td>0.842</td>
<td>0.857</td>
<td>0.831</td>
<td>0.881</td>
<td>0.827</td>
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<tr>
<td>Teaching Delivery</td>
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<td>0.962</td>
<td>0.956</td>
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<td>Learning Environment</td>
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<td>0.894</td>
<td>0.884</td>
<td>0.915</td>
<td>0.881</td>
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<tr>
<td>Total Scale</td>
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<td>0.977</td>
<td>0.974</td>
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</table>

**Figure 5.** Reliability for the total scale and four subscales of MU’s ICE.
• Intraclass Correlation

As mentioned earlier, we were interested in the variation due to the sampling of students. For each of the ICE items, and the subscale and total scale scores, we calculated the intraclass correlation (ICC). ICC is a commonly used statistic for agreement among raters. For this project, multiple students rated the same instructor for the same class. A low ICC reflects large variation (i.e., disagreement or inconsistency) among raters. The ICCs are in the range of 0.10 to 0.30, reflecting large variation due to the sampling of students (see Table 6 and Figure 6).

Table 6. Intraclass Correlations for ICE Items, Subscales, and Total Scale

<table>
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<tr>
<th>Undergraduate Sample</th>
<th>Fall 2014</th>
<th>Spring 2015</th>
<th>Fall 2015</th>
<th>Spring 2016</th>
<th>Fall 2016</th>
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<tr>
<td>Sample size</td>
<td>77496</td>
<td>66001</td>
<td>73016</td>
<td>62220</td>
<td>65240</td>
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<td># of clusters</td>
<td>2782</td>
<td>2548</td>
<td>2730</td>
<td>2543</td>
<td>2691</td>
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<tr>
<td>Average cluster size</td>
<td>27.856</td>
<td>25.903</td>
<td>26.746</td>
<td>24.467</td>
<td>24.244</td>
</tr>
<tr>
<td>Items</td>
<td></td>
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<tr>
<td>This instructor taught effectively considering both the possibilities and limitations of the subject matter and the course (including class size and facilities). Q104</td>
<td>0.22</td>
<td>0.22</td>
<td>0.22</td>
<td>0.23</td>
<td>0.26</td>
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<tr>
<td>The syllabus clearly explained the course objectives, requirements, and grading system. Q111</td>
<td>0.15</td>
<td>0.15</td>
<td>0.14</td>
<td>0.16</td>
<td>0.21</td>
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<tr>
<td>Course content was relevant and useful (e.g., readings, online media, classwork, assignments). Q112</td>
<td>0.15</td>
<td>0.14</td>
<td>0.15</td>
<td>0.17</td>
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<tr>
<td>Resources (e.g., articles, literature, textbooks, class notes, online resources) were easy to access. Q113</td>
<td>0.11</td>
<td>0.10</td>
<td>0.10</td>
<td>0.11</td>
<td>0.14</td>
</tr>
<tr>
<td>This course challenged me. Q114</td>
<td>0.15</td>
<td>0.13</td>
<td>0.14</td>
<td>0.14</td>
<td>0.14</td>
</tr>
<tr>
<td>I was well-informed about my performance during this course. Q115</td>
<td>0.20</td>
<td>0.21</td>
<td>0.21</td>
<td>0.22</td>
<td>0.25</td>
</tr>
<tr>
<td>Assignments/projects/exams were graded fairly based on clearly communicated criteria. Q116</td>
<td>0.19</td>
<td>0.18</td>
<td>0.19</td>
<td>0.20</td>
<td>0.22</td>
</tr>
<tr>
<td>This instructor was consistently well-prepared. Q117</td>
<td>0.21</td>
<td>0.22</td>
<td>0.23</td>
<td>0.23</td>
<td>0.27</td>
</tr>
<tr>
<td>This instructor was audible and clear. Q118</td>
<td>0.26</td>
<td>0.25</td>
<td>0.27</td>
<td>0.25</td>
<td>0.29</td>
</tr>
<tr>
<td>This instructor was knowledgeable and enthusiastic about the topic. Q119</td>
<td>0.19</td>
<td>0.19</td>
<td>0.22</td>
<td>0.20</td>
<td>0.23</td>
</tr>
<tr>
<td>This instructor effectively used examples/illustrations to promote learning. Q120</td>
<td>0.18</td>
<td>0.19</td>
<td>0.20</td>
<td>0.20</td>
<td>0.24</td>
</tr>
<tr>
<td>This instructor fostered questions and/or class participation. Q121</td>
<td>0.19</td>
<td>0.20</td>
<td>0.21</td>
<td>0.20</td>
<td>0.22</td>
</tr>
<tr>
<td>This instructor clearly explained important information/ideas/concepts. Q122</td>
<td>0.22</td>
<td>0.22</td>
<td>0.23</td>
<td>0.24</td>
<td>0.27</td>
</tr>
<tr>
<td>This instructor effectively used teaching methods appropriate to this class (e.g., critiques, discussion, demonstrations, group work). Q123</td>
<td>0.20</td>
<td>0.20</td>
<td>0.21</td>
<td>0.21</td>
<td>0.24</td>
</tr>
<tr>
<td>This instructor responded appropriately to questions and comments. Q124</td>
<td>0.20</td>
<td>0.20</td>
<td>0.21</td>
<td>0.21</td>
<td>0.24</td>
</tr>
<tr>
<td>This instructor stimulated student thinking and</td>
<td>0.18</td>
<td>0.19</td>
<td>0.19</td>
<td>0.21</td>
<td>0.23</td>
</tr>
</tbody>
</table>
learning. Q125
This instructor promoted an atmosphere of mutual respect regarding diversity in student demographics and viewpoints, such as race, gender, or politics. Q126
This instructor was approachable and available for extra help. Q127
This instructor used class time effectively. Q128
This instructor helped students to be independent learners, responsible for their own learning. Q129
This instructor provided feedback that helped me improve my skills in this subject area. Q130

<table>
<thead>
<tr>
<th>Constructs</th>
<th>F1: Course Content and Structure</th>
<th>F2: Teaching Delivery</th>
<th>F3: Learning Environment</th>
<th>F4: Assessment</th>
<th>ICE Total Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.15</td>
<td>0.25</td>
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<td>0.22</td>
<td>0.23</td>
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<tr>
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<td>0.26</td>
<td>0.22</td>
<td>0.25</td>
<td>0.27</td>
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<table>
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<tr>
<th>Graduate Sample</th>
<th>Fall 2014</th>
<th>Spring 2015</th>
<th>Fall 2015</th>
<th>Spring 2016</th>
<th>Fall 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size</td>
<td>7819</td>
<td>6725</td>
<td>7305</td>
<td>5858</td>
<td>6943</td>
</tr>
<tr>
<td># of clusters</td>
<td>638</td>
<td>533</td>
<td>618</td>
<td>488</td>
<td>593</td>
</tr>
<tr>
<td>Average cluster size</td>
<td>12.255</td>
<td>12.617</td>
<td>11.82</td>
<td>12.004</td>
<td>11.708</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Items</th>
<th>Fall 2014</th>
<th>Spring 2015</th>
<th>Fall 2015</th>
<th>Spring 2016</th>
<th>Fall 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>This instructor taught effectively considering both the possibilities and limitations of the subject matter and the course (including class size and facilities). Q104</td>
<td>0.22</td>
<td>0.24</td>
<td>0.25</td>
<td>0.29</td>
<td>0.25</td>
</tr>
<tr>
<td>The syllabus clearly explained the course objectives, requirements, and grading system. Q111</td>
<td>0.17</td>
<td>0.20</td>
<td>0.16</td>
<td>0.24</td>
<td>0.18</td>
</tr>
<tr>
<td>Course content was relevant and useful (e.g., readings, online media, classwork, assignments). Q112</td>
<td>0.16</td>
<td>0.19</td>
<td>0.18</td>
<td>0.21</td>
<td>0.21</td>
</tr>
<tr>
<td>Resources (e.g., articles, literature, textbooks, class notes, online resources) were easy to access. Q113</td>
<td>0.12</td>
<td>0.14</td>
<td>0.15</td>
<td>0.15</td>
<td>0.14</td>
</tr>
<tr>
<td>This course challenged me. Q114</td>
<td>0.18</td>
<td>0.17</td>
<td>0.19</td>
<td>0.20</td>
<td>0.18</td>
</tr>
<tr>
<td>I was well-informed about my performance during this course. Q115</td>
<td>0.24</td>
<td>0.31</td>
<td>0.29</td>
<td>0.24</td>
<td>0.32</td>
</tr>
<tr>
<td>Assignments/projects/exams were graded fairly based on clearly communicated criteria. Q116</td>
<td>0.18</td>
<td>0.22</td>
<td>0.21</td>
<td>0.20</td>
<td>0.27</td>
</tr>
<tr>
<td>This instructor was consistently well-prepared. Q117</td>
<td>0.25</td>
<td>0.29</td>
<td>0.28</td>
<td>0.31</td>
<td>0.27</td>
</tr>
<tr>
<td>This instructor was audible and clear. Q118</td>
<td>0.21</td>
<td>0.21</td>
<td>0.24</td>
<td>0.24</td>
<td>0.22</td>
</tr>
<tr>
<td>This instructor was knowledgeable and enthusiastic about the topic. Q119</td>
<td>0.17</td>
<td>0.18</td>
<td>0.21</td>
<td>0.19</td>
<td>0.20</td>
</tr>
<tr>
<td>This instructor effectively used examples/illustrations to promote learning. Q120</td>
<td>0.18</td>
<td>0.21</td>
<td>0.21</td>
<td>0.24</td>
<td>0.22</td>
</tr>
<tr>
<td>Construct</td>
<td>Q121</td>
<td>Q122</td>
<td>Q123</td>
<td>Q124</td>
<td>Q125</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>This instructor fostered questions and/or class participation.</td>
<td>0.20</td>
<td>0.20</td>
<td>0.23</td>
<td>0.26</td>
<td>0.20</td>
</tr>
<tr>
<td>This instructor clearly explained important information/ideas/concepts.</td>
<td>0.21</td>
<td>0.24</td>
<td>0.24</td>
<td>0.27</td>
<td>0.27</td>
</tr>
<tr>
<td>This instructor effectively used teaching methods appropriate to this</td>
<td>0.21</td>
<td>0.20</td>
<td>0.23</td>
<td>0.26</td>
<td>0.22</td>
</tr>
<tr>
<td>class (e.g., critiques, discussion, demonstrations, group work).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This instructor responded appropriately to questions and comments.</td>
<td>0.19</td>
<td>0.25</td>
<td>0.24</td>
<td>0.27</td>
<td>0.25</td>
</tr>
<tr>
<td>This instructor stimulated student thinking and learning.</td>
<td>0.19</td>
<td>0.20</td>
<td>0.24</td>
<td>0.25</td>
<td>0.22</td>
</tr>
<tr>
<td>This instructor promoted an atmosphere of mutual respect regarding</td>
<td>0.14</td>
<td>0.16</td>
<td>0.15</td>
<td>0.19</td>
<td>0.16</td>
</tr>
<tr>
<td>diversity in student demographics and viewpoints, such as race, gender,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or politics.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This instructor was approachable and available for extra help.</td>
<td>0.17</td>
<td>0.24</td>
<td>0.20</td>
<td>0.23</td>
<td>0.20</td>
</tr>
<tr>
<td>This instructor used class time effectively.</td>
<td>0.21</td>
<td>0.21</td>
<td>0.24</td>
<td>0.26</td>
<td>0.22</td>
</tr>
<tr>
<td>This instructor helped students to be independent learners, responsible</td>
<td>0.14</td>
<td>0.14</td>
<td>0.14</td>
<td>0.17</td>
<td>0.17</td>
</tr>
<tr>
<td>for their own learning.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This instructor provided feedback that helped me improve my skills in</td>
<td>0.20</td>
<td>0.25</td>
<td>0.23</td>
<td>0.23</td>
<td>0.24</td>
</tr>
<tr>
<td>this subject area.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Constructs**

- F1: Course Content and Structure
  - 0.18 0.21 0.20 0.24 0.22
- F2: Teaching Delivery
  - 0.24 0.25 0.28 0.30 0.27
- F3: Learning Environment
  - 0.21 0.23 0.24 0.28 0.24
- F4: Assessment
  - 0.23 0.30 0.28 0.25 0.32
- ICE Total Scale
  - 0.23 0.26 0.27 0.29 0.27
Figure 6. Intraclass correlations (ICCs) for ICE subscales and total scale by semester. Numbers and positions of circles indicate ICC values. Circle sizes represent average cluster sizes.
Relationships with Conceptually Related Constructs

To further collect validity evidence of the 20 items that measure the four key ICE constructs, their relationships with other conceptually related constructs were examined. Two related constructs/variables were used. The first is a general teaching effectiveness item “This instructor taught effectively considering both the possibilities and limitations of the subject matter and the course (including class size and facilities).” This item was rated on the same Liker-scale with response options Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), and Strongly Agree (5) as the scale for the 20 items measuring the key ICE constructs. This item had been used for MO SB389 in the past. The second related construct is the set of five current MO SB389 items, which asks students to report their recommendations to other students regarding five construct areas (class content, class structure, positive learning environment, instructor’s teaching skill/style, and fairness of grading). The response options for the five MO SB389 items are Yes, No, and Don’t know. For statistical analysis, only Yes and No responses were used.

The correlations between the four key ICE constructs and the general teaching effectiveness item were high (ranged from 0.81 to 0.89 for the graduate sample; and ranged from 0.76 to 0.89 for the undergraduate sample; see Table 7), suggesting that the general teaching effectiveness item may be used as an overall indicator of teaching effectiveness.

Table 7. Correlations between Key ICE Constructs and General Teaching Effectiveness Item

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>Q104</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1: Course Content and Structure</td>
<td>0.83</td>
<td>0.84</td>
<td>0.90</td>
<td>0.76</td>
<td></td>
</tr>
<tr>
<td>F2: Teaching Delivery</td>
<td>0.87</td>
<td>0.95</td>
<td>0.90</td>
<td>0.89</td>
<td></td>
</tr>
<tr>
<td>F3: Learning Environment</td>
<td>0.87</td>
<td>0.96</td>
<td>0.93</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>F4: Assessment</td>
<td>0.88</td>
<td>0.88</td>
<td>0.91</td>
<td>0.87</td>
<td></td>
</tr>
<tr>
<td>Q104: This instructor taught effectively considering both the possibilities and limitations of the subject matter and the course (including class size and facilities).</td>
<td>0.81</td>
<td>0.89</td>
<td>0.88</td>
<td>0.84</td>
<td></td>
</tr>
</tbody>
</table>

Note: Correlations for the graduate sample are shaded, and correlations for the undergraduate sample are not shaded.

Earlier analysis suggested that the 20 ICE items measure something in common. Therefore, another way to look at the relationships between the ICE items and the general teaching effectiveness item is to examine the difference between the average of the 20 ICE items and the general teaching effectiveness item for each class-instructor pair. Based on the data available for 16,148 unique combinations of class and instructor, such differences ranged from -1.35 to 1.65 with a mean of 0.0168. The 1st percentile difference was -0.3268 and the 99th percentile difference was 0.7000. Scatter plots (Figure 7) indicate that the largest discrepancies between the average of the 20 ICE items and the general teaching effectiveness item occurred for classes with fewer students who rated the instructor(s).

Figure 7. Scatter plots of the difference between the average of 20 ICE items and the general teaching effectiveness item, and the number of respondents. (A) – all classes; (B) – all undergraduate classes; (C) – all graduate classes; (D) – undergraduate classes with 50 or fewer respondents; (E) – graduate classes with 50 or fewer respondents.
Another set of scatter plots focuses on relationships between the number of enrollment and the difference between the average of 20 ICE items and the general teaching effectiveness item (Figure 8). The largest discrepancies between the average of the 20 ICE items and the general teaching effectiveness item occurred for smaller classes.

Figure 8. Scatter plots of the difference between the average of 20 ICE items and the general teaching effectiveness item, and the enrollment. (A) – all classes; (B) – all undergraduate classes; (C) – all graduate classes; (D) – undergraduate classes with 50 or fewer respondents; (E) – graduate classes with 50 or fewer respondents.
These suggest that while the general teaching effectiveness item alone may be used for larger classes and classes with a high number of respondents, if it is used for smaller classes or classes with few respondents, the rating could be unreliable. We recommend that colleges and departments promote the importance of instruction and teaching evaluation in order to get a higher response rate.

There are five items for the MO SB389 requirement. While the majority of respondents answered “Yes” when asked whether they would recommend the class to other students regarding class content, class structure, positive learning environment, instructor’s teaching skill/style, or fairness of grading, there were moderate and statistically significant correlations between the ICE key constructs and the MO SB389 questions. For Table 8, a “Yes” recommendation was coded 1 and a “No” recommendation was coded 2. Therefore, a negative correlation between a MO SB389 item and an ICE construct suggests a higher recommendation rate for classes and instructors rated higher on the construct. From Table 8, higher student ratings were associated with higher likelihood of recommending the class to other students.

Table 8. Correlations between Key ICE Constructs and MO SB389 Items

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>Q105</th>
<th>Q106</th>
<th>Q107</th>
<th>Q108</th>
<th>Q109</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1: Course Content and Structure</td>
<td>0.83</td>
<td>0.84</td>
<td>0.91</td>
<td>-0.44</td>
<td>-0.49</td>
<td>-0.42</td>
<td>-0.50</td>
<td>-0.42</td>
<td></td>
</tr>
<tr>
<td>F2: Teaching Delivery</td>
<td>0.87</td>
<td></td>
<td>0.95</td>
<td>0.90</td>
<td>-0.41</td>
<td>-0.52</td>
<td>-0.50</td>
<td>-0.64</td>
<td>-0.42</td>
</tr>
<tr>
<td>F3: Learning Environment</td>
<td>0.87</td>
<td>0.96</td>
<td>0.88</td>
<td>0.88</td>
<td></td>
<td>-</td>
<td>-0.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F4: Assessment</td>
<td>0.88</td>
<td>0.88</td>
<td>0.91</td>
<td>0.88</td>
<td>0.88</td>
<td>0.91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q105 Recommendation regarding Class Content</td>
<td>-0.53</td>
<td>-0.45</td>
<td>-0.44</td>
<td>-0.43</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q106 Recommendation regarding Class Structure</td>
<td>-0.55</td>
<td>-0.56</td>
<td>-0.54</td>
<td>-0.56</td>
<td>0.49</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q107 Recommendation regarding Positive Learning Environment</td>
<td>-0.44</td>
<td>-0.51</td>
<td>-0.54</td>
<td>-0.50</td>
<td>0.43</td>
<td>0.48</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q108 Recommendation regarding Instructor's Teaching Skill/Style</td>
<td>-0.56</td>
<td>-0.66</td>
<td>-0.62</td>
<td>-0.61</td>
<td>0.49</td>
<td>0.68</td>
<td>0.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q109 Recommendation regarding Fairness Of Grading</td>
<td>-0.41</td>
<td>-0.43</td>
<td>-0.45</td>
<td>-0.60</td>
<td>0.36</td>
<td>0.43</td>
<td>0.52</td>
<td>0.48</td>
<td></td>
</tr>
</tbody>
</table>

Note: Correlations for the graduate sample are shaded, and Correlations for the undergraduate sample are not shaded.

Relationships with Instructor and Class Information

Further, relationships between students’ ratings and instructor and class information were examined. Specifically, student average rating for each class/instructor, the standard deviation of student ratings for each class/instructor, the sex of the instructor, and the class average GPA were used.

The numbers of classes for which a male or female instructor were rated by semester and by course level (undergraduate vs. graduate) are in Table 9 and Figure 9.

Table 9. Number of Classes by Instructor’s Sex by Semester and by Course Level

<table>
<thead>
<tr>
<th></th>
<th>Undergraduate</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2014</td>
<td></td>
<td>1364 (53.7%)</td>
<td>1176 (46.3%)</td>
<td>2540</td>
</tr>
<tr>
<td>Spring 2015</td>
<td></td>
<td>1293 (54.4%)</td>
<td>1084 (45.6%)</td>
<td>2377</td>
</tr>
<tr>
<td>Fall 2015</td>
<td></td>
<td>1372 (54.2%)</td>
<td>1159 (45.8%)</td>
<td>2531</td>
</tr>
</tbody>
</table>
### Table 1

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring 2016</strong></td>
<td>1298 (54.8%)</td>
<td>1069 (45.2%)</td>
<td>2367</td>
</tr>
<tr>
<td><strong>Fall 2016</strong></td>
<td>1344 (54.3%)</td>
<td>1129 (45.7%)</td>
<td>2473</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6671 (54.3%)</td>
<td>5617 (45.7%)</td>
<td>12288</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Graduate</strong></th>
<th><strong>Male</strong></th>
<th><strong>Female</strong></th>
<th><strong>Total</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall 2014</strong></td>
<td>358 (59.6%)</td>
<td>243 (40.4%)</td>
<td>601</td>
</tr>
<tr>
<td><strong>Spring 2015</strong></td>
<td>267 (54.5%)</td>
<td>223 (45.5%)</td>
<td>490</td>
</tr>
<tr>
<td><strong>Fall 2015</strong></td>
<td>303 (52.8%)</td>
<td>271 (47.2%)</td>
<td>574</td>
</tr>
<tr>
<td><strong>Spring 2016</strong></td>
<td>239 (53.2%)</td>
<td>210 (46.8%)</td>
<td>449</td>
</tr>
<tr>
<td><strong>Fall 2016</strong></td>
<td>279 (50.3%)</td>
<td>276 (49.7%)</td>
<td>555</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1446 (54.2%)</td>
<td>1223 (45.8%)</td>
<td>2669</td>
</tr>
</tbody>
</table>

### Figure 9

*Percentages of male and female instructors for undergraduate classes by semester.*

*Percentages of male and female instructors for graduate classes by semester.*

---

_Figure 9._ Percentages of male and female instructors for undergraduate and graduate classes by semester.
Correlations between student average ratings on ICE constructs (four key constructs and the total scale), instructor’s sex and class average GPA are in Table 10. Separate analysis by semester was also conducted and the results were similar across semesters. A positive correlation between an ICE construct and the instructor’s sex variable means that a female instructor had a higher value on the ICE construct; and a negative correlation means that a male instructor had a higher value.

Despite some statistically significant correlations between student ratings and instructor’s sex, which could be due to the large sample sizes, none of these correlations reached a magnitude of 0.10. In addition, independent samples t-test results showed very small differences in average student ratings between classes taught by male and female instructors despite some statistically significant differences (see Table 11). The differences between ratings for male and female instructors ranged from -0.09 to 0.02. These results suggest that instructor’s sex was not strongly related to student rating of teaching. However, this is not to say that there was no gender bias since we are not sure if teaching effectiveness is truly equal between male and female instructors.

Similarly, the correlations between student ratings and class average GPA were very small, despite some statistically significant ones. The highest correlation was between student average rating on Teaching Delivery and class average GPA for undergraduate classes at 0.154. These results suggest that class average GPA was not strongly related to student ratings of teaching.

### Table 10. Correlations between ICE Constructs, Instructor’s Sex and Class Average GPA

<table>
<thead>
<tr>
<th></th>
<th>Undergraduate Sample</th>
<th>Graduate Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Instructor’s Sex</td>
<td>Class Average GPA</td>
</tr>
<tr>
<td>Course Content and Structure _ Mean</td>
<td>.057** (12284)</td>
<td>.090** (13192)</td>
</tr>
<tr>
<td>Teaching Delivery _ Mean</td>
<td>.083** (12281)</td>
<td>.154** (13189)</td>
</tr>
<tr>
<td>Learning Environment _ Mean</td>
<td>.076** (12281)</td>
<td>.115** (13189)</td>
</tr>
<tr>
<td>Assessment _ Mean</td>
<td>.098** (12285)</td>
<td>.114** (13193)</td>
</tr>
<tr>
<td>Total Scale _ Mean</td>
<td>.084** (12285)</td>
<td>.133** (13193)</td>
</tr>
<tr>
<td>Course Content and Structure _ SD</td>
<td>-.048** (12194)</td>
<td>-.146** (13098)</td>
</tr>
<tr>
<td>Teaching Delivery _ SD</td>
<td>-.080** (12185)</td>
<td>-.140** (13089)</td>
</tr>
<tr>
<td>Learning Environment _ SD</td>
<td>-.067** (12186)</td>
<td>-.099** (13090)</td>
</tr>
<tr>
<td>Assessment _ SD</td>
<td>-.089** (12197)</td>
<td>-.084** (13101)</td>
</tr>
<tr>
<td>Total Scale _ SD</td>
<td>-.070** (12197)</td>
<td>-.092** (13101)</td>
</tr>
</tbody>
</table>

*Note. Sample sizes are in parentheses. *p<.05, **p<.01

### Table 11. T-Test Results for Differences Between Male and Female Instructors in Average Student Ratings

<table>
<thead>
<tr>
<th>Undergraduate</th>
<th>Male Instructor</th>
<th>Female Instructor</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1: Course Content and Structure</td>
<td>4.35</td>
<td>0.32</td>
<td>4.39</td>
</tr>
<tr>
<td>F2: Teaching Delivery</td>
<td>4.38</td>
<td>0.44</td>
<td>4.45</td>
</tr>
<tr>
<td>F3: Learning Environment</td>
<td>4.41</td>
<td>0.39</td>
<td>4.47</td>
</tr>
</tbody>
</table>
Another thought is that maybe student’s gender matters when they rated a male or female instructor (note: in this report, we use gender and sex interchangeably although they are not the same. Also, for student gender, we only used Male and Female genders due to the relatively small number of students who chose other gender categories). For example, a male student might give a higher rating to a male instructor than to a female instructor; or a male instructor may receive higher ratings from male students than from female students.

Two sets of analyses were conducted. For the first set, we calculated correlations between instructor’s sex and the four ICE key constructs, separately for when the student gender and instructor’s sex were opposite and for when the student gender and instructor’s sex were the same. A positive correlation would mean that the female instructor was rated higher on the construct. Results are in Table 12. For the undergraduate sample, when student gender and instructor’s sex were opposite (i.e., a male student rating a female instructor or a female student rating a male instructor), female instructors received lower ratings on F1 “Course Content and Structure” and higher ratings on F4 “Assessment,” compared to male instructors; when student gender and instructor’s sex were the same, female instructors received higher ratings on all four constructs. For the graduate sample, the only statistically significant result (at alpha=.05) was that when student gender and instructor’s sex were opposite, female instructors received higher ratings on F4 “Assessment,” compared to male instructors. However, all correlations were very small (magnitude ranging from 0.000 to 0.071), suggesting that the instructor’s sex was not strongly related to student rating of teaching when the student’s gender is the same as or opposite to the instructor’s sex.

For the second set of analysis, we calculated correlations between student gender and the four ICE key constructs, separately for male instructors and female instructors. A positive correlation would mean that female students gave a higher rating compared to male students. Results are in Table 13. For the undergraduate sample, when the instructor was male, female students gave higher ratings on F1 “Course Content and Structure” and lower ratings on F4 “Assessment,” compared to male students; when the instructor was female, female students gave higher ratings on all four ICE constructs, compared to male students. For the graduate sample, at the statistically significance level of .05, when the instructor was male, female students gave lower ratings on F1 “Course Content and Structure,” F2 “Teaching Delivery,” and F4 “Assessment,” compared to male students; when the instructor was female, male and female students gave similar ratings. However, even the statistically significant correlations were small (highest was in
the magnitude of .048), suggesting that student gender was not strongly related to their rating for classes taught by a male instructor or a female instructor.

Table 12. Correlations between Instructor’s Sex and Four ICE Constructs

| F1: Course Content and Structure | 0.818*** | 0.827*** | 0.905*** | -0.026** |
| F2: Teaching Delivery           | 0.849*** | 0.946*** | 0.894*** | -0.002   |
| F3: Learning Environment        | 0.848*** | 0.954*** | 0.922*** | -0.004   |
| F4: Assessment                  | 0.862*** | 0.859*** | 0.894*** | 0.032**  |
| Instructor's Sex               | -0.016   | -0.021   | -0.016   | 0.039*   |

Note: Correlations for the graduate sample are shaded, and Correlations for the undergraduate sample are not shaded. *p<.05, **p<.01, ***p<.001

Table 13. Correlations between Student Gender and Four Key ICE Constructs

| F1: Course Content and Structure | 0.832*** | 0.842*** | 0.908*** | 0.068*** |
| F2: Teaching Delivery           | 0.874*** | 0.951*** | 0.903*** | 0.071*** |
| F3: Learning Environment        | 0.874*** | 0.957*** | 0.930*** | 0.069*** |
| F4: Assessment                  | 0.884*** | 0.883*** | 0.916*** | 0.058*** |
| Student Gender                  | -0.016   | -0.033   | -0.027   | 0.000    |

Note: Correlations for the graduate sample are shaded, and Correlations for the undergraduate sample are not shaded. *p<.05, **p<.01, ***p<.001
Conclusions
In this evaluation report, we examined the internal structure of key constructs of the University of Missouri’s (MU) instruction and course evaluations (ICE), as well as relationships between these constructs and relevant variables. Based on the results, we conclude:

- The four key constructs (i.e., Course Content and Structure, Teaching Delivery, Learning Environment, and Assessment), each measured by individual items on the ICE forms, have good internal structure and reliability.
- There is an overall teaching effectiveness construct that could be represented by the 20 items supposedly measuring the four key constructs.
- The general teaching effectiveness item (This instructor taught effectively considering both the possibilities and limitations of the subject matter and the course (including class size and facilities.) could be used to replace the overall teaching effectiveness construct (20 items), but only for larger classes and classes with a high number of respondents.
- There is more variability among students than variability among classes and instructors. That is, the major source of different ratings is differences between students instead of differences between classes and instructors.
- Class average GPA was not strongly related to student rating of teaching.
- Instructor’s sex was not strongly related to student rating of teaching.
- Student gender was not strongly related to their rating, for classes taught by a male instructor, or a female instructor.
- There are some group differences. They are summarized below:
  - Graduate-level courses received ratings that were about 0.14 to 0.17 standard deviations (SDs) higher than undergraduate-level courses.
  - Larger classes tend to receive lower ratings than smaller classes. For undergraduate courses, compared to classes with an enrollment of 30 or fewer students, classes with 31-99 students were rated about 0.05 SDs lower on F2 "Teaching Delivery", F3 "Learning Environment", and F4 "Assessment"; classes with 100-250 students were rated about 0.07 to 0.14 SDs lower on the four key ICE constructs; and classes with sizes>250 were rated 0.112 to 0.208 SDs lower on the four key ICE constructs. For graduate courses, larger classes with an enrollment greater than 30 were rated 0.067 SDs lower on F1 "Course Content and Structure" than smaller classes with size of 30 or fewer students.
  - For undergraduate courses, Traditional classes with no online components received the highest ratings compared to classes with other instruction modes. Compared to Traditional classes with no online component, ratings for E-Learning and Online classes were lower on F2 "Teaching Delivery" (0.163 SDs) and F3 "Learning Environment" (0.146 SDs); ratings for Web-facilitated classes were 0.088 to 0.227 SDs lower on all four constructs; and ratings for Blended classes were 0.147 to 0.226 SDs lower on all four constructs.
  - For graduate courses, compared to Traditional classes with no online component, ratings for E-Learning classes were (0.108 SDs) higher on F1 “Course Content and Structure” and (0.136 SDs) lower on F2 "Teaching Delivery"; Online classes were rated lower on F2 "Teaching Delivery" (by 0.155 SDs) and F3 "Learning Environment" (by 0.106 SDs).
Students rated elective courses higher than required courses. For undergraduate courses, when the course was elective, students gave ratings that were 0.087 to 0.176 SDs higher on all four constructs than when the course was a requirement. For graduate courses, when the course was elective, students gave ratings that were 0.074 to 0.099 SDs higher on all four constructs than when the course was a requirement.

There are some small gender differences. For undergraduate courses, female students gave 0.02 to 0.088 SDs higher ratings than male students for all four key ICE constructs. For graduate courses, female students gave 0.037 SD lower ratings than male students on F4 "Assessment."

Compared to freshmen, juniors rated 0.040 SDs higher on F4 "Assessment", and seniors rated 0.061 to 0.100 SDs higher on all four constructs.

Analyses for this report are based on five semesters of ICE data collected for the MU campus. While we have some interesting findings, we did not conduct analysis separately for individual colleges, divisions, or departments. As a result, the conclusions and recommendations are at a relatively broad level for the MU campus. Individual colleges, divisions, and departments may have unique features that are not revealed in this report.

References
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“Ask Me and I Will Tell You”: Gifted Boys’ Perceptions of Self and School

Abstract

Gifted boys’ self-perceptions as learners are influenced by their social and emotional experiences at school. The research objective of this ethnographic work was to understand how boys’ self-perceptions as learners relate to their academic and social school environments. The concepts of this paper focused on giftedness as a social construct, gifted boys’ self-perceptions, and teachers’ perceptions of boys as learners. This research was based on a four-month study during the spring public school semester in a suburban elementary school setting. The participants included 10 male students, ages 9-11, who were identified as gifted and talented by the school district in which they attended. Fieldnotes, observations, and individual interviews were examined through the frame of reference theory to understand how gifted boys develop self-concepts that influence their academic and social school contexts. The frame of reference theory served to explain how students compared their academic abilities to those of their peers (Williams & Montgomery, 1995). Understanding the intersections of academic, social, and emotional development of gifted boys in elementary school can have important instructional implications for teachers. The findings explored three themes. First, the participants’ wanted their teachers to understand that while they value their gifted identities, they still have academic needs for which they need help. Second, gifted boys believed their classroom behaviors were often misunderstood. Third, the participants they had a voice about the curriculum assigned to them. These findings conclude by examining implications for teachers to address the perceptions of boys as students in their classrooms. This study explored the significance of understanding how gifted boys feel about themselves as valued members of the classroom community.

Key words: giftedness, self-concept, frame of reference theory, social construct
Abstract

The four-year B.S. Construction Engineering Technology curriculum is weighted heavily with technical coursework. Even though students take nearly a quarter of their coursework in the humanities, many students diminish the value of those courses, both required and elective. However, the Accreditation Board for Engineering and Technology (ABET) accreditation criteria require students, by the time of graduation, to (1) “have an ability to identify, analyze, and solve broadly-defined engineering technology problems.” Furthermore, students are required to (2) “have a knowledge of the impact of engineering technology solutions in a societal and global context.”

In recent years, the senior capstone course sequence in the 4-year Construction Engineering Technology B.S. degree program has focused on developing and building service learning projects for local non-profit organizations, such as Habitat for Humanity. By engaging with outside organizations, students are exposed to (1) broadly defined construction problems, as well as (2) the impacts of construction projects in a societal and global context. Although students appear to enjoy working on real community service projects, does the experience actually generate the knowledge and exposure intended?

This poster will present a summary of the service learning course sequence with example projects, the reflective survey results from the students, highlights from relevant literature, and some proposed methodologies to better evaluate and measure student learning. The course sequence begins in the latter part of the spring semester, when students self-select into teams, choose a project to work on, prepare and present their proposal to do the work. In the following fall semester, student teams finalize their plans, participate in safety training, and actually build the projects. After construction is finished, in an attempt to measure their knowledge, students complete reflective surveys. Results of those surveys from recent years will be presented. In addition, a literature review will be conducted to discover and evaluate other potential measurement methods. Those results will be presented as well.

It is hoped that this poster presentation will generate interest and discussion about service learning projects, their educational impacts for students, and methodologies to measure them.
Use of neural responses (ERPs) for Measuring L2 Phoneme Development: Evidence from Chinese Learners of Korean learning /e/(ㅔ) and /ɛ/(ㅐ)¹

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¹ This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (2017S1A5A2A03067536). Principle Investigator: Youngjoo Kim
Abstract

This study investigates the use of neural responses, ERP (event related potentials) in particular, for measuring phoneme development of Korean as a second language. It focuses on the acquisition of the Korean mid front vowels, /e/(/ㅔ/) and /ɛ/(/ㅐ/) by Chinese learners of Korean. Recently, various kinds of brain science technology such as fMRI, EEG, and MEG are used in the field of second language acquisition in order to measure the development of L2 knowledge in the learners’ brain. Use of these brain responses has advantages over behavioral responses because it gives us rather direct and detailed information about how L2 is processed in the learners’ brain while they are engaged in the language related tasks. In many cases, these neurophysiological data are different from the behavioral data of the same learners, indicating the possibility that the learners’ real knowledge can be better captured with these neural data in addition to the behavioral data.

This study focuses on the possible use of MMN (Mismatch Negativity) in order to measure the developmental process of L2 phonological system. MMN is a well-established ERP component related to the perception of linguistic sounds (e.g., Näätänen, 1997). It is a negative-going potential usually peaking at about 150-250 ms after the onset of deviant stimuli compared to standard ones. It has been used in the previous studies, showing that the amplitude of the MMN is weaker for the nonnative sounds distinctions than for the native sounds (Näätänen, 2007). In this study, we examine the acquisition of Korean vowels by Chinese learners’ of Korean using MMN in relation to the general proficiency of the L2 in order to find the developmental patterns of MMN. The Korean vowel system includes both /e/ a mid-high front vowel and /ɛ/ a mid-low front vowel (Lee, 1996; Lee, 2012) whereas Standard Chinese vowel system has only /ɛ/ a mid-low front vowel (Yi Tso-lin, 1920). The perceptual difference between these two mid-front vowels in Korean was found evident especially in the case of Seoul dialect not only in the behavioral responses (e.g., Choi et al, 1997; Choi, 2003, Lee et al. 2018) but also in the brain responses (Lee et al. 2018). Recently, Lee et al. (2018) in particular, showed the young Seoul dialect speakers’ perceptual sensitivity to the two sounds not only in the behavioral AX task with high accuracy rates (94%) but also in the neural ERP experiment eliciting the MMN (Mismatch Negativity). Based on the findings of Lee et al (2018), this study investigates L2 learners’ perceptual sensitivity to the distinction between the two Korean mid front vowels, /e/(/ㅔ/) and /ɛ/(/ㅐ/) by using the same experimental methodology with Chinese learners of Korean. It is expected that the Chinese learners of Korean, whose L1 has only one mid front vowel /ɛ/, will have difficulty in distinguishing the two sounds at the beginning stage of learning Korean. However, they will become sensitive to the perceptual difference between the two sounds as their proficiency of Korean improves. These developmental patterns will be depicted in the change of the amplitude of MMN.
References


Introduction: Visual teaching materials for programming have recently been utilized for elementary school programming. Such resources include programming language inputs such as Scratch and VISCUIT. However, the available teaching content is difficult for lower-grade elementary school children to comprehend. Many teachers also find it problematic to use these resources in their instruction.

Methods: The authors of this paper developed physical teaching tools for programming to surmount the challenges of using the available teaching materials. These instruments can be easily employed, even by lower-grade elementary school children. An experiment on the use of the proposed tools was conducted at an elementary school. Pre- and post-questionnaires were utilized to investigate the changes in the participating children’s awareness levels. The participants answered questions on the attitudes of logical thinking, creativity, and cooperation.
Results: The results of the questionnaire surveys showed that there was an improvement in the children’s attitudes of logical thinking and creativity.

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude of logical thinking</td>
<td>3.21</td>
<td>3.48</td>
</tr>
<tr>
<td></td>
<td>(1.29)</td>
<td>(1.20)</td>
</tr>
<tr>
<td>Creativity</td>
<td>3.51</td>
<td>3.75</td>
</tr>
<tr>
<td></td>
<td>(1.41)</td>
<td>(1.25)</td>
</tr>
<tr>
<td>Cooperativeness</td>
<td>3.58</td>
<td>3.62</td>
</tr>
<tr>
<td></td>
<td>(1.22)</td>
<td>(1.25)</td>
</tr>
</tbody>
</table>

**p<0.01, *p<0.05, ( ):SD

Conclusion: It may be inferred that the logical thinking abilities and creativity of children would improve through the introduction of this novel teaching resource to programming education in elementary schools. However, the class design using the developed teaching materials has not yet been considered. Further, the findings of this investigation did not demonstrate a significant difference in cooperation, and it is possible that an insufficiency remains in the use of cards as teaching aids for group work. The development of lesson plans that can further incorporate the idea of cooperation in children should be the focus of future research.
Title: Using Exergame Development to Build Computational Thinking Skills

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Abstract

Teaching Engineering Concepts to Harness Future Innovators and Technologists (TECHFIT) was an NSF-funded STEM/STEAM project (DRL-1312215) [1] that included a professional development (PD) program for teachers and an afterschool program for students. Curriculum and Assessment Design to Study the Development of Motivation and Computational Thinking for Middle School Students across Three Learning Contexts is an NSF-funded research project (DRL-1640178) [2] that examines the impact of delivering the TECHFIT curriculum to middle school students in three different contexts: afterschool program, in-school class, core class module. Thus far, the new project has deployed TECHFIT using the first two contexts, both of which use the entire TECHFIT curriculum.

The goal of the TECHFIT curriculum is to spark interest in STEM and computational thinking (CT) in middle school students. The approach involves teaching individual and teams of middle school teachers in a week-long summer workshop the essential skills that contribute to the task of innovating an exergame. Then during the subsequent school year, the teachers teach their students the same skills, so their students can innovate their own exergames. The curriculum employs two computer programming tools as well as physical computing to introduce participants to STEM and CT. It also includes use of brain blasts to engage participants in a wide variety of physical activity throughout the instruction as well as to enrich their imaginations with different ways to make movement fun.

This paper will focus on the process of exergame development using TECHFIT tools and show how it supports CT skills development. The presenters will demonstrate the process from start to finish by creating an exergame that will employ externally-wired input and output components. Attendees will be offered copies of the software to create the exergame and the code for the exergame created. They will also receive information on how to acquire the technology to create the physical exergame.

Background

As of July 2018, the TECHFIT team has delivered ten (10) professional development (PD) programs to 65 teams of middle school teachers from thirteen different states: Indiana, South Carolina, Ohio, Washington, Tennessee, Wisconsin, Michigan, Virginia, North Carolina, New York, Kentucky, Illinois, and Florida. Thus far, over 125 middle school teachers and over 1300 middle school students have successfully completed TECHFIT programs. By December 2018, an additional 500-1000 additional students are expected to complete TECHFIT programs.

TECHFIT program content includes computer programming, engineering design, electrical and mechanical engineering technology, game design, exercise science, and fitness, all with a common goal of innovating an exergame. The objective is to show participants how STEM and computing skills can be used to solve big, societal problems. In the case of TECHFIT, the problem being addressed is physical inactivity. [3]

1 An exergame is a technology-supported fitness game that can educate/train, assess performance, and/or entertain the player(s).
Both groups, teachers and students, learn how to design and develop physical, technology-supported fitness games (exergames) that occupy a large space on a gym floor and allow multiple players to play and/or compete. The process of learning how to innovate exergames teaches essential STEM skills, but more importantly sparks enthusiasm for computing, engineering, and technology.

Computer programming concepts are taught using two tools, Scratch [4] and NanoNavigator [5]. Scratch is a block programming tool that TECHFIT uses to create animations to explain visually how to play the exergame. NanoNavigator is a flowchart programming tool that is used to develop the program logic for the physical exergame.

In addition to learning computer programming through these two tools, everyone gains hands-on experience with physical computing through provided instruction on wiring electronic components to a microcontroller—the Nanoline [6] controller by Phoenix Contact (See Figure 1). Fun, physical activities called brain blasts are interspersed throughout the instruction. The brain blasts help keep minds alert, resulting in better retention [7]. They also provide ideas for activities to be included in their own exergames. Once the physical exergames are built, they are used to conduct brain blasts.

Each teacher team receives a technology toolkit that includes the Nanoline microcontroller, wires, push buttons, lights, sensors, other related technology and documentation. The toolkit components are acquired through generous donations from Phoenix Contact, Balluff, Automation Direct, as well as purchases made by the project team leaders. Although each toolkit is valued at over $4500, each teacher team receives a complete toolkit at no cost to them with the understanding that they will fully implement TECHFIT at their schools.

During the six-day TECHFIT PD, the majority of the instructional content is covered in the first three days. Daily homework gives the teachers opportunities for additional practice and to demonstrate their understanding. Questions from the homework are reviewed at the start of the next day. To further demonstrate understanding of these concepts, each teacher team is required to successfully implement their own exergame invention by the fifth day of the PD. On the sixth day, each team adapts the provided curriculum to their school’s unique needs and circumstances, and presents their ready-to-implement plans to the rest of the group.
During the subsequent school year, each teacher team is expected to deliver a 30+ hour afterschool program or STEM class at their school. The content is the same as what they learned in the summer PD, but their students fortunately have more time to digest the content gradually. The student teams are also expected to innovate their own, large-group exergame using the same technology toolkit.

**The TECHFIT Showcase**

In early December, a showcase event hosted by Purdue University gives the top teams an opportunity to present their TECHFIT experience and demonstrate their exergame to a public audience as well as to an invited panel of judges. The judges evaluate all presentations using a web application to help select the showcase champion. All student teams are recognized for noteworthy elements of their presentation/exergame, and the showcase winner is presented with the championship trophy.

In the first four years of TECHFIT, all participating schools were invited to the showcase; however, in 2018, there were too many teams to hold a one-day showcase. For this reason, a video showcase was instituted as a way to select up to the top eight teams most likely to have a competitive exergame project.

In the video showcase occurs in early November, so that there is enough time for invited teams to make travel arrangements. Teams not selected are encouraged to attend as observers to take advantage of the educational opportunity of seeing the breadth of exergame inventions created with the same toolkit materials and educational curriculum.

The short video that each team is expected to submit to the video showcase must address all of the following:

1. Identifies teams and status of work completed by each.
2. Describes the exergame (some teams set up their game without technology and explained how/what technology will be used).
3. Shares the Scratch animation that explains the team’s vision for the exergame.
4. Shows some aspect of the physical exergame that is working.
5. Includes a viable plan (who is doing what with a timetable) that convinces project leaders that they will be finished and ready to compete at the final showcase event.

The video showcase includes a public voting opportunity, so all teams are encouraged to spread the word about the video showcase to their stakeholders. The team with the most public votes receives an automatic invitation to the final showcase event; however, this public vote is more than a simple popularity contest. In order to vote, the voter must assign up to five (5) points to a minimum of three (3) teams. The total votes are visible only at the beginning of the voting period, but become hidden on the last two days. Based on Google Recaptcha Analytics from last year’s video showcase, the TECHFIT website was visited nearly 4000 times in four selected days of voting.
A judging panel is used to select the remaining showcase competitors. They use a web application that includes criteria consistent with the final showcase, but takes into account that teams will have almost a month to finish their exergame.

**Exergame Development Process**

The target group is middle school, so it is important to instill good programming habits from the start. The exergame development process taught to teachers is designed to aid in the development of an exergame using the provided software, nanoNavigator, and the physical Nanoline controller. This process is illustrated in Figure 2 and explained in further detail through a step-by-step example that follows.

![Figure 2: TECHFIT’s Exergame Development Process](image)

The process is introduced to the teachers before any programming is done. Then the TECHFIT leaders facilitate development of a simple exergame to illustrate each step of the process. The artifacts produced during the process are shared as resources for the teachers. Refer to Figure 3 to view an artifact of step 2 in the process (identify needed data elements). It shows the notes that were made immediately after brainstorming a jumping game to be created.

Given that a physical system will be created, teachers are taught to plan the types of electronic components that would be needed to build the exergame. Anything that provides information to the exergame system, such as the keypad keys or a sensor, are categorized as input. Anything that the exergame system provides to the player, such as alighting a light or displaying a message on the screen of the operator panel, are considered output. Any other data used in the process of running the exergame are also given a name. All data items needed by the exergame are
categorized into three columns: Input, Output, and Other Data Stores (see Figure 3). This approach simplifies development of the flowchart program in a later step.

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Other Data Stores</th>
</tr>
</thead>
<tbody>
<tr>
<td>StartButton</td>
<td>Instructions</td>
<td>JumpTimer</td>
</tr>
<tr>
<td>JumpSensor</td>
<td>JUMP</td>
<td>JumpCounter</td>
</tr>
<tr>
<td>NextPlayer</td>
<td>DetectLight</td>
<td></td>
</tr>
<tr>
<td></td>
<td>StopBuzzer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GameStats</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 3: List of Data Items for Simple Jumping Exergame*

Figure 4, an artifact of step 3 (think through and outline logical steps), depicts the logical outline that describes how the jumping exergame works. It was developed through a group discussion.

1. Show Instructions
2. When player presses start button
   a. Reset jump timer
   b. Reset jump counter
   c. Show JUMP message
   d. Is there still time to play?
      i. When jump is detected
         1. Increment counter
         2. Pulse the detect light
   e. Sound the stop buzzer
   f. Stop the timer
   g. Show game stats
   h. Return to start when the next player button is pressed

*Figure 4: Logical Outline of Simple Jumping Exergame*

When a large team is building an exergame, it is very likely that the groups that develop the program are not the same ones who will be constructing the physical system. For this reason, it is imperative that all groups agree in advance regarding how specific data stores on the Nanoline controller will be used, particularly the externally wired input and output components. Therefore, before even opening up NanoNavigator, remind participants that they are creating a physical exergame using a specific controller (previously shown in Figure 1). Have everyone agree on where each of the external components would be wired to the controller. Return to the data item table (from Figure 3) and mark the specific slot labels where the external input/output components will be wired (shown in red in Figure 5).

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
<th>Other Data Stores</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-0</td>
<td>MI-0 Instructions</td>
<td>TC-0 JumpTimer</td>
</tr>
<tr>
<td>I-1</td>
<td>MI-1 JUMP</td>
<td>TC-1 JumpCounter</td>
</tr>
<tr>
<td>I-2</td>
<td>Q-0 DetectLight</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q-1 StopBuzzer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MI-2 GameStats</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 5: Updated List of Data Items with Nanoline Slots for Simple Jumping Exergame*
Before programming in nanoNavigator, the types of blocks available within the tool are reviewed (see Figure 6). When developing a flowchart, the Control, Math, Move, and Message blocks have exactly one entry point and one exit point. The Decision, Compare, and Wait blocks have exactly one entry point, just like the other blocks, but two exit points (true, false) because the content of the block is a Boolean expression. The exit path that will be followed depends upon the value of the Boolean expression at that particular point during execution. The Notes block is really not part of the flowchart logic, but it is useful to document sections of the logic to explain the purpose in English.

After opening NanoNavigator and configuring it to match the controller and basic setup to be used, the flowchart editor page appears with the starting terminal symbol at the top. However, before beginning to develop the flowchart, the data items to be used by the program should be identified/named. To name the data items, use the notes from Figure 5 to match the Nanoline’s names to descriptive labels that will make it easier to follow the program logic.

Once the data items have been named, the text of messages for the operator panel screen should be constructed. Figure 7 shows sample messages for the simple jumping exergame.

![Image of Control Blocks in nanoNavigator](image)

*Figure 6: Control Blocks in nanoNavigator*

![Image of Sample Messages](image)

*Figure 7: Predefined Messages for the Simple Jumping Exergame*
Next, the group steps through the logical outline to construct the corresponding flowchart. Once it is finished, the built-in simulator is used to test the accuracy of the program (See Figure 8).

![Figure 8: Testing the Flowchart Program Using the Simulator](image1)

Once the program works as expected, the program is downloaded to the wired controller while still connected to the computer. This allows the programmer to watch the program run alongside the simulator to verify that the data stores are changing as expected while the program runs. Figure 9 shows one of the teacher teams testing their physical jumping exergame.

![Figure 9: Testing the Physical Exergame on the Wired Controller](image2)
During the paper presentation, the authors will illustrate the key steps in the exergame development process and highlight the elements of STEM and CT addressed by the TECHFIT approach. Attendees will also receive tips on how they could acquire Nanoline technology through a contest sponsored by Phoenix Contact [7].

**Conclusion**

Exergaming is a fun, appealing activity for children and adults alike. Teaching both groups how they can create their own exergames equips them with essential STEM and CT skills and the knowledge that these skills can be applied to innovating useful products. This formula has helped the TECHFIT team spark enthusiasm for STEM and CT in over 125 teachers and over 1300 students while encouraging fitness to keep minds active.

**Acknowledgements**

TECHFIT is supported by two grants from the National Science Foundation, #DRL-1312215 and #DRL-1640178. Any findings and opinions expressed in this article are those of the authors and do not necessarily reflect the views of the National Science Foundation.

**References**


1. Title: Supporting vulnerable students: Techniques for teaching emotional self-regulation to adult learners in the classroom

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6. Abstract

Most educators can recount experiences with students who demonstrate emotional dysregulation negatively impacting classroom dynamics and disrupting student learning. Many of the students who are dysregulated have academic challenges (Anderson et. al., 2015; Brunzell et al., 2016; Crosby, 2015) and poor social competence (Fabes et al, 1999; Pulkkinen, 1982), and report symptoms of depression, anxiety, eating pathology, and substance abuse (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Aldao, Nolen-Hoeksema, 2010). According to Gross (2002), emotional regulation is a learned skill that assists individuals in coping with affect. Most dysregulated students do not have the skills necessary to cope with what they are feeling when consciously or unconsciously triggered by the implicit or explicit curricular content in the classroom. The Emotion Regulation Process Model posits that emotional regulation is a complex process that involves initiating, inhibiting, or modulating one's state or behavior in a given situation (Gross, 1998). When adaptive models of emotional regulation are absent, individuals often struggle with adaptive coping throughout their life. This can impact psychosocial domains of development and lead to ongoing challenges in learning, relationships, mental health, and stress management.

Social work educators have knowledge and skills about trauma informed practices that can inform the field of education and improve learning outcomes for students. In order to support trauma-affected students in the classroom, trauma informed practices need to be intentionally and consistently integrated into classroom structures and teaching methods. Trauma informed practices help repair emotional regulation abilities of students by creating safe, supportive spaces for students to identify, process, and cope with their emotions (Brunzell, et al., 2016). By creating trauma informed classroom environments, students are more likely to experience academic success which creates greater likelihood of professional success (Crosby, 2015).

Beyond creating trauma informed classroom environments, innovative methods are needed to not only teach content regarding emotional regulation, but also to support students in enhancing their own affect regulation. This begins with providing tools for instructors to aide students in assessing their own emotional regulation and using this data to engage in discussion and experiential activities to capture the nuanced experiences of students. Emotional regulation skills such as situation selection, situation modification, attentional deployment, cognitive change,
response modulation (Gross, 1998) and mindfulness, interpersonal effectiveness, emotional and distress tolerance (Linehan, 2015) can be adapted to students in the classroom. This presentation will provide educators with tools to support students in assessing and further developing their affect regulation skills.

References


Abstract

The Frameworks for STEM (Science, Technology, Engineering, and Mathematics) Success professional development project was designed to provide the critical academic and social support structure necessary for diverse K-9 classroom teachers to succeed in designing, developing, implementing, and evaluating STEM curriculum for their students. The project took place on the Big Island of Hawaii in Hilo with elementary, middle, and high school teachers. The four objectives of the professional development project were to determine (1) the challenges teachers faced when developing, designing, and sharing the STEM project-based lessons with colleagues, as well as implementing and evaluating the lessons with students; (2) teachers’ levels of self-efficacy as it related to presenting and facilitating hands-on STEM project-based lessons with students; (3) teachers’ perceptions of the value, strengths, and weaknesses of the STEM professional development within which they participated over an academic year; and (4) teachers’ actual instructional behaviors, including interactions with and among students, during STEM project-based lessons. This professional development project included mixed methods (quantitative and qualitative) research used to satisfy the interests of the researchers, the needs in the field of STEM education, and the evaluation requirements of the grant funding agency. Three data collection instruments were designed, developed, and administered. They were (1) a pre/post STEM Teacher Self-Efficacy Questionnaire, (2) a STEM Classroom Observation Checklist, and (3) a STEM Professional Development Survey that included interviews of select teachers. Findings revealed that teachers’ STEM self-efficacy grew after participation in the professional development aspect of the grant project, including their confidence in developing and implementing STEM experiences for their students in different grade levels. STEM lessons, as well as student-created artifacts related to the lessons, were clearly aligned to the Next Generation Science Standards at each grade level, as well as the STEM learning competencies. The Frameworks for STEM Success professional development project was funded through a THINK Grant provided by the Hawaii Community Foundation.
Introduction

Conderman and Sheldon Woods (2008) suggest that science must play a central role in our world today. To cultivate higher-order thinking, as well as meet the changing demands of society, the quality and quantity of science teaching and learning must be increased in all classrooms. STEM education, which integrates the practices from science, technology, engineering and mathematics, broadens this emphasis to include the development of problem-solving, critical thinking, and collaboration skills from all of the disciplines (Bell, Shouse & Peterman, 2018).

The current national focus on “good STEM education” advocates for problem-solving, exploring and designing solutions as real-world applications of skills, whereas the science perspective focuses more on the development of scientific curiosity to find solutions to problems. So overall, STEM and science focus on the attainment of critical problem-solving skills, as well as the development of creative solutions to solve real-world problems. STEM experiences should be designed “not just to prepare future scientists and engineers, but also to instill a scientific way of thinking in each and every citizen” (TwigEducation.com, 2017).

Longitudinal research on STEM teaching and learning is limited by the lack of data, as teachers develop STEM-based lessons and evolve in their capacities to deliver STEM learning experiences for their students. Researchers have investigated the construct of efficacy (Bandura, 1977, 2006a; Riggs & Enochs, 1990; Ramey-Gassert, Shroyer & Staver, 1996; Tschannen-Moran, Hoy & Hoy, 1998). Professional and conceptual development in teachers has also been explored (Gordon, 1990; Sheerer, 1997; Skaalvik & Skaalvik, 2007). Supporting science-content-knowledge development and effective science teaching are imperative for teachers to further develop STEM learning experiences that integrate STEM content and practices.

According to Abell and Lee (2008), the most effective professional development in science has: (a) relevant and applicable content directly connected to the classroom, (b) teachers learning in a way similar to the way their students will learn, (c) collaborative teacher relationships, and (d) sustained opportunities to collaborate and reflect over time (p.62).

Purpose of Study

The purpose of the Frameworks for STEM Success professional development project was to provide the critical academic and social support structure necessary for diverse K-9 classroom teachers to succeed in designing, developing, implementing, and evaluating STEM curriculum for their students.

Research Objectives

The four objectives of the Framework of STEM Success professional development project were to determine (1) the challenges teachers faced when developing, designing and sharing the STEM project-based lessons with colleagues, as well as implementing and evaluating the lessons with students; (2) teachers’ levels of self-efficacy as it related to presenting and facilitating hands-on STEM project-based lessons with students; (3) teachers’ perceptions of the value, strengths, and weaknesses of the STEM professional development
within which they participated over an academic year; and (4) teachers’ actual instructional behaviors, including interactions with and among students, during STEM project-based lessons.

Methodology

The methodology employed for this research study, including the research design, subjects, instrumentation and administration, data analysis, and limitations, is presented below.

Research Design

This professional development project included mixed methods (quantitative and qualitative) research to satisfy the interests of the researchers, the needs in the field of STEM education, and the evaluation requirements of the grant funding agency. Three data collection instruments were designed, developed, and administered. They were (1) a STEM Teacher Self-Efficacy Questionnaire, (2) a STEM Classroom Observation Checklist, and (3) a STEM Professional Development Survey, which included interviews of select teachers.

Subjects

The subjects for this project were 21 teachers and their students in grades K-9 from seven Hilo Complex (HC) area schools. Nineteen of the teachers were female and two were male. All teachers were certified to teach in the grades/classrooms to which they were assigned—6 as secondary teachers and 15 as elementary teachers. Forty seven percent of the teachers had a master’s degree with the balance having bachelor’s degrees only. Teaching experience ranged from 3-42 years, with an average of 14 years. A half-time STEM curriculum coordinator, who also taught eighth-grade science, worked with the project participants, as well as implemented the developed curriculum with her own students.

Instrumentation and Administration

Three research instruments were designed, developed, and implemented for this study. They were the (1) STEM Teacher Self-Efficacy Questionnaire, (2) STEM Classroom Observation Checklist, and (3) STEM Professional Development Survey.

STEM Teacher Self-Efficacy Questionnaire (STSEQ)

The STEM Teacher Self-Efficacy Questionnaire (STSEQ) was developed through analyzing and adapting components of several existing surveys (Bleicher, R.E., 2004; Koehler, J.R., 2006; Tschannen-Moran, Woolfolk Hoy & Hoy, 1998; Woolfolk Hoy, 2000). A prior survey, the Teacher Retrospective Self-Efficacy Questionnaire, was used as the basis for the STSEQ, as well as the national STEM standards for teaching and learning (www.iteea.org/STEMCenter.aspx, 2017). Internal consistency reliability was addressed by the fact that all survey items represented only one construct—self-efficacy. Two measures of validity were established—content validity and construct validity. STSEQ items were adapted from already established surveys of teacher self-efficacy. The content was further adapted to reflect the 20 STEM competencies (behaviors and skills) of science teachers. Construct validity was addressed by including items that specifically described the behaviors and skills of self-efficacy in STEM/science teaching. The STSEQ was
administered to teachers at the beginning and conclusion of the Frameworks for STEM Success professional development project.

**STEM Classroom Observation Checklist (SCOC)**

The STEM Classroom Observation Checklist (SCOC) was developed using a prior checklist developed by the author for a Math/Science Partnership (MSP) Title IIb grant project. STEM standards for teaching and learning were defined and embedded into the classroom observation protocol, addressing content and construct validity. Researchers established inter-rater reliability through comparative side-by-side scoring, using the SCOC, during the observation of a science lesson in the classroom. The STEM Classroom Observation Checklist was completed by the researchers while observing each teacher, who participated in the study, as they facilitated a STEM lesson.

**STEM Professional Development Survey (SPdS)**

The STEM Professional Development Survey (SPdS) was developed using both Likert-scale and open-ended questions directly related to the STEM lessons created; the perceived impact of the lessons on students, as well as teachers; teachers’ comfort levels with six STEM teaching tasks; ways to improve the STEM professional development; and teachers’ biggest “take away” from the project. The SPdS was administered at the conclusion of the Frameworks for STEM Success professional development project through Survey Monkey. The only identifying information provided by the teachers was the grade level that they taught. Since multiple teachers taught each grade level, the responses were considered anonymous, unless the teacher described specific experiences that were known to the project researchers.

**Data Analysis**

The data for the three instruments used in this study—the (1) STEM Teacher Self-Efficacy Questionnaire, (2) STEM Classroom Observation Checklist, and (3) STEM Professional Development Survey—were analyzed as follows:

**STEM Teacher Self Efficacy Questionnaire (STSEQ)**

The pre-project STEM Teacher Self-Efficacy Questionnaire responses and the post-project questionnaire responses were entered into an Excel spreadsheet by question and also by Likert-scale self-evaluation of STEM-related teaching behaviors and skills (1 = Very Little [pre and post], 2 = Some [pre and post], 3 = Quite a Bit [pre and post], and 4 = A Great Deal [pre and post]). This enabled researchers to observe the dramatic shift upward in teachers’ self-efficacy from the pre-project administration of the questionnaire to the post-project administration of the questionnaire.

**STEM Classroom Observation Checklist (SCOC)**

The STEM Classroom Observation Checklist values were compiled in an Excel spreadsheet to determine what percentage of teachers were observed demonstrating each of the 20 STEM behaviors and skills. Researchers observation notes were also compiled to determine the top three observations during STEM classroom projects.
STEM Professional Development Survey (SPdS)

The STEM Professional Development Survey collected both quantitative data, related to teachers’ comfort levels with the STEM teaching tasks, and qualitative data, related to STEM lesson creation, the impact of STEM lessons on teachers and students, ways to improve the Frameworks for STEM Success professional development project, and more. Quantitative values were moved from Survey Monkey to an Excel spreadsheet to analyze teachers’ comfort levels with the STEM teaching tasks. The qualitative data was coded within Survey Monkey.

Limitations

There were three limitations identified for this research study. First, there was a small number of K-9 classroom teachers (21) who participated in this study. Consequently, the findings cannot be generalized to all teachers. Second, participating teachers were self-selected for the project and, therefore, self-selected for this research study as well. Finally, this research was not a randomized controlled trial study because the resources were not available for testing effectiveness via a larger experimental study.

Findings

The findings for the three instruments used in this study—the STEM Teacher Self-Efficacy Questionnaire, the STEM Observation Checklist, and the STEM Professional Development Survey are provided below. A comparison of the results of the STEM Observation Checklist and the STEM Self-Efficacy Questionnaire is also provided.

STEM Teacher Self-Efficacy Questionnaire (STSEQ)

The STEM Teacher Self-Efficacy Questionnaire was administered at the beginning and conclusion of the project. Findings revealed that there was a dramatic shift in teachers’ behaviors and skills moving from “Very Little” and “Some” to “Quite a Bit” and “A Great Deal” from the pre-administration to the post-administration of the questionnaire, as documented in Figure 1: Pre- and Post-Findings for the STEM Teacher Self-Efficacy Questionnaire and displayed in Figure 2: Shift from Pre- to Post-STEM Teacher Self-Efficacy Questionnaire (Average of Percents).

| Figures 1: Pre- and Post-Findings for the STEM Teacher Self-Efficacy Questionnaire |
|----------------------------------|-----------------|--------------|-----------------|--------------|-----------------|
| **To what extent are you able to...** | **Very Little** | **Some** | **Quite a Bit** | **A Great Deal** |
| **Category: Content Knowledge** | % Pre | % Post | % Pre | % Post | % Pre | % Post | % Pre | % Post |
| Q 10. Effectively teach STEM experiences | 5 | 0 | 58 | 29 | 26 | 41 | 11 | 29 |
| Q 11. Clearly explain the content for your STEM lessons | 11 | 0 | 50 | 29 | 33 | 41 | 11 | 29 |
| Q 12. Adapt your instruction to address student differences | 6 | 6 | 39 | 18 | 59 | 53 | 17 | 24 |
| **Category: Learning Environment** | % Pre | % Post | % Pre | % Post | % Pre | % Post | % Pre | % Post |
| Q 6. Craft appropriate inquiry questions | 16 | 12 | 47 | 24 | 32 | 41 | 5 | 34 |
| Q 8. Answer student STEM questions | 16 | 0 | 47 | 35 | 37 | 41 | 0 | 24 |
| Q 14. Provide materials and equipment to support safety during STEM design process | 22 | 6 | 50 | 29 | 22 | 47 | 6 | 18 |
| Very Little | Some | Quite a Bit | A Great Deal |
### Category: Process/Pedagogy

<table>
<thead>
<tr>
<th>Question</th>
<th>% Pre</th>
<th>% Post</th>
<th>% Pre</th>
<th>% Post</th>
<th>% Pre</th>
<th>% Post</th>
<th>% Pre</th>
<th>% Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1. Keep students on task with challenging STEM activities/assignments</td>
<td>16</td>
<td>0</td>
<td>23</td>
<td>12</td>
<td>53</td>
<td>35</td>
<td>11</td>
<td>53</td>
</tr>
<tr>
<td>Q13. Get students to discuss with you/peers what they are learning</td>
<td>11</td>
<td>0</td>
<td>61</td>
<td>35</td>
<td>17</td>
<td>53</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Q19. Assess prior knowledge and student understanding</td>
<td>17</td>
<td>0</td>
<td>56</td>
<td>29</td>
<td>22</td>
<td>53</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>Q15. Use student experiences/interests to solve a real-world problem/issue</td>
<td>17</td>
<td>6</td>
<td>56</td>
<td>41</td>
<td>22</td>
<td>41</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Q16. Identify and address misconceptions</td>
<td>23</td>
<td>0</td>
<td>44</td>
<td>35</td>
<td>22</td>
<td>47</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>Q20. Do more than just textbook/simple “cookbook” type STEM learning activities</td>
<td>11</td>
<td>6</td>
<td>44</td>
<td>18</td>
<td>17</td>
<td>35</td>
<td>28</td>
<td>41</td>
</tr>
</tbody>
</table>

### Category: Assessment

<table>
<thead>
<tr>
<th>Question</th>
<th>% Pre</th>
<th>% Post</th>
<th>% Pre</th>
<th>% Post</th>
<th>% Pre</th>
<th>% Post</th>
<th>% Pre</th>
<th>% Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q5. Use a variety of assessment strategies to gauge student learning</td>
<td>0</td>
<td>0</td>
<td>63</td>
<td>35</td>
<td>32</td>
<td>41</td>
<td>5</td>
<td>24</td>
</tr>
<tr>
<td>Q18. Provide opportunities for students to assess their own learning</td>
<td>23</td>
<td>18</td>
<td>56</td>
<td>41</td>
<td>17</td>
<td>24</td>
<td>6</td>
<td>18</td>
</tr>
</tbody>
</table>

**Figure 2: Shift from Pre- to Post-STEM Teacher Self-Efficacy Questionnaire (Average of Percents)**
**STEM Classroom Observation Checklist (SCOC)**

All teachers were observed while conducting their STEM lessons with students and scored within the following four categories—Content Knowledge, Learning Environment, Process/Pedagogy, and Assessment—, as shown in Figure 3: Findings for the STEM Classroom Observation Checklist.

In the category of Content Knowledge, from 57 to 71 percent of the teachers were observed meeting the behaviors or skills listed, with an average of 61 percent. In the category of Learning Environment, from 43 to 100 percent of the teachers were observed meeting the behaviors or skills listed, with an average of 72 percent. In the category of Process/Pedagogy, from 57 to 86 percent of the teachers were observed meeting the behaviors of skills listed, with an average of 70 percent. In the category of Assessment, from 14 to 71 percent of the teachers were observed meeting the behaviors or skills listed, with an average of 38 percent. Overall, an average of 60 percent of the teachers were observed meeting the behaviors or skills for the four categories—Content Knowledge, Learning Environment, Process/Pedagogy, and Assessment.

Teachers proved to be the strongest in the two categories Learning Environment (72 percent) and Process/Pedagogy (70 percent), followed by Content Knowledge (61 percent). Teachers proved to be the weakest in Assessment (38 percent).

### Figure 3: Findings for the STEM Classroom Observation Checklist

<table>
<thead>
<tr>
<th>Category</th>
<th>Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. Content Knowledge</strong></td>
<td></td>
</tr>
<tr>
<td>1. The teacher articulates the STEM objective(s) of the lesson.</td>
<td>71%</td>
</tr>
<tr>
<td>2. The lesson promotes understanding of the key STEM content area(s).</td>
<td>57%</td>
</tr>
<tr>
<td>3. The teacher is able to explicitly explain the science, technology, engineering and/or math content to the students.</td>
<td>57%</td>
</tr>
<tr>
<td>4. The teacher adapts instruction to address student differences.</td>
<td>57%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>61%</td>
</tr>
<tr>
<td><strong>II. Learning Environment</strong></td>
<td></td>
</tr>
<tr>
<td>5. The teacher provides a climate that is safe, challenging, motivating and collaborative.</td>
<td>100%</td>
</tr>
<tr>
<td>6. The teacher encourages discourse and moves the discussion forward.</td>
<td>57%</td>
</tr>
<tr>
<td>7. Students are encouraged to problem solve and ask questions.</td>
<td>43%</td>
</tr>
<tr>
<td>8. Materials/supplies support engineering design &amp; safety in the classroom.</td>
<td>86%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>72%</td>
</tr>
<tr>
<td><strong>III. Process/Pedagogy</strong></td>
<td></td>
</tr>
<tr>
<td>9. The teacher communicates logical, sequenced instruction that is clear and organized.</td>
<td>71%</td>
</tr>
<tr>
<td>10. The students are actively engaged and challenging &amp; relevant student learning is the focus of interactions.</td>
<td>71%</td>
</tr>
<tr>
<td>11. The teacher facilitates dialogue with the students and between the students.</td>
<td>86%</td>
</tr>
<tr>
<td>12. The teacher assesses prior knowledge and student understanding and uses that information to make instructional decisions.</td>
<td>71%</td>
</tr>
<tr>
<td>13. The teacher uses student experiences, interests and real-life situations to promote understanding of the STEM learning exp.</td>
<td>71%</td>
</tr>
<tr>
<td>14. The teacher effectively addresses misconceptions.</td>
<td>57%</td>
</tr>
<tr>
<td>15. The teacher provides opportunities for students to apply &amp; practice learning through challenging and relevant STEM activities/lessons.</td>
<td>71%</td>
</tr>
<tr>
<td>16. The teacher engages students in active, hands-on, creative, open-ended, problem-based learning experiences.</td>
<td>71%</td>
</tr>
<tr>
<td>17. The teacher engages students in STEM learning experiences that encourage/showcase STEM careers and are beyond the textbook.</td>
<td>57%</td>
</tr>
</tbody>
</table>
Researchers recorded observation notes on the back of the checklist. The top three observations recorded by researchers included:

1. In all instances, students were clearly excited and actively engaged in learning. Due to the nature of the lessons, students collaborated on STEM-based project designed to solve identified problems. Their myriad conversations were truly project focused and demonstrated a collaborative give-and-take sharing of ideas, resources, and responsibilities.

2. In all instances, teachers were well prepared. The amount of forethought and advanced preparation for the STEM lessons was clearly apparent. Although STEM resources were provided, there were many teacher-created resources used as well.

3. Classroom management of STEM lessons was both challenging and achieved. This non-traditional form of instruction allowed students to work in collaborative groups, out of their seats, and with a variety of materials and supplies, while talking and working hands-on and hand-in-hand to create solutions to real-world problems. The potential for classroom management disasters, including interpersonal issues and colossal messes, was extremely high; however, none were observed.

**STEM Professional Development Survey (SPdS)**

Twenty of the 21 participating teachers completed the STEM Professional Development Survey via Survey Monkey at the conclusion of the project, which coincided with the end of the school year. It should be noted that 4 of the 20 surveys submitted were not entirely completed. Below are the findings from the open-ended and Likert-scale questions of the survey.

**What and How Were the STEM Lessons?**

Teachers were asked to explain the lessons taught and to express how the lessons went for them. Lessons ranged from creating marble roller coasters to building earthquake resistant structures. Teachers noted the tremendous amount of planning and preparation required to design, develop, implement, and evaluate STEM lessons; however, they also expressed how highly engaged students were in every aspect of learning.

**What Changes Would You Make?**

Teachers were asked what aspects of the STEM lessons they would keep and what aspects of the STEM lessons they would change. All teachers who responded indicated that they would keep their STEM lessons . . . with modifications, such as gathering recycled materials well ahead of time or incorporating mini lessons on related subjects.
Participation Impacts
Teachers were asked to identify how participating in the STEM professional development impacted their teaching. The most frequent responses focused upon an increased awareness of the engineering design process, the need for student hands-on learning, and the importance of collaborating with other teachers.

What About Students?
Teachers were asked about how their students did, including their reactions to the STEM lessons. All teachers who responded indicated how much students “loved” the STEM lessons. As one teacher noted, students “don’t get many opportunities to actually create, test, and recreate something that is actually based on a real-world problem.” Another teacher wrote, “They loved it!!! Students [were] literally jumping out of their seats to participate.”

The Biggest Take Away
Teachers were asked to identify their biggest take away from STEM professional development. Nearly all teacher responses focused upon collaboration with peers as the key to successful implementation of STEM lessons with students.

Ways to Improve the STEM Professional Development
Teachers were asked to identify ways to improve the training and support they received. Although most teachers reported that everything went well, a few recommendations included involving more teachers, as well as providing more time for meeting and planning.

Comfort Levels with STEM Teaching Tasks
Teachers were asked to identify their comfort levels—from very comfortable to very unsure—related to the following six teaching tasks.
1. Designing and writing out the lesson plans for my STEM learning experience.
2. Gathering the materials and doing my lessons.
3. Evaluating the product(s) from my STEM learning experiences/lessons.
4. Collecting and sharing student exemplars from my STEM lessons.
5. Sharing my learning experiences as I did my STEM lesson(s) with my students.
6. Using Google Docs to upload my lessons, pictures, and view others' lessons in my grade cohort.

As can be seen in Figure 4: Comfort Levels with STEM Teaching Tasks, all teachers felt very comfortable or comfortable designing and writing out their STEM lessons. All but one teacher felt very comfortable or comfortable gathering materials and conducting STEM lessons. All but two teachers felt very comfortable or comfortable evaluating the products developed through their STEM lessons. All but two teachers felt very comfortable or comfortable collecting and sharing student exemplars from their STEM lessons. All but one teacher felt very comfortable or comfortable sharing their STEM lesson learning experiences with students. Eleven teachers felt very comfortable or comfortable using Google Docs to upload lessons, pictures, and more; whereas four teachers felt a little unsure about performing this task.
What Else Would You Like to Share?

Teachers were asked what else they would like to share about their experience participating in STEM professional development. Teachers expressed many thanks for the materials, supplies, and resource binder provided through the grant, as they could not have conducted the STEM lessons without them. Others expressed a desire to continue the professional development. Many expressed thanks to Dr. Pinner for her tireless efforts to support them through every aspect of the process.

Comparing Results between STEM Self-Efficacy Questionnaire and STEM Classroom Observation Checklist

Results of the STEM Self-Efficacy Questionnaire and the STEM Classroom Observation Checklist were compared in four different categories—Content Knowledge, Learning Environment, Process/Pedagogy, and Assessment—to explore the differences between the teachers’ perceptions of their STEM behaviors and skills and the researchers’ observations of their STEM behaviors and skills. Highlights of the findings for each category are provided below.
**Content Knowledge**
- The teacher is able to clearly explain STEM content, effectively teach STEM lessons and adapt instruction for student differences.

<table>
<thead>
<tr>
<th>STEM Self-Efficacy Questionnaire</th>
<th>STEM Classroom Observation Checklist</th>
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<tbody>
<tr>
<td>Teacher questionnaire responses indicated that 70% to 77% of teachers thought they were explaining/adapting their STEM lessons “Quite a Bit” to “A Great Deal.”</td>
<td>Researcher observations of STEM lessons indicated that only 57% of teachers were able to explain and adapt STEM lessons clearly.</td>
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</table>

**Learning Environment**
- The teacher is able to encourage discourse with/between students through inquiry questions that access STEM content.
- The classroom environment supports safety and STEM design processes.

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<tr>
<th>STEM Self-Efficacy Questionnaire</th>
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<tbody>
<tr>
<td>Teacher questionnaire responses indicated 75% of teachers thought they were asking/answering STEM inquiry questions “Quite a Bit” to “A Great Deal.”</td>
<td>Researcher observations indicated that only 43% of teachers were able to encourage students to problem solve and ask questions.</td>
</tr>
<tr>
<td>Teacher questionnaire responses indicated that 65% of teachers were able to provide materials and supplies that supported safety and the engineering design process.</td>
<td>Researcher observations indicated that 86% of teachers provided materials and supplies to support the engineering design process and student safety in classroom.</td>
</tr>
</tbody>
</table>

**Process/Pedagogy**
- Students are engaged in challenging, rigorous STEM lessons.
- Prior knowledge is assessed and used for student connections to real-life problems/issues.
- STEM learning experiences go beyond the textbook and connect to STEM careers.

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<tr>
<th>STEM Self-Efficacy Questionnaire</th>
<th>STEM Classroom Observation Checklist</th>
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<tr>
<td>Teacher questionnaire responses indicated 71% to 88% of teachers thought they were keeping students on task with challenging STEM activities.</td>
<td>Researcher observations indicated that 71% of classrooms had engaged students conducting investigations that were connected to the student and real-world problems/issues.</td>
</tr>
<tr>
<td>Teacher questionnaire responses indicated that 65% of teachers thought they were addressing students misconceptions of STEM content.</td>
<td>Researcher observations indicated that only 57% of teachers addressed student misconceptions of STEM content.</td>
</tr>
</tbody>
</table>
Teacher questionnaire responses indicated that 76% of teachers thought they were providing STEM learning experiences beyond the textbook/curriculum guide. Researcher observations indicated that only 57% of teachers were using STEM lessons beyond the textbook and connecting them to STEM careers.

**Assessment**

- Teachers use a variety of assessment strategies, including student self-assessment.

<table>
<thead>
<tr>
<th><strong>STEM Self-Efficacy Questionnaire</strong></th>
<th><strong>STEM Classroom Observation Checklist</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher questionnaire responses indicated that 65% of teachers used a variety of assessment strategies. Further, 42% of teachers stated they implemented student self-assessments.</td>
<td>Researcher observations indicated that although teachers used a variety of assessment strategies, only 14% of teachers implemented student self-assessments.</td>
</tr>
</tbody>
</table>

**Conclusions**

The research findings indicated that teachers felt supported by the Frameworks for STEM Success professional development model in both physical and social ways. All of their responses aligned with what Bolman and Deal (2008) addressed as the structural frame—the one that looks at the “social architecture of work” (p. 106).

This study reinforced the idea that teachers grow and develop over time. The prior literature only described, in a limited ways, what efficacy looks like at one moment in time (Bandura, 1977, 2006a; Riggs & Enochs, 1990; Ramey-Gassert, Shroyer & Staver, 1996; Tschannen-Moran, Hoy & Hoy, 1998). When teachers are supported by consistent professional development over a year, they do learn more than basic science content and STEM applications, because they begin to internalize and implement STEM experiences for their students that are deeper and more engaging than those simple activities they did in the past (if they even taught science at all). In addition, as they continue to learn and become more confident, they also recognize what they have not quite understood, and they move towards trying to improve in those areas; they now know what they don’t know, so they can learn more about it, which in turn will support their identification and addressing of misconceptions in their students’ learning of STEM concepts. Finally, as the teachers moved towards a higher sense of efficacy, their feelings towards learning challenging material or experiments changed to a “can do” attitude, and they embraced the challenge of learning and teaching new skills.

This project was committed to providing the critical academic and social support structure necessary for teachers to succeed in designing, developing, implementing, and evaluating STEM curriculum. The project built a cadre of 21 teachers who became competent and comfortable teaching and modeling STEM lessons as an integral part of their curriculum in their classroom and school. The main outcomes of the project included: (1) professional development of grades K-9 teachers, enabling them to align lessons to both Hawaii Content and Performance Standards and the Next Generation Science Standards, as well as, develop and implement STEM curriculum; and (2) development of a network of community members involved in STEM careers who supported place-based learning experiences related to the
culturally- and ethnically-diverse local environment of Hawaii Island through the development of STEM-based learning activities and experiences.

Finally, the ability to take this professional development model and use it to help teachers with STEM curriculum development over a longer period of time needs to be explored. There needs to be a way to support teachers and schools through the Frameworks for STEM Success professional development model implemented in this project to continually improve teaching and learning, especially in the more challenging development of real-world STEM learning experiences.

References


Riggs, C. M., & Enochs, L. G. (1990). Toward the development of an elementary teacher’s
science teaching efficacy belief instrument. *Science Education, 74*(6), 625-637.
Title:

Education Professionals Perceptions of Inclusive Practices Across Preparation Programs

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Abstract:

Our phenomenological study will employ grounded theory to analyze educational professionals’ reflective writings. Responses to online writing prompts from pre-service and inservice teachers will be analyzed across three themes: 1) descriptions of students with exceptionalities; 2) models of inclusive practices; and 3) strategies for differentiated instruction. Transcripts of reflective writings will be coded by themes as identified through the special education literature on best practices for inclusion to identify common understanding/misunderstandings.
Previously, researchers have identified a research to practice gap by identifying misunderstandings about the models and practices necessary for effective inclusion (e.g., full participation, academic achievement, social/emotional membership) (Bohjanen, Cameron Standerford, Meidl, 2017; Hamilton & Vail, 2013; Oyler, 2011). Our experiences as teacher educators reaffirms these findings through our students’ anecdotal reports. To extend these findings, we will provide writing prompts to students across three teacher/leadership preparation programs at a midsize Midwestern University. Courses within teacher preparation programs during student teaching provides an opportunity for preservice teachers to reflect upon their teaching experiences. Additionally, courses within the Masters, Doctorate, and Administration licensure programs (e.g., K-12 Principal, Superintendent, Special Education Director, and Community Education Director) allows for inservice teachers to reflect upon current practices. The objective of this study are twofold. First, to expand our insights regarding differences between preservice teachers prepared to be general education teachers, and those prepared to be special education teachers. Second, to examine inservice teachers perceptions of current practices for inclusion of diverse learners.

This study will compare three different types of preparation for education professionals. Likely our findings will support the existing literature base. Therefore, our goal is to identify what common understandings and misunderstandings exist across multiple groups of educational professionals, to better inform preparation programs for effective inclusion. Insights gained will allow us to integrate knowledge for improvement of preparation programs, to alleviate the research to practice gap, and empower education professionals to be agents of change for effective inclusion in their settings.

References

Abstract

Principal Leadership and Turning Around the Underperforming School

Aaron E. Haughton

In 2002, the No Child Left Behind (NCLB) legislation greatly enhanced the school accountability movement in the US and resulted in pervasive influence in mandating student achievement outcomes in low-income school communities. Of particular challenge had been the NCLB requirement to advance student achievement each year according to designated achievement goals with 100 percent of all students achieving proficiency by the year 2014. For those schools and districts in California not making these goals, NCLB designated them as underperforming and placed them in a category requiring considerable oversight termed program improvement (PI). A larger percentage of schools ended up being identified as underperforming or as Program Improvement (PI) institutions according to NCLB; yet some schools in this category made the achievement progress necessary to “Exit PI” and stand apart in overcoming considerable obstacles. The purpose of this multi-case qualitative study was to explore a sample of principals’ perceptions of the strategies and practices they adopted that resulted in meeting NCLB achievement goals and the “exiting” of Program Improvement (PI). The study focused on how principals interacted with and overcame the challenges associated with negative school cultural perceptions in a school community that was designated PI. The study also sought to identify the common strategies and practices that resulted in improving student achievement that can be replicated in other schools. Three major findings in this study highlight the approaches used by principals in order to exit PI. The first of these findings identified the importance of
addressing school cultural issues. This was a multi-year process driven by ongoing efforts at collaboration, data-analysis, teacher training, and ongoing teacher feedback. The second finding highlighted the importance of instructional leadership. This leadership was provided through ongoing classroom observations, clarifying performance expectations for teachers, and through modeling and coaching to assist teachers in adopting effective instructional practices. The third finding underlined the importance of primarily focusing on established state curricular standards instead of relying exclusively on the adopted curriculum. This focus was brought about as teachers collaborated and reviewed student achievement data and then considered how to best plan instruction for the state assessment.
Abstract

Tyler Clementi was an undergraduate student at Rutgers University who committed suicide after cyberbullied by his roommate (Foderaro, 2010; Varghese & Pistole, 2017). Cyberbullying is harassment through digital sources with intention of causing harm (Watts et al., 2017; Schaefer, 2017)—a phenomenon that is increasingly evident in higher learning (Siwajian, 2018; Siwajian & Fraizer, 2019). Emotional and psychological concerns such as anger, increased alcohol consumption, posttraumatic stress disorder, academic setbacks, loneliness, and psychosomatic issues have been reported by cyberbullied victims (Ireland & Power, 2004; Varghese & Pistole, 2017). Targets of such harassment has also led its victims, toward clinical anxiety, dropping out of college, and others, like Tyler Clementi, to suicide (Washington, 2015; Schaefer, 2017).

With 86% of college students accessing the Internet everyday (Varghese & Pistole, 2017), approximately half of college students have been targeted by cyberbullies (Kowalski et al., 2012). According to Watts et al. (2017), college students conceal being cyberbullied from parents and teachers—and thus proactive prevention is needed to provide support for targets unwilling or afraid to seek help (Washington, 2015). This session raises awareness for how bystanders, educators, and parents can be equipped with the proper tools to identify evidence of cyberbullying so that its targets can be helped, and harassers stopped. It is important to investigate possible strategies in reducing cyberbullying incidents to prevent such fatal and detrimental occurrences as Tyler Clementi experienced—Cyberbullicide (Foderaro, 2010; Faucher et al., 2015; Varghese & Pistole, 2017).

Keywords
cyberbullying, cyberbullicide, bullying, harassment, digital harassment, digital aggression, higher education, high learning
References


Violence and Suicide Prevention Initiative

Author and Investigator Dr. Cherie R. Safapou

Dr. Kenneth P. Monteiro

Healthy Habit Initiative Consultant Daniel A. Jahangard

Data Analysis Abdol Daghighi

Interns Makena Barkus JM Wesierski

Edited Deanna K Young
Abstract

Research Objective

The violence and suicide prevention initiative project has created a comprehensive, cost-effective intervention to reduce violence, aggression and depressions among vulnerable student populations while increasing their self-efficacy, well-being, and social adjustment skills. Participants will experience a shift in awareness, attitudes, and behaviors that promotes greater self-understanding and serve to reduce risk factors. Ultimately, this project seeks to advance the teaching of non-violence and reduce social injustice while improving academic achievement and cultivating a more beneficial university experience and culture.

Methodology

The Violence and Suicide Prevention Initiative was conducted as a 3-phase class that meets once a week for three hours. Each class takes place in a classroom and is attended by 16-20 students. Students are encouraged to attend all three phases of the class which will span 3 semesters. Phase one focuses on self-esteem and emotional intelligence. Phase Two focuses on anger-management strategies. Phase Three focuses on building and maintaining healthy relationships. A 49-item instrument was used to measure the outcome of the study that is rated on a 10-point Likert scale ranging from 1 = “not at all” to 10 = “very much so”.

It is structured as a 3-unit semester long class and is led by mental health professionals, scholars, and community members. The curriculum fosters student’s resilience by strengthening their protective factors including social support, competence, self-esteem, and healthy attachments while combating obesity and dropout rates of students.
Wilcoxon Signed Rank test was used to find the significant result\(^1\).

**Results**

A large percent of the 21 Spring 2018 students reported they felt more positive and confident about themselves; had a better positive body image; felt less feeling of short temper and anger;

The positive consequence of increasing students’ self-esteem, developing anger management skills, and encouraging positive relationships are numerous. By dissolving the psychological blockages that individuals have accumulated, the program gives participants the power to take charge of their behavior, leading to impressive results. Our program helps prevent obesity while promoting healthy eating and weigh loss.

**Introduction**

**How Empathy Occurs**

The *Descent of Man*, a description of human evolution, Charles Darwin states his ideas on human ability to experience the feelings of another. Though today we would refer to this ability as empathy, Darwin denoted it as sympathy when describing the roots of moral and relational behavior.\(^2\) Similarly, empathy has been deemed merely a sense of experiencing similar emotions as those felt by another.\(^3\) Darwin describes the basis of empathetic (denoted sympathetic) behavior as lying in the individual’s memory of prior similar circumstances of pain or pleasure. Adams Smith’s Theory of Moral Sentiments states that when viewing another’s experiences of

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\(^1\) [https://pdfs.semanticscholar.org/13214777cea59148f91f81a9407155687c15c](https://pdfs.semanticscholar.org/13214777cea59148f91f81a9407155687c15c)


hunger, cold, or fatigue, the memories of personal experiences arouse in us similar feelings of pain. This self-identification with the emotion of another’s distress causes personal mental strain through which relief of the suffering of said ‘other’ will in turn relieve the pain of the identifier and thus incite the drive to help another. Furthering this discussion in the Expression of the Emotions in Man and Animals, an individual puts themselves in the position of another’s suffering through imagination and sympathy. The differentiation of the word sympathy from empathy is feeling specifically for pity and sorrow, versus the more broadly viewed ability to share the feelings of another, respectively. As Darwin uses the word pertaining to the human ability to hold them emotional state of another, it is clear he was referring to that which today we would view as empathy. From a more recent perspective, William Ickes believed empathy was more of a psychosocial interpretation analogous to an introspection of the feelings and mentality of another which formed through knowledge, observation, and intuition.

**Narcissistic Personality Disorder**

Narcissistic Personality Disorder, among other traits, is characterized by a disdain for and lack of empathetic elicitation towards other people. Vulnerability (e.g. insecurity, inferiority) has recently been identified as accompanying emotional deviation, such as lacking empathy, in a

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4 Smith Adam (1790). Theory of Moral Sentiments, or An Essay towards An Analysis of the Principles by which Men naturally judge concerning the Conduct and Characters, first of their Neighbors, and afterwards of themselves, to which is added a Dissertation on the Origin of Languages. I (Sixth ed.). London: A. Strahan; and T. Cadell in the Strand; and T. Creech and J. Bell & Co. at Edinburgh
7 Oxford Dictionary
narcissist. Empathy holds with it a volatility that can be affected by social, emotional, and motivational experiences. “New Insights Into Narcissistic Personality Disorder” (2016), outlines a case of compromised empathy using a single mother describing her situation at work.

Ms. F, a professional woman and single mother of an 8-year-old son, describes a very emotional situation at work. The young daughter of one of her colleagues had lost her battle with cancer. Everyone in the department was emotionally affected by this tragic event and engaged in various ways to console their grieving colleague. Ms. F described the situation as unbearable. She was noticeably upset and frustrated as she complained about the emotional reactions of her colleagues – she felt overwhelmed and had to leave the office. Ms. F also thought that this emotional outpouring was interfering with work and misdirected attention from an important project with a looming deadline that she oversaw. From her perspective, successfully meeting the deadline was crucial for her upcoming promotion.

This vignette illuminates the patient’s lack of empathetic response during her narcissistic portrayal. The patient holds no care for her lamenting colleagues and is evidently flustered by their empathetic reactions towards the situation. Thought the patient later recounts contrastingly towards the mother who sees her daughter as “feeling for her” with examples of singing the condolence card and even donating money. It is as if she plated the expected part of a mourning individual without actually feeling the grief.

Neural Components of Empathy

Empathy has been reevaluated more recently through studies in the field of neuroscience.\textsuperscript{13} Knowing oneself has come to be seen as necessary before empathetically knowing another. Introspection is either entirely crucial to or a focal point for the basis of feelings empathy for another.\textsuperscript{14} As empathy can be attributed to a surplus of cognitive phenomena,\textsuperscript{15} the neural processing of any distinct psychological occurrence can be hard to discern.\textsuperscript{16} There are multiple mental, social, and biological impetuses that may be driving the emotional response. All of which must be differentiated for accurate assessment. Studies in the neurology of animals and humans have brought to light that motivational and cognitive components working together may be a possible inducement for the elicitation of empathy.\textsuperscript{17,18} Through evolution, most of the mammalian species has to come to develop such neural components as a means of reproduction and survival by recognizing and accurately responding to social ‘ques,’ such as another’s distress.\textsuperscript{19}

Empathy as Shared Emotions

The sharing of emotion is a strong social trait integral in effective interaction. The ability to share and reflect the emotions of another, often referred to as emotional contagion, can be seen as a rudimentary form of empathy, or is at least a vital part of its stimulation. The common-coding theory is the most widely accepted view of the ability to elicit empathy. There is a prolific amount of empirical data about the topic which suggests that identifying with another is automatic and uncontrollable in those who elicit it. This often-human attributed ability can just as well be found in rodents and various types of poultry. Female mice showed traits of incapacitation (e.g. freezing up) when viewing the distress of a close relative. Similarly, mice have been shown to display less signs of pain when introduced to a female from relatively the same cage. In addition, when the accompanying mouse was a distinct relative or a stranger, respectively, the mice would exhibit significantly less of a shared emotional response. Studies on human emotional contagion have been done just as well. For example, when a researcher mimicked the emotions of their participants, the individual was more generous and supportive towards both the researcher as well as those not part of the study as opposed to when the

21 Hatfield E, Cacioppo J, Rapson R; Emotional Contagion New York; Cambridge University Press; 1994.
23 Empathy and Pro-Social Behavior in Rats. Ben-Ami Bartal I, Decety J, Mason P. Science. 2011 Dec 9; 334(6061):1427-30
researcher did nothing.26 Human adults who grew up with or are familiar with members of another race tend to elicit less fear (e.g. amygdala response) when encountering members of the same race.27 Beneficially, two groups experiencing the same emotion through empathy or otherwise, show the ability to cooperate better and experience less conflicts of interest.28

**Correlation Between Guilt and Reading Emotions**

Young children eliciting hyper empathetic dispositions tend to hold a greater ability to control their emotions which then fuels their drive to relieve another’s anguish.29 Surprisingly, guilt is also a common attribute to those who are good at reading another’s emotions.30 As those who experience empathy also feel the need to relieve stress in another, such as is the act of helping.31 There is a high correlation between guilt and helping behavior, whether or not the guilt is theirs or from another.32 Guilt prone individuals often have an enhanced capacity for seeing from another person’s perspective.33

**Social Responsibility and Prevention**

While empathy allows for feelings to be shared and understood between parties, apathy, by
definition, is the opposite. Apathy means to lack interest, enthusiasm or concern; to not identify
with another.34 These two types of feelings should not be seen as separated by a thin line, with
every individual obvious falling into one category. These two types of feeling should be seen as
two separate sides of the spectrum, with each individual being a length away from the center.
The volatility of the spectrum between empathy and apathy can well be seen through the
Stanford Prison Experiment. Through mere role playing and environmental influence, two
randomly selected parties of students acted and then proceeded to briefly become entirely
oppressive or submissive individuals.35 Research done at Western Kentucky University,
attempted to see what empathetic level students who responded to a similar advertisement were
at. It was found that such students were higher in social dominance, while lacking empathy and
altruism.36 From the results of this study, assuaging of the malleability of empathy and altruism
as well as the dissipation of authoritarianist mentalities should be paramount in society. Just as
this experiment dealt with college students and bringing to light how easy it is to engrain social
norms, specifically, Dr.’s Cherie R. Safapou and Kenneth P. Monteiro, primary investigators for
the Violence and Suicide Prevention Initiative at San Francisco State University, are attempting
to do the opposite with a class at San Francisco State University on violence and suicide
prevention with the help of Healthy Habits consultant Daniel A. Jahangard. The class aims to
instill confidence, emotional intelligence, and to teach students relational skills.37 Programs like

Dr. Cherie R. Safapou and Dr. Kenneth P. Monteiro’s will reduce the severity of events similar

https://whitneyhess.com/blog/2012/08/21/on-empathy-and-apathy-two-cases-studies/
35 The Stanford Prison Experiment – A Simulation Study of the Psychology of Imprisonment Conducted at
Stanford.
36 Carnahan, Thomas; Sam McFarland (2007). “Revisiting the Stanford Prison Experiment: Could Participant Self-
37 Citation for Healthy Habits Study
to those depicted by the Stanford Prison Experiment for the next generation. They envision a multi-ethnic and interdisciplinary center that advances the study and practice of personal and societal transformation to improve wellbeing, create pathways to success, and reduce internalized oppression and structural violence.

Learning to be Happy

The meaning of happiness, like many other subjective topics, can be an arduous task to find a definitive answer to. What is much harder is differentiating between that which brings immediate happiness and that which will bring lifelong happiness. Naturally being born with empathy allows us to find happiness through the relief of the suffering of another. In a world that engrains its inhabitants with the idea that they can find happiness through sex and money, the prior mentioned differentiation can be much harder not to discern an answer to, but to act on. The difference between the happiness received from acting on empathy versus acting for self-pleasure is longevity. Dr. Cherie R. Safapou and her colleague Dr. Kenneth P. Monteiro’s Violence and Suicide Prevention course at the Ethnic studies School of San Francisco State University, with the help of Healthy Habits consultant Daniel A. Jahangard 38, viewed a film called Happy 39. In the film, Roko Belic traveled to 14 countries to find what really made people happy, particularly those who did not find happiness through money or sex. This film taught the students the benefits of positive psychology. Furthermore, the film highlights that by changings ones own view of the world, one can find happiness regardless of time, place, or situation. The class went on to recognize that it does not matter on what scale empathy is acted upon, merely


that it is acted at all. While having sex, buying food, clothes, or friends makes us feel good momentarily, it is helping others that makes us feel good for a lifetime. The class has recognized that if one can regulate their emotions to feel for others instead of themselves, they can find happiness at any time. Because the United States currently ranks 18th in the world for happiness, works like that conducted by Dr. Cherie R. Safapou, Daniel A. Jahangard, Dr. Kenneth P. Monteiro, and Roko Belic need to be emphasized and engrained into our society.

Optimizing our Empathy

As shown by the studies of Cameron and Payne, and Pancer, while empathy can often feel uncontrollable, it is ultimately a choice. Sometimes choosing not to feel for someone can be the easier path to take than its alternative. Because humans were gifted with the ability to share the emotions of another it is our duty to do it to the best of our ability. That means not looking the other way when another is in need, and not putting another in a position of need in the first place (i.e., suffering). For such circumstances, Dr.’s Cherie R. Safapou and Kenneth P. Monteiro, primary investigators for the Suicide and Violence Prevention Initiative at the college of Ethnic Studies at San Francisco State University, with the help of Healthy Habits consultant Daniel A. Jahangard, brought to light the bystander effect, a phenomenon of decreased empathetic action when in the presence of others, by showing their participants the film.

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41 Cameron, Daryl C.; Payne, Keith B. *Escaping Affect: How Motivated Emotion Regulation Creates Insensitivity to Mass Suffering*. University of North Carolina at Chapel Hill.


This film was about the murder of Kitty Genovese which was allegedly viewed by 37 people who did nothing to intervene. This lack of help denoted “Genovese Syndrome,” is an analog to the bystander effect or bystander apathy. Dr.’s Cherie R. Safapou and Kenneth P. Monteiro have made it their missions to eradicate such omissions. Through the Violence and Suicide Prevention Initiative, their course teaches the next generation to think for themselves. The bystander effect, also known as “bystander apathy,” is an inability to feel for those around you, and in turn, an inability to diffuse responsibility for pertaining stations. The 1986 research of Darley and Latane found that the greater number of people in a situation the less likely one of them is to help a victim. They attributed this to an indecisiveness of who should take action, or a failure to diffuse responsibility. Students taking the Violence and Suicide Prevention course will not fail to diffuse responsibility because they will take responsibility themselves. By watching, Safapou and Monteiro displayed 37 ways not to perform under a situation where the wellbeing of another is at stake. The movie, as well the primary investigators, are not endorsing conflict to be performed under such circumstances (i.e., fighting) they are merely conveying the idea that action must be taken: an action no more personally harmful than getting ahold of the proper authorities. Like the film, the course is not convincing its participants that they need to save the day every day, it is merely convincing them to choose empathy.

There’s been a dramatic rise in campus violence in the last 25 years. Not surprisingly, today's college students also experience high rates of depression, self-destructive behavior and suicide ideation. A comprehensive public university such as San Francisco State University, whose

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student body closely reflects the diversity and complexity of the general population, is particularly susceptible.

In addition to their overladen backpacks, far too many college students are burdened by stress, anxiety, competitive environments, family and financial pressures, as well as adjustment and attachment problems. Nationwide the number of college students on psychiatric medicines increased more than 10 percentage points over the last 10 years. Students whose emotional and mood disorders were effectively managed through high school suddenly find themselves in an environment with few familiar faces, supports, or services, and often lack the necessary coping skills. 40.1% of college students have felt as though they were too depressed to function, and 20.4% of college students have seriously considered suicide or have intentionally hurt themselves with 2.1% committing suicide.47 Suicide is the leading cause of death in college students ages 18-24.48 Teens diagnosed with depression are five times more likely to attempt suicide than adults.

Nationwide, 17 percent of college students experienced some form of violence or harassment in the previous year, including teasing, name-calling, stalking, vandalism, physical assault, sexual assault, texting assault and other forms of interpersonal violence as well as suicide. Almost a quarter of student’s report being the victims of cyberbullying, and almost a quarter of college

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47 American College Health Association National College Health Assessment. Undergraduate Student Reference Group Executive Summary Fall 2017 (pp. 1-22, Publication).
women will be raped during their college years. Foster children are at risk of homelessness and 60,000 youths are behind bars on any given day.49, 50

In the last three years alone, San Francisco State University (SFSU) has seen the frequency of rape, assault, and burglary more than double.51 Suicide is also on the rise. Outreach programs that offer mental health services and prevention against suicide and on-campus violence are absolutely essential.

The followings are a brief summary of the health topics that Daniel A. Jahangard covered in class.

**Obesity:**

The prevalence of obesity among U.S. youth was 18.5% and approximately 40% of the US population52.

**Heart Disease:**

More than 600,000 Americans die from heart disease every year53.

**Type 2 Diabetes:**

More than 30 million Americans have diabetes (about 1 in 10), and 90% to 95% of them have type 2 diabetes54.

**Depression and Anxiety Disorders and Exercise:**

Physical exercise is a form of treatment for improving clinical symptoms, quality of life, global functioning, and depressive symptoms in patients with schizophrenia55.
Positive Effects of Exercise:

A body of evidence has revealed positive effects of physical exercise on behavioral, cognitive and physical outcomes in patients with schizophrenia.\textsuperscript{56}

Osteoporosis and benefits of exercise:

Research indicated that Strength training increased muscular strength, and preserved BMD in postmenopausal women.\textsuperscript{57}

Effectiveness of Exercise:

The systematic review confirmed the effectiveness of exercises to preserve BMD in premenopausal and postmenopausal women.\textsuperscript{58}

**Method**

The Violence and Suicide Prevention Initiative was conducted as a 3-phase class that meets once a week for three hours. Each class takes place in a classroom and is attended by 16-20 students. Students are encouraged to attend all three phases of the class which will span 3 semesters. Phase one focuses on self-esteem and emotional intelligence. Phase Two focuses on anger-management strategies. Phase Three focuses on building and maintaining healthy relationships. A 49-item


instrument was used to measure the outcome of the study that is rated on a 10-point scale ranging from 1 = “not at all” to 10 = “very much so”.

It is structured as a 3-unit semester long class and is led by mental health professionals, scholars, and community members. The curriculum fosters student’s resilience by strengthening their protective factors including social support, competence, self-esteem, and healthy attachments while combating obesity and dropout rates of students.

Results

A high percent of the 21 Spring 2018 students reported they felt more positive and confident about themselves; had a better positive body image; felt less feeling of short temper and anger;

The positive consequence of increasing students’ self-esteem, developing anger management skills, and encouraging positive relationships are numerous. By dissolving the psychological blockages that individuals have accumulated, the program gives participants the power to take charge of their behavior, leading to impressive results. Our program helps prevent obesity while promoting healthy eating and weigh loss.

Here is a summary of the statistically significant findings at 5% and 10% levels.

- Students compared themselves less with others.
  - Second survey compared to the first survey. (p = 0.008)
  - Third survey compared to the first survey. (p = 0.007)
● Students expressed they could better deal with stress.
  o Second survey compared to the first survey. (p = 0.06)
  o Third survey compared to the first survey. (p = 0.084)

● Students felt more positive and confident about themselves.
  o Third survey compared to the first survey. (p = 0.085)

● Students had less trouble with law.
  o Second survey compared to the first survey. (p = 0.084)

● Students expressed more experience with meditation.
  o Second survey compared to the first survey. (p = 0.001)
  o Third survey compared to the first survey. (p = 0.008)

● Students thought less about the habits they wish they could change.
  o Third survey compared to the first survey. (p = 0.065)

● Students felt they are more creative.
  o Third survey compared to the first survey. (p = 0.051)

● Students increased interest in developing new habits.
  o Third survey compared to the second survey. (p = 0.072)

● Students experienced more positive body image.
  o Third survey compared to the first survey. (p = 0.017)

● Students experienced less feeling of sadness, depression, and melancholy.
  o Third survey compared to the second survey. (p = 0.059)
(#2) 86% of students in the first survey expressed they could better deal with stress compared to 90% in the second survey. (from 86% to 90%). (5-10 range)

First  
Mean: 7  
Median: 8  
Standard Deviation: 2.07

Second  
Mean: 7.81  
Median: 8  
Standard Deviation: 2.22

Figure 1. First and second survey comparison for Question #2

(#3) 100% of students described themselves as kind on both first and second surveys. (5-10 range)

First  
Mean: 8.42  
Median: 9  
Standard Deviation: 1.16

Second  
Mean: 8.42  
Median: 9  
Standard Deviation: 1.39
(4) 81% of Students in the first survey felt positive and confident about themselves compared to 90% the second survey. (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>7.38</td>
<td>7</td>
<td>2.73</td>
</tr>
<tr>
<td>Second</td>
<td>7.76</td>
<td>8</td>
<td>2.09</td>
</tr>
</tbody>
</table>

**Figure 2.** First and second survey comparison for Question #3
(6) There was a 9% increase in the number of students who criticized themselves often in the second survey compared to the first survey. (from 67% to 76%) (5-10 range)

**First**  
Mean: 5.71  
Median: 5  
Standard Deviation: 2.32

**Second**  
Mean: 5.62  
Median: 5  
Standard Deviation: 2.52

**Figure 3.** First and second survey comparison for Question #4
Figure 4. First and second survey comparison for Question #6

(#8) The percent of students who compared themselves with others was 19% less in the second survey compared to the first survey (from 86% to 67%). (5-10 range)

<table>
<thead>
<tr>
<th>Survey</th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>6.62</td>
<td>7</td>
<td>2.22</td>
</tr>
<tr>
<td>Second</td>
<td>5.24</td>
<td>5</td>
<td>2.38</td>
</tr>
</tbody>
</table>
Figure 5. First and second survey comparison for Question #8

(#10) The percent of students who felt their desires were similar to the other people increased from the first survey to the second survey (from 90% to 95%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th>Second</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>7.14</td>
<td>7.47</td>
</tr>
<tr>
<td>Median</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>SD</td>
<td>2.26</td>
<td>1.43</td>
</tr>
</tbody>
</table>

Figure 6. First and second survey comparison for Question #10

(#11) The percent of students who saw themselves more addicted to things decreased from the first survey to the second survey (from 43% to 38%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th>Second</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.52</td>
<td>3.95</td>
</tr>
<tr>
<td>Median</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>SD</td>
<td>3.23</td>
<td>3.35</td>
</tr>
</tbody>
</table>
Figure 7. First and second survey comparison for Question #2

(#14) A higher percent of students said they were treated unfairly in the second survey compared to the first survey (from 33% to 38%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th></th>
<th>Second</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.43</td>
<td>Median</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 8. First and second survey comparison for Question #14
(#15) There was a 14% decrease in the number of students who said they had exposure to suicide in their lives in the second survey compared to the first survey (from 52% to 38%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>5.04</td>
<td>5</td>
<td>2.82</td>
</tr>
<tr>
<td>Second</td>
<td>4.47</td>
<td>3</td>
<td>2.89</td>
</tr>
</tbody>
</table>

Figure 9. First and second survey comparison for Question #15

(#16) There was an increase in the number of students who said they witnessed violence in their lives in the second survey compared to the first survey (from 52% to 57%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>5.71</td>
<td>5</td>
<td>3.08</td>
</tr>
<tr>
<td>Second</td>
<td>6.04</td>
<td>5</td>
<td>3.26</td>
</tr>
</tbody>
</table>
More students said they witnessed others being subjected to emotional abuse in the second survey compared to the first survey (from 76% to 81%).

<table>
<thead>
<tr>
<th></th>
<th>Mean:</th>
<th>Median:</th>
<th>Standard Deviation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(#18) 95% percent of students expressed they felt safe at home or in their neighborhoods in the first and second surveys. (%95). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>8.47</td>
<td>9</td>
<td>1.99</td>
</tr>
<tr>
<td>Second</td>
<td>8.57</td>
<td>9</td>
<td>1.80</td>
</tr>
</tbody>
</table>

Figure 12. First and second survey comparison for Question #18

(#19) A significantly smaller percent of students reported they had trouble with law in the second survey compared to the first survey (from 24% to 10%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>2.80</td>
<td>1</td>
<td>2.80</td>
</tr>
<tr>
<td>Second</td>
<td>2.28</td>
<td>1</td>
<td>2.66</td>
</tr>
</tbody>
</table>
Figure 13. First and second survey comparison for Question #19

(#20) 100% of students reported they were strongly guided by moral principles in first survey compared with 95% in the second survey (from 100% to 95%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th>Second</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>8.38</td>
<td>8.43</td>
</tr>
<tr>
<td>Median</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>SD</td>
<td>2.08</td>
<td>1.43</td>
</tr>
</tbody>
</table>
Figure 14. First and second survey comparison for Question #20

(#21) 95% of students reported they were proud of their family in first survey compared with 100% in the second survey (from 95% to 100%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th>Second</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>8.38</td>
<td>8.42</td>
</tr>
<tr>
<td>Median</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>2.08</td>
<td>1.43</td>
</tr>
</tbody>
</table>

Figure 15. First and second survey comparison for Question #21

(#22) Percent of students said they liked school decreased from 81% in the first survey to 76% in the second survey (from 81% to 76%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th>Second</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>6.86</td>
<td>6.43</td>
</tr>
<tr>
<td>Median</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>2.35</td>
<td>2.97</td>
</tr>
</tbody>
</table>
Figure 16. First and second survey comparison for Question #22

(#23) A higher percent of students reported a positive body image in the second survey than in the first survey (from 81% to 90%). (5-10 range)

First  Mean: 6.85  Median: 7  Standard Deviation: 1.98
Second  Mean: 7.19  Median: 7  Standard Deviation: 1.88
Figure 17. First and second survey comparison for Question #23

(#24) The percent of students who said dreams had meaning to them increased 23% from 67% to 90% in the second survey compared with the first survey (from 67% to 90%). (5-10 range)

(#25) 86% percent of students reported stress affected their work and health in the first and second surveys (86%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th>Mean: 6.65</th>
<th>Median: 7</th>
<th>Standard Deviation: 2.54</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Second</td>
<td>Mean: 7.14</td>
<td>Median: 7</td>
<td>Standard Deviation: 2.67</td>
</tr>
</tbody>
</table>

Figure 18. First and second survey comparison for Question #25

(#26) The percent of students who reached out when dealing with suffering and failure decreased from 43% in the first survey to 38% in the second survey (from 43% to 38%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th>Mean: 4.14</th>
<th>Median: 4</th>
<th>Standard Deviation: 2.05</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Second</td>
<td>Mean: 4.05</td>
<td>Median: 4</td>
<td>Standard Deviation: 2.52</td>
</tr>
</tbody>
</table>
Figure 19. First and second survey comparison for Question #26

(#27) Fourteen percent more students reported they knew nutrition in the second survey than the first survey (from 76% to 90%). (5-10 range)

First
Mean: 5.76  Median: 6  Standard Deviation: 2.09

Second
Mean: 6  Median: 5  Standard Deviation: 1.79

Figure 20. First and second survey comparison for Question #27
(#28) There was a 14% increase in percent of students said they snacked between meals in the second survey than in the first survey (from 57% to 71%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean: 5.47</td>
<td>Median: 5</td>
<td>Standard Deviation: 2.68</td>
</tr>
<tr>
<td>Second</td>
<td>Mean: 5.86</td>
<td>Median: 6</td>
<td>Standard Deviation: 2.67</td>
</tr>
</tbody>
</table>

**Figure 21.** First and second survey comparison for Question #28

(#29) There was an increase of 19% in students reported they drank soda in the second survey compared to the first survey (from 24% to 43%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean: 3.28</td>
<td>Median: 2</td>
<td>Standard Deviation: 2.05</td>
</tr>
<tr>
<td>Second</td>
<td>Mean: 3.52</td>
<td>Median: 3</td>
<td>Standard Deviation: 1.99</td>
</tr>
</tbody>
</table>
Figure 22. First and second survey comparison for Question #29

(#30) A lower percent of students reported they exercised in the second survey than in the first survey (from 71% to 67%) (5-10 range)

First  
Mean: 5.62  Median: 6  Standard Deviation: 2.73

Second  
Mean: 5.67  Median: 6  Standard Deviation: 2.22
Figure 23. First and second survey comparison for Question #30

(#31) 95% of students reported they were familiar with the feeling of love in both first and second surveys. (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th></th>
<th>Second</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>7.90</td>
<td>Median</td>
<td>9</td>
<td>Median</td>
</tr>
<tr>
<td></td>
<td>Mean:  8.04</td>
<td>Median: 9</td>
<td>Standard Deviation: 2.43</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean:  8.04</td>
<td>Median: 9</td>
<td>Standard Deviation: 2.33</td>
<td></td>
</tr>
</tbody>
</table>

![Q31- First and Second Survey Results](image)

Figure 24. First and second survey comparison for Question #31

(#32a) There was 19% less percent of students who said they like to be more loving in the second survey than the first survey (from 86% to 67%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th></th>
<th>Second</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>6.90</td>
<td>Median</td>
<td>8</td>
<td>Median</td>
</tr>
<tr>
<td></td>
<td>Mean:  5.47</td>
<td>Median: 5</td>
<td>Standard Deviation: 2.88</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean:  5.47</td>
<td>Median: 5</td>
<td>Standard Deviation: 3.04</td>
<td></td>
</tr>
</tbody>
</table>
Figure 25. First and second survey comparison for Question #32a

(#32b) 67% of students reported they wanted to be less loving in the first survey compared to 52% in the second survey (from 52% to 67%). (5-10 range)

First
- Mean: 4.23
- Median: 5
- Standard Deviation: 1.92

Second
- Mean: 3.90
- Median: 5
- Standard Deviation: 2.06
Figure 26. First and second survey comparison for Question #32b

(#33) The percentage of students who thought fear was interfering with their ability to love and be loved decreased from 71% in the first survey to 62% in the third survey (from 71% to 62%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>5.85</td>
<td>7</td>
<td>3.20</td>
</tr>
<tr>
<td>Second</td>
<td>5.47</td>
<td>5</td>
<td>3.29</td>
</tr>
</tbody>
</table>

Figure 27. First and second survey comparison for Question #33

(#34) The percent of students who reported having experience with meditation has increased by 14%, from 52% in the first survey to 76% in the second survey (from 52% to 76%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>3.95</td>
<td>5</td>
<td>2.56</td>
</tr>
<tr>
<td>Second</td>
<td>5.57</td>
<td>6</td>
<td>2.18</td>
</tr>
</tbody>
</table>
Figure 28. First and second survey comparison for Question #34

(#36) 86% of students said they are creative in both the first and the second surveys (86%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th>Second</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>6.71</td>
<td>7.09</td>
</tr>
<tr>
<td>Median</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>SD</td>
<td>2.30</td>
<td>2.32</td>
</tr>
</tbody>
</table>

Figure 29. First and second survey comparison for Question #36
(#37a) The percent of students experienced less happiness, security, and wholeness decreased in the second survey compared to the first survey (from 52% to 47%). (5-10 range)

- **First**
  - Mean: 4.86
  - Median: 5
  - Standard Deviation: 2.07

- **Second**
  - Mean: 4.48
  - Median: 4
  - Standard Deviation: 2.44

![Q37a - First and Second Survey Results](image)

**Figure 30.** First and second survey comparison for Question #37a

(#37b) The percent of students reported experiencing less feeling of sadness, depression, and melancholy was reduced from 86% in first survey to 76% in the second survey (from 86% to 76%). (5-10 range)

- **First**
  - Mean: 5.95
  - Median: 6
  - Standard Deviation: 1.63

- **Second**
  - Mean: 5.38
  - Median: 5
  - Standard Deviation: 1.83
The percent of students experienced less patience, endurance and kindness increased in the second survey compared to the first survey (from 38% to 47%), (5-10 range)

**First**
- Mean: 4.00
- Median: 3
- Standard Deviation: 2.74

**Second**
- Mean: 4.43
- Median: 4
- Standard Deviation: 2.48
(#38b) The percent of students reported less feeling of short temper, anger, aggression increased in the second survey compared to the first survey (from 71% to 76%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First</strong></td>
<td>6.43</td>
<td>7</td>
<td>2.16</td>
</tr>
<tr>
<td><strong>Second</strong></td>
<td>6.43</td>
<td>7</td>
<td>2.36</td>
</tr>
</tbody>
</table>

Figure 33. First and second survey comparison for Question #38b

(#39a) Percent of students reported less feeling of sympathy, wisdom and consideration increased from 43% in the first survey to 48% in the second survey (from 43% to 48%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First</strong></td>
<td>4.14</td>
<td>3</td>
<td>2.85</td>
</tr>
<tr>
<td><strong>Second</strong></td>
<td>4.14</td>
<td>4</td>
<td>2.03</td>
</tr>
</tbody>
</table>
The percent of students with less feeling of irritability, skepticism and criticism decreased from 71% in the first survey to 62% in the second survey (from 71% to 62%). (5-10 range)

<table>
<thead>
<tr>
<th>First</th>
<th>Mean: 5.52</th>
<th>Median: 5</th>
<th>Standard Deviation: 2.25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>Mean: 5.47</td>
<td>Median: 5</td>
<td>Standard Deviation: 2.09</td>
</tr>
</tbody>
</table>

The data shows a slight decrease in the percentage of students reporting lower levels of irritability, skepticism, and criticism between the first and second surveys. The first survey had a mean of 5.52, while the second survey had a mean of 5.47. Both surveys had a median of 5, and the standard deviation was lower in the second survey, at 2.09 compared to 2.25 in the first survey.
The percent of students with less feeling of being allowed to be yourself increased from 52% in the first survey compared to 62% in the second survey (from 52% to 62%). (5-10 range)

First  
Mean: 5.00  
Median: 5  
Standard Deviation: 2.41

Second  
Mean: 4.38  
Median: 5  
Standard Deviation: 2.82

Figure 36. First and second survey comparison for Question #40a

The percent of students feeling of being dominated or pressure by people has decreased from 81% in the first survey to 76% in the third survey (from 81% to 76%). (5-10 range)

First  
Mean: 7.00  
Median: 8  
Standard Deviation: 2.45

Second  
Mean: 6.28  
Median: 5  
Standard Deviation: 2.28
(41) There was a higher percent of students who believe people can change on the second survey compared to the first survey (from 95% to 100%). (5-10 range)

First  
Mean: 8.05  
Median: 9  
Standard Deviation: 2.08

Second  
Mean: 8.38  
Median: 9  
Standard Deviation: 1.85
(#42) A lower percent of students believed they could succeed in forming a new positive habit in the second survey compared to the first survey (from 90% to 81%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First</strong></td>
<td>7.28</td>
<td>8</td>
<td>2.24</td>
</tr>
<tr>
<td><strong>Second</strong></td>
<td>7.33</td>
<td>8</td>
<td>2.17</td>
</tr>
</tbody>
</table>

**Figure 39.** First and second survey comparison for Question #42

(#43) 19% less students reported they have habits that they wish they could change in the second survey than in the first survey. (from 90% to 71%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First</strong></td>
<td>6.95</td>
<td>7</td>
<td>2.31</td>
</tr>
<tr>
<td><strong>Second</strong></td>
<td>6.05</td>
<td>7</td>
<td>2.73</td>
</tr>
</tbody>
</table>
Figure 40. First and second survey comparison for Question #43

(#44) 5% more of students said they like to develop new habits in the second survey than in the first survey (from 95% to 100%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>8.38</td>
<td>10</td>
<td>2.37</td>
</tr>
<tr>
<td>Second</td>
<td>8.52</td>
<td>9</td>
<td>1.94</td>
</tr>
</tbody>
</table>
(2) 90% of students in the second survey expressed they could better deal with stress compared to 86% in the third survey. (from 90% to 86%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>7.81</td>
<td>8</td>
<td>2.23</td>
</tr>
<tr>
<td>Third</td>
<td>7.62</td>
<td>8</td>
<td>2.44</td>
</tr>
</tbody>
</table>
Figure 42. Second and third survey comparison for Question #2

(#3) 95% of students described themselves as kind on both second and third surveys. (5-10 range)

Second
Mean: 8.43
Median: 9
Standard Deviation: 1.40

Third
Mean: 8.33
Median: 8
Standard Deviation: 1.42
Figure 43. Second and third survey comparison for Question #3

(#4) 5% more of Students in the third survey felt positive and confident about themselves compared to the result of the second survey. (from 90% to 95%) (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>7.76</td>
<td>7</td>
<td>2.09</td>
</tr>
<tr>
<td>Third</td>
<td>8.05</td>
<td>8</td>
<td>2.15</td>
</tr>
</tbody>
</table>

Figure 44. Second and third survey comparison for Question #4

(#6) 76% of students criticized themselves often in the second survey compared to 71% in the third survey. (from 76% to 71%) (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>5.62</td>
<td>5</td>
<td>2.52</td>
</tr>
<tr>
<td>Third</td>
<td>5.95</td>
<td>6</td>
<td>2.46</td>
</tr>
</tbody>
</table>
Figure 45. Second and third survey comparison for Question #6

(#8) The percent of students who compared themselves with others was 10% less in the third survey compared to the second survey (from 67% to 57%). (5-10 range)

Second
Mean: 5.24  Median: 5  Standard Deviation: 2.38

Third
Mean: 5.19  Median: 5  Standard Deviation: 2.40
Figure 46. Second and third survey comparison for Question #8

(#10) 95% percent of students felt their desires were similar to the other people in the second survey compared to 90% in the third survey (from 95% to 90%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>7.47</td>
<td>8</td>
<td>1.43</td>
</tr>
<tr>
<td>Third</td>
<td>7.47</td>
<td>8</td>
<td>2.14</td>
</tr>
</tbody>
</table>

Figure 47. Second and third survey comparison for Question #10

(#11) The percent of students who saw themselves more addicted to things increased 19%, from 38% in the second survey to 57% in the third survey (from 38% to 57%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>3.95</td>
<td>2</td>
<td>3.35</td>
</tr>
<tr>
<td>Third</td>
<td>4.95</td>
<td>5</td>
<td>3.44</td>
</tr>
</tbody>
</table>
(#14) 38% percent of students said they were treated unfairly in second survey compared to 33% in the third survey (from 38% to 33%). (5-10 range)

**Second**  
Mean: 3.76  
Median: 3  
Standard Deviation: 2.32

**Third**  
Mean: 3.80  
Median: 4  
Standard Deviation: 2.34
Figure 49. Second and third survey comparison for Question #14

(#15) There was a 9% decrease in the number of students who said they had exposure to suicide in their lives in the third survey compared to the second survey (from 38% to 29%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>4.47</td>
<td>3</td>
<td>2.89</td>
</tr>
<tr>
<td>Third</td>
<td>4</td>
<td>3</td>
<td>3.11</td>
</tr>
</tbody>
</table>

Figure 50. Second and third survey comparison for Question #15

(#16) There was a 5% increase in the number of students who said they witnessed violence in their lives in the third survey compared to the second survey (from 57% to 62%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>6.05</td>
<td>5</td>
<td>3.26</td>
</tr>
<tr>
<td>Third</td>
<td>6.14</td>
<td>6</td>
<td>3.22</td>
</tr>
</tbody>
</table>
Figure 51. Second and third survey comparison for Question #16

(#17) 81% of students said they witnessed others being subjected to emotional abuse in the second compared to 76% in the third survey (from 81% to 76%). (5-10 range)

Second	Mean: 6.66	Median: 8	Standard Deviation: 2.71
Third	Mean: 6.62	Median: 8	Standard Deviation: 3.10
(#18) 5% less students expressed they felt safe at home or in their neighborhoods in the third survey compared to the second one. (from 95% to %90). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>5.87</td>
<td>9</td>
<td>1.80</td>
</tr>
<tr>
<td>Third</td>
<td>8.85</td>
<td>9</td>
<td>2.59</td>
</tr>
</tbody>
</table>

Figure 52. Second and third survey comparison for Question #17

(#19) There is a 19% increase in students who reported they had trouble with law in the third survey compared to the second survey (from 10% to 29%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>2.28</td>
<td>1</td>
<td>2.67</td>
</tr>
<tr>
<td>Third</td>
<td>3.28</td>
<td>1</td>
<td>3.28</td>
</tr>
</tbody>
</table>

Figure 53. Second and third survey comparison for Question #18
Figure 54. Second and third survey comparison for Question #19

(20) 100% of students reported they were strongly guided by moral principles in second survey compared with 90% in the third survey (from 100% to 90%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean:</th>
<th>Median:</th>
<th>Standard Deviation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>8.43</td>
<td>9</td>
<td>1.43</td>
</tr>
<tr>
<td>Third</td>
<td>7.9</td>
<td>9</td>
<td>2.53</td>
</tr>
</tbody>
</table>
Figure 55. Second and third survey comparison for Question #20

(#21) 95% of students reported they were proud of their family in the second survey compared to 100% in the third surveys. (from 95% to 100%). (5-10 range)

Second  Mean: 9.19  Median: 10  Standard Deviation: 1.47
Third  Mean: 8.57  Median: 9  Standard Deviation: 1.72

Figure 56. Second and third survey comparison for Question #21

(#22) Percent of students said they liked school decreased from 76% in the second survey to 67% in the third survey (from 76% to 67%). (5-10 range)

Second  Mean: 6.43  Median: 7  Standard Deviation: 2.97
Third  Mean: 5.95  Median: 7  Standard Deviation: 3.44
Figure 57. Second and third survey comparison for Question #22

(#23) A higher percent of students reported a positive body image in the third survey than in the second survey (from 90% to 95%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>7.19</td>
<td>7</td>
<td>1.89</td>
</tr>
<tr>
<td>Third</td>
<td>7.57</td>
<td>8</td>
<td>1.80</td>
</tr>
</tbody>
</table>
Figure 58. Second and third survey comparison for Question #23

(#24) The percent of students who said dreams had meaning to them decreased 4% from 90% in the second survey to 86% in the third survey (from 90% to 86%). (5-10 range)

(#25) 86% percent of students reported stress affected their work and health in the second survey compared to a lower percent of 81% in the third survey (from 86% to 81%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>7.14</td>
<td>7</td>
<td>2.57</td>
</tr>
<tr>
<td>Third</td>
<td>7.09</td>
<td>7</td>
<td>2.57</td>
</tr>
</tbody>
</table>

Figure 59. Second and third survey comparison for Question #25

(#26) The percent of students who reached out when dealing with suffering and failure increased from 38% in the second survey to 48% in the third survey (from 38% to 48%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>4.05</td>
<td>4</td>
<td>2.52</td>
</tr>
<tr>
<td>Third</td>
<td>4.81</td>
<td>4</td>
<td>2.69</td>
</tr>
</tbody>
</table>
Figure 60. Second and third survey comparison for Question #26

(#27) 86% of students reported they knew nutrition in the second survey than the 90% in the third survey (from 86% to 90%). (5-10 range)

Second  Mean:  6  Median:  6  Standard Deviation:  1.79
Third    Mean:  6.38 Median:  6  Standard Deviation:  1.74
Figure 61. Second and third survey comparison for Question #27

(#28) There was a 10% increase in percent of students said they snacked between meals in the third survey than in the second survey (from 57% to 67%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean:</th>
<th>Median:</th>
<th>Standard Deviation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>5.47</td>
<td>5</td>
<td>2.57</td>
</tr>
<tr>
<td>Third</td>
<td>6.52</td>
<td>7</td>
<td>2.82</td>
</tr>
</tbody>
</table>

Figure 62. Second and third survey comparison for Question #28

(#29) 43% of students reported they drank soda in the second survey compared to 24% in the third surveys (from 43% to 24%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean:</th>
<th>Median:</th>
<th>Standard Deviation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>3.52</td>
<td>3</td>
<td>1.99</td>
</tr>
<tr>
<td>Third</td>
<td>3.38</td>
<td>2</td>
<td>2.25</td>
</tr>
</tbody>
</table>
Figure 63. Second and third survey comparison for Question #29

(30) 67% of students reported they exercised in both the second and the third surveys (67%) (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>5.66</td>
<td>6</td>
<td>2.22</td>
</tr>
<tr>
<td>Third</td>
<td>5.57</td>
<td>6</td>
<td>2.11</td>
</tr>
</tbody>
</table>

Q30 - Second and Third Survey Results
Figure 64. Second and third survey comparison for Question #30

(#31) 95% of students reported they were familiar with the feeling of love in both second and third surveys (95%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>8.05</td>
<td>9</td>
<td>2.33</td>
</tr>
<tr>
<td>Third</td>
<td>8.43</td>
<td>9</td>
<td>1.99</td>
</tr>
</tbody>
</table>

Figure 65. Second and third survey comparison for Question #31

(#32a) There was 5% less students said they like to be more loving in the third survey than the second survey (from 67% to 62%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>5.47</td>
<td>5</td>
<td>3.04</td>
</tr>
<tr>
<td>Third</td>
<td>5.62</td>
<td>5</td>
<td>3.20</td>
</tr>
</tbody>
</table>
(32b) 52% of students reported they wanted to be less loving in the second than 43% in the third surveys (from 52% to 43%). (5-10 range)

**Second**
- Mean: 3.90
- Median: 5
- Standard Deviation: 2.60

**Third**
- Mean: 3.81
- Median: 3
- Standard Deviation: 2.64

---

**Figure 66.** Second and third survey comparison for Question #32a

**Figure 67.** Second and third survey comparison for Question #32b
(33) The percentage of students who thought fear was interfering with their ability to love and be loved decreased by 14% from 62% in the second survey to 48% in the third survey (from 62% to 48%). (5-10 range)

**Second**
- Mean: 5.47
- Median: 5
- Standard Deviation: 3.29

**Third**
- Mean: 5.47
- Median: 4
- Standard Deviation: 3.31

![Figure 68. Second and third survey comparison for Question #33](image)

(34) The percent of students who reported having experience with meditation has decreased by 5%, from 76% in the second survey to 71% in the third survey (from 76% to 71%). (5-10 range)

**Second**
- Mean: 5.57
- Median: 6
- Standard Deviation: 2.18

**Third**
- Mean: 5.71
- Median: 6
- Standard Deviation: 2.43
(36) 86% of students said they are creative in the second survey compared to 81% in the third survey (from 86% to 81%). (5-10 range)

**Second**
Mean: 7.09  
Median: 8  
Standard Deviation: 2.32

**Third**
Mean: 7.24  
Median: 8  
Standard Deviation: 2.45
(#37a) 10% less students experienced less happiness, security, and wholeness in the third survey compared to the second survey (from 48% to 38%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Second</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.47</td>
<td>4</td>
</tr>
<tr>
<td>Median</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>SD</td>
<td>2.44</td>
<td>2.34</td>
</tr>
</tbody>
</table>

**Figure 71.** Second and third survey comparison for Question #37a

(#37b) The percent of students reported experiencing less feeling of sadness, depression, and melancholy was 76% in the second and 86% in the third survey (from 76% to 86%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Second</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>5.38</td>
<td>6.28</td>
</tr>
<tr>
<td>Median</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>SD</td>
<td>1.83</td>
<td>2.12</td>
</tr>
</tbody>
</table>
Figure 72. Second and third survey comparison for Question #37b

(38a) The percent of students experienced less patience, endurance and kindness was 48% in the second and the 38% in the third survey (from 48% to 38%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Second</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.43</td>
<td>4.05</td>
</tr>
<tr>
<td>Median</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>SD</td>
<td>2.48</td>
<td>2.18</td>
</tr>
</tbody>
</table>
Figure 73. Second and third survey comparison for Question #38a

(#38b) 76% of the students reported less feeling of short temper, anger, aggression in both the second and the third surveys (76%). (5-10 range)

<table>
<thead>
<tr>
<th>Survey</th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>6.43</td>
<td>7</td>
<td>2.36</td>
</tr>
<tr>
<td>Third</td>
<td>6.47</td>
<td>7</td>
<td>2.46</td>
</tr>
</tbody>
</table>

Figure 74. Second and third survey comparison for Question #38b

(#39a) Percent of students reported less feeling of sympathy, wisdom and consideration decreased by 15%, from 48% in the second survey to 33% in the third survey (from 48% to 33%). (5-10 range)

<table>
<thead>
<tr>
<th>Survey</th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
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<tbody>
<tr>
<td>Second</td>
<td>4.14</td>
<td>4</td>
<td>2.03</td>
</tr>
<tr>
<td>Third</td>
<td>3.71</td>
<td>4</td>
<td>1.95</td>
</tr>
</tbody>
</table>
Figure 75. Second and third survey comparison for Question #39a

(#39b) The percent of students with less feeling of irritability, skepticism and criticism increased from 62% in the second survey to 67% in the third survey (from 62% to 67%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>5.47</td>
<td>5</td>
<td>2.25</td>
</tr>
<tr>
<td>Third</td>
<td>5.28</td>
<td>5</td>
<td>1.90</td>
</tr>
</tbody>
</table>
(40a) The percent of students with less feeling of being allowed to be yourself decreased by 5%, from 48% in the second survey compared to 43% in the third survey (from 48% to 43%). (5-10 range)

**Second**  
Mean: 4.38  
Median: 5  
Standard Deviation: 2.82

**Third**  
Mean: 4.43  
Median: 4  
Standard Deviation: 2.40

(40b) The percent of students feeling of being dominated or pressure by people has increased by 19%, from 71% in the second survey to 90% in the third survey (from 71% to 90%). (5-10 range)

**Second**  
Mean: 6.05  
Median: 5  
Standard Deviation: 2.65

**Third**  
Mean: 6.95  
Median: 7  
Standard Deviation: 1.96
The percent of students who believed people can change was 100% in the second survey and 95% in the third survey (from 100% to 95%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>8.38</td>
<td>9</td>
<td>1.85</td>
</tr>
<tr>
<td>Third</td>
<td>8.43</td>
<td>9</td>
<td>1.83</td>
</tr>
</tbody>
</table>

Figure 78. Second and third survey comparison for Question #40b

Figure 79. Second and third survey comparison for Question #41
(#42) 81% of students believed they could succeed in forming a new positive habit in the second and 90% in the third survey (from 81% to 90%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>7.33</td>
<td>8</td>
<td>2.17</td>
</tr>
<tr>
<td>Third</td>
<td>7.38</td>
<td>7</td>
<td>2.20</td>
</tr>
</tbody>
</table>

![Figure 80. Second and third survey comparison for Question #42](image)

(#43) 71% of students reported they have habits that they wish they could change in the second survey compared to 86% in the third survey (from 71% to 86%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>6.09</td>
<td>7</td>
<td>2.73</td>
</tr>
<tr>
<td>Third</td>
<td>7.37</td>
<td>7</td>
<td>2.20</td>
</tr>
</tbody>
</table>
Figure 81. Second and third survey comparison for Question #43

(44) 100% of students said they like to develop new habits in the second survey compared to 95% in the third survey (from 100% to 95%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second</td>
<td>8.52</td>
<td>9</td>
<td>1.94</td>
</tr>
<tr>
<td>Third</td>
<td>9</td>
<td>10</td>
<td>2.10</td>
</tr>
</tbody>
</table>

Figure 82. Second and third survey comparison for Question #44
Spring 2018 Ethnic Studies Course – First and Third Surveys Comparison

(#2) 85% of students in the first and third surveys expressed they could better deal with stress. (from 85%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>7</td>
<td>7.62</td>
</tr>
<tr>
<td>Median</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>SD</td>
<td>2.07</td>
<td>2.44</td>
</tr>
</tbody>
</table>

Figure 83. First and third survey comparison for Question #2

(#3) 100% of students described themselves as kind on both first and third surveys. (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>8.42</td>
<td>8.33</td>
</tr>
<tr>
<td>Median</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>SD</td>
<td>1.16</td>
<td>1.42</td>
</tr>
</tbody>
</table>
Figure 84. First and third survey comparison for Question #3

(#4) 19% more of Students in the third survey felt positive and confident about themselves compared to the result of the first survey. (from 81% to 100%) (5-10 range)

**First**  
Mean: 7.38  
Median: 7  
Standard Deviation: 2.73

**Third**  
Mean: 8.05  
Median: 8  
Standard Deviation: 2.15

Figure 85. First and third survey comparison for Question #4
(6) 67% of students criticized themselves often in the first survey compared to 71% in the third survey. (from 67% to 71%) (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>5.71</td>
<td>5</td>
<td>2.32</td>
</tr>
<tr>
<td>Third</td>
<td>5.95</td>
<td>6</td>
<td>2.46</td>
</tr>
</tbody>
</table>

Figure 86. First and third survey comparison for Question #6

(8) The percent of students who compared themselves with others was 29% less in the third survey compared to the first survey (from 86% to 57%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>6.62</td>
<td>7</td>
<td>2.22</td>
</tr>
<tr>
<td>Third</td>
<td>5.19</td>
<td>5</td>
<td>2.40</td>
</tr>
</tbody>
</table>
Figure 87. First and third survey comparison for Question #8

(#10) 90% percent of students felt their desires were similar to the other people in the first survey and the third survey s(90%). (5-10 range)

First  
Mean: 7.14  
Median: 8  
Standard Deviation: 2.26

Third  
Mean: 7.47  
Median: 8  
Standard Deviation: 2.14
Figure 88. First and third survey comparison for Question #10

(#11) The percent of students who saw themselves more addicted to things increased from the first survey to the third survey (from 38% to 57%). (5-10 range)

<table>
<thead>
<tr>
<th>First</th>
<th>Mean: 4.52</th>
<th>Median: 3</th>
<th>Standard Deviation: 3.23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Third</td>
<td>Mean: 4.95</td>
<td>Median: 5</td>
<td>Standard Deviation: 3.44</td>
</tr>
</tbody>
</table>

Figure 89. First and third survey comparison for Question #11

(#14) 33% percent of students said they were treated unfairly in both the first and the third surveys. (5-10 range)

<table>
<thead>
<tr>
<th>First</th>
<th>Mean: 3.42</th>
<th>Median: 3</th>
<th>Standard Deviation: 2.31</th>
</tr>
</thead>
<tbody>
<tr>
<td>Third</td>
<td>Mean: 3.80</td>
<td>Median: 4</td>
<td>Standard Deviation: 2.34</td>
</tr>
</tbody>
</table>
There was a 23% decrease in the number of students who said they had exposure to suicide in their lives in the third survey compared to the first survey (from 52% to 29%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>5.04</td>
<td>5</td>
<td>2.82</td>
</tr>
<tr>
<td>Third</td>
<td>4</td>
<td>3</td>
<td>3.11</td>
</tr>
</tbody>
</table>
There was a 10% increase in the number of students who said they witnessed violence in their lives in the third survey compared to the first survey (from 52% to 62%). (5-10 range)

First  
Mean: 5.71  
Median: 5  
Standard Deviation: 3.08

Third  
Mean: 6.14  
Median: 6  
Standard Deviation: 3.22
(#17) 76% of students said they witnessed others being subjected to emotional abuse in the first and third surveys. (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First</strong></td>
<td>6.76</td>
<td>8</td>
<td>2.66</td>
</tr>
<tr>
<td><strong>Third</strong></td>
<td>6.62</td>
<td>8</td>
<td>3.10</td>
</tr>
</tbody>
</table>

![Q17 - First and Third Survey Results](image)

**Figure 93.** First and third survey comparison for Question #17

(#18) 5% less students expressed they felt safe at home or in their neighborhoods in the third survey compared to the first one. (from 95% to %90). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First</strong></td>
<td>8.47</td>
<td>9</td>
<td>1.99</td>
</tr>
<tr>
<td><strong>Third</strong></td>
<td>8.85</td>
<td>9</td>
<td>2.59</td>
</tr>
</tbody>
</table>
There is a 5% increase in students who reported they had trouble with law in the third survey compared to the first survey (from 24% to 29%). (5-10 range)

**First**
- Mean: 2.80
- Median: 1
- Standard Deviation: 2.80

**Third**
- Mean: 3.28
- Median: 1
- Standard Deviation: 3.28
(#20) 95% of students reported they were strongly guided by moral principles in first survey compared with 90% in the third survey (from 95% to 90%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>8.38</td>
<td>9</td>
<td>2.08</td>
</tr>
<tr>
<td>Third</td>
<td>7.9</td>
<td>9</td>
<td>2.53</td>
</tr>
</tbody>
</table>

**Figure 96.** First and third survey comparison for Question #20

(#21) 100% of students reported they were proud of their family in the first and the third surveys. (100%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>9.28</td>
<td>10</td>
<td>1.05</td>
</tr>
<tr>
<td>Third</td>
<td>8.57</td>
<td>9</td>
<td>1.72</td>
</tr>
</tbody>
</table>
Figure 97. First and third survey comparison for Question #21

(#22) Percent of students said they liked school decreased from 81% in the first survey to 67% in the third survey (from 81% to 67%). (5-10 range)

First  | Mean: 6.86 | Median: 7 | Standard Deviation: 2.35
Third  | Mean: 5.95 | Median: 7 | Standard Deviation: 3.44

Figure 98. First and third survey comparison for Question #22
(23) A higher percent of students reported a positive body image in the third survey than in the first survey (from 81% to 95%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th></th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>6.85</td>
<td>Median</td>
<td>7</td>
</tr>
<tr>
<td>Median</td>
<td>7</td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

Figure 99. First and third survey comparison for Question #23

(24) The percent of students who said dreams had meaning to them increased 15% from 71% to 86% in the third survey compared with the first survey (from 71% to 86%). (5-10 range)

(25) 86% percent of students reported stress affected their work and health in the first survey compared to the lower percent of 81% in the third survey (from 86% to 81%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th></th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>6.57</td>
<td>Median</td>
<td>7</td>
</tr>
<tr>
<td>Median</td>
<td>7</td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>
The percent of students who reached out when dealing with suffering and failure increased from 43% in the first survey to 48% in the third survey (from 43% to 48%). (5-10 range)

First
Mean: 4.14
Median: 4
Standard Deviation: 2.05

Third
Mean: 4.81
Median: 4
Standard Deviation: 2.69
Fourteen percent more students reported they knew nutrition in the third survey than the first survey (from 76% to 90%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>5.76</td>
<td>6.38</td>
</tr>
<tr>
<td>Median</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>SD</td>
<td>2.09</td>
<td>1.74</td>
</tr>
</tbody>
</table>

Figure 102. First and third survey comparison for Question #27

There was a 10% increase in percent of students said they snacked between meals in the third survey than in the first survey (from 57% to 67%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>5.47</td>
<td>6.52</td>
</tr>
<tr>
<td>Median</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>SD</td>
<td>2.68</td>
<td>2.82</td>
</tr>
</tbody>
</table>
(29) 24% of students reported they drank soda in the first and the third surveys (from 24). (5-10 range)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First</strong></td>
<td>Mean: 3.28</td>
<td>Median: 2</td>
</tr>
<tr>
<td><strong>Third</strong></td>
<td>Mean: 3.38</td>
<td>Median: 2</td>
</tr>
</tbody>
</table>

**Figure 103.** First and third survey comparison for Question #28

**Figure 104.** First and third survey comparison for Question #29
(#30) 14% less students reported they exercised in the third survey than in the first survey (from 76% to 62%) (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>5.62</td>
<td>6</td>
<td>2.73</td>
</tr>
<tr>
<td>Third</td>
<td>5.57</td>
<td>6</td>
<td>2.11</td>
</tr>
</tbody>
</table>

**Figure 105.** First and third survey comparison for Question #30

(#31) 95% of students reported they were familiar with the feeling of love in both first and third surveys. (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>7.90</td>
<td>9</td>
<td>2.43</td>
</tr>
<tr>
<td>Third</td>
<td>8.43</td>
<td>9</td>
<td>1.99</td>
</tr>
</tbody>
</table>
(32a) There was 24% less students said they like to be more loving in the third survey than the first survey (from 86% to 62%). (5-10 range)

**First**
- Mean: 6.90
- Median: 8
- Standard Deviation: 2.88

**Third**
- Mean: 5.62
- Median: 5
- Standard Deviation: 3.20
(#32b) 43% of students reported they wanted to be less loving in the first and the third surveys (43%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th></th>
<th>Third</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.23</td>
<td>Median: 5</td>
<td>Mean: 3.81</td>
<td>Median: 3</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation: 1.92</td>
<td>Standard Deviation: 2.64</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 108. First and third survey comparison for Question #32b

(#33) The percentage of students who thought fear was interfering with their ability to love and be loved decreased by 28% from 76% in the first survey to 48% in the third survey (from 76% to 48%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th></th>
<th>Third</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>5.85</td>
<td>Median: 7</td>
<td>Mean: 5.47</td>
<td>Median: 4</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation: 3.20</td>
<td>Standard Deviation: 3.31</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(34) The percent of students who reported having experience with meditation has increased by 19%, from 52% in the first survey to 71% in the third survey (from 52% to 71%). (5-10 range)

First  
Mean: 3.95  
Median: 5  
Standard Deviation: 2.56

Third  
Mean: 5.71  
Median: 6  
Standard Deviation: 2.43
#36 86% of students said they are creative in the first survey compared to 81% in the third survey (from 86% to 81%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>6.71</td>
<td>7</td>
<td>2.30</td>
</tr>
<tr>
<td>Third</td>
<td>7.24</td>
<td>8</td>
<td>2.45</td>
</tr>
</tbody>
</table>

Figure 111. First and third survey comparison for Question #36

#37a 14% less students experienced less happiness, security, and wholeness in the third survey compared to the first survey (from 52% to 38%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>4.86</td>
<td>5</td>
<td>2.07</td>
</tr>
<tr>
<td>Third</td>
<td>4</td>
<td>3</td>
<td>2.34</td>
</tr>
</tbody>
</table>
The percent of students reported experiencing less feeling of sadness, depression, and melancholy was 86% in the first and the third surveys (from 86%). (5-10 range)

**First**
- Mean: 5.95
- Median: 6
- Standard Deviation: 1.63

**Third**
- Mean: 6.28
- Median: 6
- Standard Deviation: 2.12

---

**Figure 112.** First and third survey comparison for Question #37a

---

**Figure 113.** First and third survey comparison for Question #37b
(#38a) The percent of students experienced less patience, endurance and kindness was 38% in the first and the third surveys (from 38%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>4.00</td>
<td>3</td>
<td>2.74</td>
</tr>
<tr>
<td>Third</td>
<td>4.05</td>
<td>3</td>
<td>2.18</td>
</tr>
</tbody>
</table>

Figure 114. First and third survey comparison for Question #38a

(#38b) The percent of students reported less feeling of short temper, anger, aggression increased in the third survey compared to the first survey (from 71% to 76%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>6.43</td>
<td>7</td>
<td>2.16</td>
</tr>
<tr>
<td>Third</td>
<td>6.47</td>
<td>7</td>
<td>2.46</td>
</tr>
</tbody>
</table>
(39a) Percent of students reported less feeling of sympathy, wisdom and consideration decreased from 43% in the first survey to 33% in the third survey (from 43% to 33%). (5-10 range)

**First**
- Mean: 4.14
- Median: 3
- Standard Deviation: 2.85

**Third**
- Mean: 3.71
- Median: 4
- Standard Deviation: 1.95
First Mean: 5.52 Median: 5 Standard Deviation: 2.25
Third Mean: 5.28 Median: 5 Standard Deviation: 1.90
The percent of students feeling of being dominated or pressure by people has increased from 81% in the first survey to 90% in the third survey (from 81% to 90%). 

First
Mean: 7.00  Median: 8  Standard Deviation: 2.45

Third
Mean: 6.95  Median: 7  Standard Deviation: 1.96
The percent of students who believed people can change was 95% both in the first and the third surveys (95%). (5-10 range)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
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</thead>
<tbody>
<tr>
<td><strong>First</strong></td>
<td>8.05</td>
<td>9</td>
<td>2.08</td>
</tr>
<tr>
<td><strong>Third</strong></td>
<td>8.43</td>
<td>9</td>
<td>1.83</td>
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Figure 120. First and third survey comparison for Question #41

90% of students believed they could succeed in forming a new positive habit in the first and the third surveys survey (90%). (5-10 range)

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<th>Median</th>
<th>Standard Deviation</th>
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<tbody>
<tr>
<td><strong>First</strong></td>
<td>7.28</td>
<td>8</td>
<td>2.24</td>
</tr>
<tr>
<td><strong>Third</strong></td>
<td>7.38</td>
<td>7</td>
<td>2.20</td>
</tr>
</tbody>
</table>
(43) 90% of students reported they have habits that they wish they could change in the first and the third surveys (90%). (5-10 range)

First
Mean: 7.28
Median: 8
Standard Deviation: 2.24

Third
Mean: 7.37
Median: 7
Standard Deviation: 2.20
Figure 122. First and third survey comparison for Question #43

(44) 95% of students said they like to develop new habits in the first and the third surveys (95%). (5-10 range)

<table>
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<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>8.38</td>
<td>10</td>
<td>2.37</td>
</tr>
<tr>
<td>Third</td>
<td>9</td>
<td>10</td>
<td>2.10</td>
</tr>
</tbody>
</table>

Summary

The questionnaire that was administered three times in class provided opportunity to students to self-reflection and a better understanding of themselves. It also provided the environment that allowed students to ask for help, if needed.

This report is based on the survey result of 22 students who completed all 3 surveys at the beginning of the class, in the middle of the term, and the final week of class.

The pair-wise comparison of the result of these three surveys was used to help understand the impact of the instruction on students’ understanding of themselves and the world around them.
The following information is based on the result of comparison of the first survey result with the second, the second survey with the third, and the first one with the last survey.

Here are the highlights of the study of these three comparisons.

The percent of students reported that they felt positive and confident about themselves in all 3 comparisons. (19% improvement from the first to the third survey).

The Percent of students compared themselves to others decreased in all 3 comparisons. (including the 29% decrease in the first-third survey comparison).

The percent of students reported a positive body image increased in all 3 comparisons.

The percent of students who reported they were reached out when suffered increased in second and third comparisons.

A higher percent of students reported they knew nutrition in all 3 comparisons.

There was a significant percent of drop in the portion of students who said they had exposure to suicide in their lives in all 3 comparisons.

The percent of students expressed fear was interfering with their ability to love and be loved decreased in all 3 comparisons.

A higher percent of students said they were creative in the second and the third comparisons.

A smaller portion of students felt less happiness and security in all 3 comparisons.

A larger portion of students expressed less feeling of short temper and anger in two of the three comparisons.

A smaller portion of students reported feeling of sympathy, wisdom and consideration in two of the three comparisons.

The percent of change in Students reported that they felt positive and confident about themselves in the pair-wise 3-survey comparisons.
The percent of change in the students who compared themselves to others in the pair-wise 3-survey comparisons. The comparison shows a significant improvement.

The percent of change in Students reported a positive body image in the pair-wise 3-survey comparisons. The First to Third survey comparison showed a high percent of improvement.
The percent of change in Students reported they knew nutrition in the pair-wise 3-survey comparisons.

The percent of change in Students who said they experienced suicide in their lives in the pair-wise 3-survey comparisons.
There were also some seemingly unexplained results of these three comparisons that may require further analytical work.

- There was an increase in the percent of students who said they witnessed violence in their lives in all comparisons.
- The percent of students who said they liked school decreased in all 3 comparisons.
- A smaller portion of student reported that they are guided by morale in all 3 comparisons.

Discussion

Previously implemented as a pilot model, the next phase in the development of this groundbreaking partnership will allow for the creation of the Initiative for Advancing Non-Violence and Peace to evaluate the research-based approach to instilling and promoting self-management skills with regard to self-knowledge and esteem, emotional intelligence, anger
management, and relationship bridling as a means to help ameliorate the increasing trend of violence and suicide while focusing on college students.

The Initiative for Advancing Non-Violence and Peace will focus on the individual and societal risk factors to help mitigate the larger social circumstances that often lead individuals to violence, aggression, and depression by combining multiple non-clinical interventions in an intensive comprehensive approach through small classes of 16-20 students. Our semester long classroom will encourage a shift in mindset that will promote well-being and positive values.

The goal will be to equip participants with skills to create positive change, starting with themselves, then to bring this change to the communities in which they live, study, or work, with special attention given to cultural awareness.

Appendix

Questionnaire

Emotional Intelligence – Daniel He¹

1. How would you describe yourself emotionally?

2. How well do you deal with uncomfortable emotions?

   (not very well) 1 2 3 4 5 6 7 8 9 10 (very well)

3. When you wake up, how would you describe your emotional state?

   (very negative) 1 2 3 4 5 6 7 8 9 10 (very positive)

4. What is your understanding of emotional intelligence?

5. How well do you deal with conflicts?

   (not very well) 1 2 3 4 5 6 7 8 9 10 (very well)
6. How kind would you describe yourself as?
   
   (very unkind) 1 2 3 4 5 6 7 8 9 10 (very kind)

7. How often do you examine the other person's perspective when someone disagrees with you?
   
   (never) 1 2 3 4 5 6 7 8 9 10 (always)

8. How do you feel about working with others? Do you prefer working alone or with others?
   
   (always alone) 1 2 3 4 5 6 7 8 9 10 (always with others)

9. Do you consider yourself a jealous person?
   
   (never jealous) 1 2 3 4 5 6 7 8 9 10 (always jealous)

10. When you feel you are about to cry, do you usually hold it in, or do you let it out?
    
    (always hold it in) 1 2 3 4 5 6 7 8 9 10 (always let it out)

11. How often do you worry?
    
    (not very often) 1 2 3 4 5 6 7 8 9 10 (very often)

12. How often do you feel like you agree with others?
    
    (never) 1 2 3 4 5 6 7 8 9 10 (always)

13. Do you have a lot of future goals?
    
    (none) 1 2 3 4 5 6 7 8 9 10 (very many)

14. What are your goals? How do you see yourself in five years?

15. Are you a curious person?
    
    (not curious) 1 2 3 4 5 6 7 8 9 10 (very curious)


Self-Esteem – Daniel He

16. Do you currently feel positive and confident about yourself?
    
    (not positive) 1 2 3 4 5 6 7 8 9 10 (very positive)

17. How much difficulty with your self-esteem have you had in the past?
    
    (very little difficulty) 1 2 3 4 5 6 7 8 9 10 (a lot of difficulty)

18. What is your understanding of self-esteem? What does it mean to you?

19. Where do you think a person's self-esteem comes from?

20. Are you a motivated person?
What motivates you?
Are you an outgoing person?
Do you criticize yourself often?
What is your self image? Describe in detail your mental picture of yourself
How do you think you can relax by visualizing yourself?
How often do you compare yourself with others?
If you are a man, describe the perfect man; if you are a woman, describe the perfect woman:
How do you compare to your description of the perfect man or woman?
Do you live in the past and worry about it a lot?
If you are a man, describe the perfect man; if you are a woman, describe the perfect woman:
How do you compare to your description of the perfect man or woman?
Do you live in the past and worry about it a lot?
To what extent do you examine your own motivations, attitudes and beliefs? How self-reflective are you?
To what extent are you aware of your role in the larger scheme of things? Your relationship to a first cause or a larger universal context, often referred to as God or Allah or the Buddha Nature, the Tao or even the Evolutionary imperative?
How much are you aware of how your desires and needs are the same or similar to other people’s?
Do you see yourself as addicted to anything...either a substance, a process, self-identity, belief system, emotional habits...something you perpetuate that you can’t seem to do without that is harmful to yourself or others?

1 2 3 4 5 6 7 8 9 10 (very motivated)
1 2 3 4 5 6 7 8 9 10 (very outgoing)
1 2 3 4 5 6 7 8 9 10 (always)
1 2 3 4 5 6 7 8 9 10 (very similar)
1 2 3 4 5 6 7 8 9 10 (always)

Introspection – Strider Entertainment (Conscious Cabaret)
34. To what extent has poetry been a part of your life? How strongly do you respond to poetry? Have you found poetry to be a way to understand life or yourself better?
   
   (not at all) 1 2 3 4 5 6 7 8 9 10 (very much so)


**Culture and Diversity – Samuel Harvell**

35. Where are you from? Draw a pictorial or symbolic representation of where your ancestors are from.

36. How do you identify yourself racially/ethnically?

37. How strongly do you identify with and take pride in your ethnic and racial heritage?
   
   (not at all) 1 2 3 4 5 6 7 8 9 10 (very strongly)

38. Describe what you know about the heritage of your first or last name.

39. When were you first aware of yourself as a member of a particular racial group?

40. When were you first aware of people from other races? Which races?

41. When did you first witness or experience someone being treated differently because of his/her racial group?

42. How often do you witness someone being treated unfairly due to race or ethnicity?
   
   (not at all) 1 2 3 4 5 6 7 8 9 10 (very strongly)

43. How often are you treated unfairly due to your race or ethnicity?
   
   (not at all) 1 2 3 4 5 6 7 8 9 10 (very strongly)

44. When was a time that you were proud of your racial group identity?

45. When was a time you realized that you would be treated differently because of your race?

46. To what extent do your friends represent a variety of different racial groups?
   
   (not at all) 1 2 3 4 5 6 7 8 9 10 (very much)

47. What significance would you place on the role of race and ethnicity in your life so far?
   
   (insignificant) 1 2 3 4 5 6 7 8 9 10 (very significant)


**Violence and Suicide – Dr. Ann Marie Meagher / Dr. Cherie R. Safapou**

48. How much exposure have you had to suicide in your life?
49. In recent times, how often have you thought about ending your own life?
(never) 1 2 3 4 5 6 7 8 9 10 (very often)

50. How much violence would you say you have witnessed in your life?
(none) 1 2 3 4 5 6 7 8 9 10 (a lot)

51. How much have you witnessed others being subjected to emotional abuse?
(none) 1 2 3 4 5 6 7 8 9 10 (a lot)

52. How much have you been physically or emotionally abused?
(none) 1 2 3 4 5 6 7 8 9 10 (a lot)

53. How well have you coped with the abuse that you have suffered?
(poorly) 1 2 3 4 5 6 7 8 9 10 (very well)

54. Do you feel safe at home or in your neighborhood?
(very unsafe) 1 2 3 4 5 6 7 8 9 10 (very safe)

55. Have you been a member of a gang or a participant in gang activities?  □ Yes □ No

56. Have you seen or experienced any problems arising from gang activities?
(none) 1 2 3 4 5 6 7 8 9 10 (a lot)

57. Have you had any trouble with the law?
(none) 1 2 3 4 5 6 7 8 9 10 (a lot)

58. Do you feel as though you are strongly guided by moral principles?
(not at all) 1 2 3 4 5 6 7 8 9 10 (very much so)

59. Do you like your father?
(not at all) 1 2 3 4 5 6 7 8 9 10 (very much)

60. Do you like your mother?
(not at all) 1 2 3 4 5 6 7 8 9 10 (very much)

61. If you have siblings, are you on good terms with them?
(not at all) 1 2 3 4 5 6 7 8 9 10 (very much so)

62. If you have children, are you on good terms with them?
63. If you are in a relationship, are you on good terms with your partner?
   *(not at all) 1 2 3 4 5 6 7 8 9 10 (very much so)*

64. Are you ashamed or proud of your family?
   *(very ashamed) 1 2 3 4 5 6 7 8 9 10 (very proud)*

65. Are you proud of yourself or your accomplishments?
   *(not at all) 1 2 3 4 5 6 7 8 9 10 (very proud)*

66. Do you like school?
   *(not at all) 1 2 3 4 5 6 7 8 9 10 (very much)*


**Nutrition – Dr. Ann Marie Meagher**

67. How would you rate your body image?
   *(negative) 1 2 3 4 5 6 7 8 9 10 (positive)*

68. Are you overweight or underweight?
   *(very underweight) 1 2 3 4 5 6 7 8 9 10 (very overweight)*

69. Do you know what your healthy weight should be?  □ Yes □ No

70. Have you ever dieted to lose weight?  □ Yes □ No

71. If so, have you been successful?
   *(unsuccessful) 1 2 3 4 5 6 7 8 9 10 (very successful)*

72. Do you smoke?  □ Yes □ No  If so, how many cigarettes per day? _____

73. Do you drink alcohol?  □ Yes □ No  If so, how many drinks per day? _____

74. Do you use recreational drugs often enough to interfere with your daily life?  □ Yes □ No

75. Do you drink:  □ Coffee □ Tea


**Sleep – Dr. Ann Marie Meagher / Dr. Cherie R. Safapou**

76. How many hours, on average, do you sleep per night during the week? _____
   On the weekends? _____

77. How well do you sleep at night? Do you suffer from insomnia or wake up in the
middle of the night?

*(terrible sleep) 1 2 3 4 5 6 7 8 9 10 (excellent sleep)*

78. Do you use medication to help you sleep? 
   □ Yes   □ No

79. Do you use alcohol to help you go to sleep? 
   □ Yes   □ No

80. No

81. Do you fall asleep during the day? 
   □ Yes   □ No

82. No

83. Do you fall asleep when you are driving?  
   □ Yes   □ No

84. Do you fall asleep when you are in class?  
   □ Yes   □ No

85. Do you remember your dreams?  
   □ Yes   □ No

86. Do your dreams have any meaning to you?  
   □ Yes   □ No

---


**Emotions and Health – Dr. Ann Marie Meagher / Dr. Cherie R. Safapou**

85. Are you able to be emotionally close to others? 
   *(not at all) 1 2 3 4 5 6 7 8 9 10 (very much so)*

86. Can you easily share your experiences and emotions with another? 
   *(very difficult) 1 2 3 4 5 6 7 8 9 10 (very easy)*

87. How often have you been in trouble because of how you expressed your anger? 
   *(very rarely) 1 2 3 4 5 6 7 8 9 10 (very often)*

88. How much stress is present in your life? 
   *(none) 1 2 3 4 5 6 7 8 9 10 (a lot)*

89. How well do you cope with stress? 
   *(very poorly) 1 2 3 4 5 6 7 8 9 10 (very well)*

90. Has stress adversely affected your work or your health? 
   *(not at all) 1 2 3 4 5 6 7 8 9 10 (very much)*
91. How well do you deal with failure, suffering, and grief?
   (very poorly) 1 2 3 4 5 6 7 8 9 10 (very well)

92. When you are stressed out or dealing with failure, suffering, or grief, do you reach out, or do you manage it on your own?
   (always alone) 1 2 3 4 5 6 7 8 9 10 (always reach out)

93. Does stress affect you (check all that apply): □ Physically □ Emotionally


Fitness – Daniel A. Jahangard 9

94. How well do you think you understand nutrition?
   (very poorly) 1 2 3 4 5 6 7 8 9 10 (very well)

95. How would you rate your diet?
   (very unhealthy) 1 2 3 4 5 6 7 8 9 10 (very healthy)

96. How often do you eat fast foods?
   (never) 1 2 3 4 5 6 7 8 9 10 (always)

97. How much fruit do you eat each day?
   (none) 1 2 3 4 5 6 7 8 9 10 (huge amounts)

98. How much water do you drink each day?
   (very little) 1 2 3 4 5 6 7 8 9 10 (huge amounts)

99. Do you take any vitamin supplements on a regular basis? □ Yes □ No

100. How often do you snack between meals?
    (never) 1 2 3 4 5 6 7 8 9 10 (always)

101. How often do you eat breakfast?
    (never) 1 2 3 4 5 6 7 8 9 10 (always)

102. How often do you drink soda?
    (never) 1 2 3 4 5 6 7 8 9 10 (always)

103. How often do you eat fish?
    (never) 1 2 3 4 5 6 7 8 9 10 (always)

104. How often do you exercise?
105. How much of a role would you say exercise currently plays in your own health and well-being?

* (insignificant) 1 2 3 4 5 6 7 8 9 10 (huge part)


**Relationships – Rochelle A. Strider**

106. How familiar are you with the feeling of love?

* (unfamiliar) 1 2 3 4 5 6 7 8 9 10 (very familiar)

107. How much of a role does love play in your day to day mentality?

* (insignificant) 1 2 3 4 5 6 7 8 9 10 (huge part)

108. How capable do you think you are of loving?

* (incapable) 1 2 3 4 5 6 7 8 9 10 (very capable)

109. How capable do you think you are of being loved?

* (incapable) 1 2 3 4 5 6 7 8 9 10 (very capable)

110. How comfortable are you with your ability to love and be loved?

☐ I would like to be more loving  (a little more) 1 2 3 4 5 6 7 8 9 10 (a lot more)

☐ I would like to be less loving  (a little less) 1 2 3 4 5 6 7 8 9 10 (a lot less)

111. To what extent have you experienced love between yourself and your family?

* (none) 1 2 3 4 5 6 7 8 9 10 (a lot)

112. To what extent have you experienced love between yourself and your friends?

* (none) 1 2 3 4 5 6 7 8 9 10 (a lot)

113. To what extent have you experienced romantic love?

* (none) 1 2 3 4 5 6 7 8 9 10 (a lot)

114. How well do you express family love?

* (very poorly) 1 2 3 4 5 6 7 8 9 10 (very well)

115. How well do you express love for your friends?

* (very poorly) 1 2 3 4 5 6 7 8 9 10 (very well)

116. How well do you express romantic love?
117. How important do you think touching, being held, and/or hugging is in your life?  
(unimportant) 1 2 3 4 5 6 7 8 9 10 (very important)

118. How much fear do you experience in your life?  
(none) 1 2 3 4 5 6 7 8 9 10 (a lot)

119. Do you think fear is interfering with your ability to love or be loved?  
(not at all) 1 2 3 4 5 6 7 8 9 10 (interfering a lot)

120. How comfortable are you at hugging people or being hugged?  
(uncomfortable) 1 2 3 4 5 6 7 8 9 10 (very comfortable)

121. How much experience with meditation do you have?  
(none) 1 2 3 4 5 6 7 8 9 10 (a lot)

122. What forms of meditation have you experimented with, if any?

123. Which, if any, religious traditions were you born into?

124. What set of religious or spiritual beliefs do you currently subscribe to, if any?

125. How much time each day, week or month do you spend in prayer, meditation, silence, or simply in nature?

126. Which hobby or activity is the most calming and centering to you?

127. How creative would you say you are?  
(not creative) 1 2 3 4 5 6 7 8 9 10 (very creative)

128. How often do you find it difficult to let go of something that's occupying your mind?  
(never) 1 2 3 4 5 6 7 8 9 10 (always)

Which of these feelings do you find yourself experiencing, and to what extent?

129. happiness, security, wholeness (H/LU/LI)
sadness, depression, melancholy

fear, lack of self-esteem, hopelessness

patience, endurance, kindness

short temper, anger, aggression

irritability, skepticism, criticism, worry

gentleness, tranquility, intuition, comprehension, spiritual oneness, merriness

separateness, excitement, excessive laughter

power, freedom, fulfillment, ambition

powerlessness

feelings of being allowed to be oneself

feeling dominated, pressured

Picking feelings out of the above list, which ones would you like to feel more of? (Name a feeling, add a feeling that may not be on the list, and explain or elaborate if you like)
Picking feelings out of the above list, which ones would you like to feel less of? (Name a feeling, add a feeling that may not be on the list, and explain or elaborate if you like)


- General Questions (used at end of each presentation): Cherie Safapou

What feelings did you have as you completed this activity?
What is one thing you learned in this activity?
What surprised you about this activity?
What do you want to find out more as a result of this activity?
Overall did you find this activity to be a learning experience? Why?


Developing New Habits – Tasmin Pesso

Please rate how closely these statements reflect your feelings:

When I decide to make a new habit, I am confident I will succeed.
(Strongly agree) 1 2 3 4 5 6 7 8 9 10 (Strongly disagree)

I have habits that I wish I could change.
(Strongly agree) 1 2 3 4 5 6 7 8 9 10 (Strongly disagree)

I would like to be able to make the habits stick.
(Strongly agree) 1 2 3 4 5 6 7 8 9 10 (Strongly disagree)

I know a lot of helpful things to do that help make habits stick.
(Strongly agree) 1 2 3 4 5 6 7 8 9 10 (Strongly disagree)

I think people can change.
(Strongly agree) 1 2 3 4 5 6 7 8 9 10 (Strongly disagree)

Good habits are hard to keep.
(Strongly agree) 1 2 3 4 5 6 7 8 9 10 (Strongly disagree)


One Last Question...
Make a wish!
References


A Neurocognitive Study on the Digital Game-based Learning of English Phoneme Distinction by ESL Children in Korea

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Abstract

This study investigated the effect of digital game-based learning of English phonemes by ESL 6th graders in Korea by examining their brain responses. It employed a “serious game” in the classroom setting of English teaching and measured the effect of the game on the acquisition of English phonemes using ERP (event related potentials). A serious game is a game pursuing a primary purpose other than entertainment, such as learning, training, marketing or cognitive or social change (Abt, 1970). Game dynamics driven by the teachers in class affect strong class dynamics and learner motivation (Kim et al., 2018). Serious games gained interest in educators to facilitate their teaching and testing. Not only scholars but also teachers and education companies have focused on the positive features of games, such as learner motivation, engagement, or learning effects including memory retention and recall of knowledge and skills. In this study, we created a phoneme distinction game, which is named ‘Alien Family’, focusing on three minimal pairs of the English sounds - /m/ vs /n/, /l/ vs /r/,
and /æ/ vs /e/ using 54 minimal pair words such as moo vs. new, lace vs. race, and pan vs. pen. A total of 30 6th grade elementary school students participated in this study including 16 in the control group and 14 in the experimental group. The experimental group played the game for 10 minutes two times per week for four weeks whereas the control group used digital dictionary for listening practice. The comparison between the pre- and post-ERP data from both groups revealed the change of MMN (Mismatch Negativity) for /l/ vs. /r/ distinction in the “game” group. In addition, the survey of the students’ experience about the serious game-based learning in the classroom resulted in positive psychological responses. The findings of this study provide supporting evidence for the cognitive and psychological effectiveness of the serious game on the English education.

References


Teaching Students about the importance of Mathematics and Statistics in the Real World

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Abstract

In an attempt to help reduce the shortage of suitably trained employees in the STEM areas, there needs to be an increased focus on teaching about the importance of mathematics and statistics in the real world so that students have a better understanding about the nature of work in these fields and of the high demand for such skills in the workforce. Not only should these skills be emphasised to undergraduates in the tertiary setting, but they also need to be a focus in secondary education.
Description: In this paper, I investigate the EFL policy changes that are affected by global factors. Also, I analyze the post-2001 EFL policy in terms of Bourdieu’s (1986) conception of capital, particularly cultural capital and social capital. I also use Bourdieu’s theory of the sociology of education as frames of reference to identify the obstacles that hinder EFL learners’ English achievement.
Abstract

It is widely known that globalization has had a considerable impact on many aspects of human life, including education and language policies, in many countries, including Saudi Arabia. Although Saudi Arabia is a monolingual country where Arabic language is the sole official medium for communication, English language education has been a concern of education policy makers who represent the Ministry of education (MoE). In Saudi Arabia, English is taught as a foreign language (EFL) and was taught beginning in grade 7 until 2012. However, the importance of English language as a global language led the MoE to adjust the EFL policy and to start teaching English beginning with the fourth grade in 2013. The EFL policy may be understood as having two main eras, pre-2001 and post-2001. However, a research study has shown that there has been only one study in Saudi Arabia examining the EFL policy in relation to curriculum and culture (Elyas & Badawood, 2016). In this paper, I investigate the EFL policy changes that are affected by global factors. Also, I analyze the post-2001 EFL policy in terms of Bourdieu’s (1986) conception of capital, particularly cultural capital and social capital. I also use Bourdieu’s theory of the sociology of education as frames of reference to identify the obstacles that hinder EFL learners’ English achievement. The results show that the post-2001 EFL policy promotes the home culture over the EFL capital culture. The more students are attached to their home culture, the less they gain competence in EFL. Therefore, EFL policy makers should provide learners with a curriculum that includes appropriate EFL culture and connect it with their social lives. Policy makers should promote EFL learners’ attitudes through issuing them credentials that distinguish them from their home background and insure them access to use EFL to communicate with individuals beyond their home ground. Policy makers should promote critical teaching pedagogies that produce creative learners and help them to construct their new EFL identities and feel like legitimate users of EFL.
Keywords: EFL, Saudi Arabia, policy, cultural capital, social capital
Abstract

EXPLORING GRADUATE STUDENTS’ PERCEPTIONS OF USING SOCIAL MEDIA IN EDUCATION COURSEWORK

Kimberly Holiday Udeh, Ed.D.
Drexel University, January 2019
Chairperson: Joyce A. Pittman

Several research studies have linked the use of social media with improved academic performance; however, the role of social media as a pedagogical tool to support learning through academic engagement and collaboration in graduate education coursework needs further exploration. Millennials and post-millennials (ages 18-42) quickly embrace and adopt new technology, and most are either in graduate school or will be in the future. Higher education can use such tools, including social media, to connect more academically with their students, who are frequently on these platforms. This study examines social media in graduate coursework and provides insight into how faculty and higher education administrators can strategically incorporate social media into graduate school coursework. Moreover, this study bridges an existing literature gap regarding graduate students’ perceptions of social media use and its impact on their learning.

Conducted over a one-month period, this cross-sectional study empirically examined the perceptions, attitudes, and experiences that graduate students hold about the pedagogical use of
social media to support learning, academic engagement, and academic performance. An online quantitative survey collected data on 1,212 students enrolled in graduate courses in one university’s School of Education. The survey results confirmed that social media was a useful pedagogical tool in graduate coursework to support academic performance and collaboration among students. Results were mixed or not supported regarding the use of graduate coursework to improve collaboration between fellow students and their professors, respectively.

Keywords: graduate education coursework; social media; pedagogical tool; academic performance; learning
Exploring the role of agency within an entrepreneurial university: Evidence from a Scottish business school

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Abstract

The role of entrepreneurial universities as drivers of innovation and entrepreneurship remains unclear (Bramwell and Wolfe 2008). To clarify matters requires research employing novel methodological approaches and new theoretical perspectives that are able to address the dichotomy found in a modern entrepreneurial university (Guerrero et al 2016). The nature of the dichotomy revolves around the relationship between innovation and entrepreneurship (Guerrero et al 2016:552). Understanding the symbiotic nature of the ‘dichotomy’ and its effects on total factor productivity underpins the ‘systems’ approach to the study of innovation and more recently of entrepreneurship (McCann and Ortega-Argiles 2015; Acs et al 2014; Acs et al 2016).

However, a ‘systems’ approach places the emphasis on the ‘institution’ as the unit of analysis, failing to address the role of ‘agency’ to our understanding of the micro-economic foundations underpinning local economic growth (Gustafsson and Autio, 2011). This is why the “the existing literature provides only limited insights on the drivers of national systems of innovation and the mechanisms that may explain their evolution and growth over time”. (Castellacci and Natera 2013:579).

To understand the role of agency within an entrepreneurial university more fully requires an appreciation of its entrepreneurial process. However, “[m]ost empirical studies of entrepreneurship continue to employ linear models that are presumed to occur at a single point in time” (McMullen and Dimov 2013:1481), failing to capture the underlying dynamics of the entrepreneurial process.

The paper reports on efforts by a university to engage with its entrepreneurial ecosphere to deliver a new delivery model of higher (degree level) education designed to enhance local economic growth. Its contribution is an examination of Guerrero et al’s (2016) dichotomy and the activity in the space between units of analysis (agency and institution). That is, the university as part of a system of innovation but also acting as an agent in a non-systemic manner, in contrast to studies of the entrepreneurial university which have taken a narrow view of university-industry relationships were the focus is on commercialisation and mechanisms for technology transfer (Wright et al 2007; Grimaldi et al 2011). In particular, the critical role for agency in this interface is explored in detail through case study evidence.

Introduction

Universities are integral to regional economic development (Cohen et al 2002), adopting a dual role around innovation and entrepreneurship. Moving from the Humboldtian view of higher education (Benneworth and Cunha 2015) to the triple-helix approach (Etzkowitz and Leydesdorff 2000), they became competitive rather than collaborative, institutions (Marginson 2011) increasingly entrepreneurial and innovative (Guerrero et al 2016:552). We explore models of the entrepreneurial university to identify a gap in the literature around the role of agency as a driver of economic development. We later present evidence of an entrepreneurial university engaging with its entrepreneurial ecosphere as an initial stage to a later more in-depth study.

However, we begin by setting the scene with a brief look at a key macroeconomic feature that appears, to some, to herald a long term decline in the western model of economic growth; namely
fears of a permanent decline in rates of productivity. We do this provide a backdrop for the potential impact that the concept of an entrepreneurial university may have in countering declining rates of investment. Particularly since the financial recession of 2007/8 some commentators have raised the spectre of the Alvin Hansen’s analysis of 1930s USA, when the term secular stagnation was used to describe the devastating effect on productivity due to the impact of declining investment on innovation (Hansen 1939). Gordon (2015) used US data to identify a series of supply side constraints that taken together results in lower rates of labour force participation; curtails capital formation by large firms and culminates in slower productivity growth of the kind we have seen since 2008 (particularly in Europe). Gordon’s thesis is that a series of ‘head winds’ combine to slow growth in the US and many other developed countries. Gordon notes that:

“[G]rowth in real per capita income over the past ten years has been only 0.6 per cent per year; less than one-third of the 2.1 per cent achieved from 1890 to 2007. The ratio of net investment to the capital stock has declined over the past five years to 1.0 percent, less than one-third of the average ratio achieved between 1950 and 2007.” (Gordon, 2015: 58)

Given the failure of productivity to return to rates seen before the recession, the fear is that the west in particular has entered a ‘new normal’ of low growth (Cato Institute, 2013; IMF, 2016). Policies of quantitative easing have failed to transform real investment and instead have boosted asset prices and stimulated financialisation across much of the world. The effect has been the rise of financial engineering devoted to creating increasingly sophisticated financial products which have the effect of diverting resources from the real economy and results in limiting non-financial investment, lowering labour productivity and hindering the growth of output (Hudson 2015; Kapetanios et al 2012; Stiglitz 2012). The OECD and EU both call for a more thoughtful approach to what is becoming a major structural issue that impacts on productivity growth. At the centre of this approach is the changed emphasis from supply-side issues to those affecting the demand-side, particularly around the idea that top-down policies have failed to provide the answers to many of the structural issues facing mature economies (European Commission 2014; OECD 2013). The OECD suggests the more thoughtful approach to policy frameworks should include:

“[s]mart specialisation, both as an economic concept and a policy framework, provides a novel avenue to pursue the dual objectives of fiscal constraint and investment in longer-term growth potential in a context of rapid technological change and globalisation”. (OECD 2013:22)

At the core of smart specialisation is the role of the entrepreneur and the so-called discovery process and is a means of addressing the crisis around innovation. From our perspective the key feature is the potential for identifying and releasing so-called ‘hidden innovation’ which currently lies dormant waiting to be discovered:

“[H]idden innovation’ means that innovative activities being undertaken in such ‘low-tech’ sectors also require support that is likely to be of a different nature and form (e.g. building internal capabilities of firms, assistance in adopting new process technologies or ‘outsourcing’ product development) than the strong emphasis on funding support provided to R&D intensive sectors”. (Coad and Reid 2012: 13)
For our purposes the key feature is the move away from the traditional managed economy domain that emphasises scale economies and access to factors of production and a reliance on input-output analysis (Guerrero et al 2015:751) and the emergence of non-linear interpretation of economic growth around the activities of the entrepreneur, whose search for ‘hidden’ innovation becomes a key driver of growth within each region and its unique factor endowments. Locating the entrepreneur at the centre of our analysis of productivity differs from traditional explanations of regional growth (Dannreuther, 2009; Henrekson, 2005; Porter, 2003), rather than drivers based on scale economies, industry clusters and natural resources. For this we explore the methodological space around the nexus between two systems approaches: national systems of innovation and national systems of entrepreneurship and set the scene for future study. However, to begin we take a brief look at the changed environment within which European universities are required to operate and within which they are expected to find a new role.

The changing role of universities

European policy is for universities to play a leading role developing a knowledge-based society which improves economic competitiveness and supports social cohesion (EU 2003). The policy is aimed at making the European university system a world-leading model of best practice through providing resources, creating networks and increasing the outreach and international appeal of European universities. Such features align with long running changing views on universities as they seek to become entrepreneurial by becoming knowledge enterprises (Butera 2000) or engaging in academic capitalism (Slaughter and Leslie 1997). The concept of the entrepreneurial university is one that is flexible enough to capture many forms of university, ranging from those oriented around research at one end of a spectrum to those newer universities where the focus is on teaching (Mohrman et al 2008). Critically, the concept fits well with the ‘Triple Helix’ model of a putative partnership between government, industry and education (Etzkowitz and Leydesdorff 2000). Specifically, universities engage in a new ‘third mission’:

“the Triple Helix thesis states that the university can play an enhanced role in innovation in increasingly knowledge based societies”. (Etzkowitz and Leydesdorff: 109)

In such partnerships, universities are able to act outwith traditional teaching and research activities when fulfilling the ‘third mission’, activities that are not narrowly defined as teaching, research and narrow technology transfer. The ‘mission’ is “one of (socio-) economic engagement”. (Nelles and Vorley 2010:341). Third mission emphasises role of new knowledge as tool of economic development as knowledge becomes a key factor of production (Nelson and Winter 1991; Romer 1986, and Lucas 1988). This is a move from a science-based policy to one based around innovation and technology (Shinn 2002). However, it is still mainly prescriptive in approach and under-theorized (Vorley and Nellis 2009), requiring further research. It means that universities need to become more complex but more difficult to manage, and so:

“coordinated change is required both in systems regulation and in institutional governance in order to mobilise the enormous potential of knowledge and energy of European universities to adapt to new missions”. (EU 2006: 1)

However, fundamental questions arise: how does the university acquire the capacity and capability to generate new knowledge? How does the university operationalization the entrepreneurial
Kolb (1984) claims that entrepreneurial learning can be understood as an experiential process, knowledge developed through four learning abilities: experiencing, reflecting, thinking and acting. In this way entrepreneurial learning is a process through which people (in our case university staff) acquire, assimilate and organize newly formed knowledge within pre-existing structures along the lines of with Holcomb et al’s (2009) architecture of entrepreneurial learning. A version of this was developed by Talbot et al (2012) to model new knowledge associated with the design and delivery of enterprise programme at the University of the West of Scotland. What we now propose is that such processes are better understood as taking place within a specific methodological space which encompasses a complex blend of systems: those of innovation and entrepreneurship. In this way we capture the nature of the entrepreneurial university:

“The emerging role of a modern entrepreneurial university is dichotomous, focusing both on innovation and entrepreneurship” (Guerrero et al 2016:552).

It is within this methodological space that the symbiotic nature of the innovation-entrepreneurship ‘dichotomy’ is captured along with potential impact on local total factor productivity (economic growth). This blended ‘systems’ approach to the study of innovation and entrepreneurship has at its centre issues around resource allocation, growth and determinants of total factor productivity (McCann and Ortega-Argiles 2015; Acs et al 2014; Acs et al 2016). A systems approach shows how innovation and entrepreneurship contribute to economic growth by means of a more effective resource allocation (Ketkar and Acs 2013).

Thus, within such a framework the workings of an entrepreneurial university and its contribution to economic growth can be examined, particularly around the role, generation and dissemination of new knowledge, which is now embedded in the new growth literature:

“The main engine of growth is the accumulation of human capital -of knowledge- and the main source of differences in living standards among nations is differences in human capital. Physical capital accumulation plays an essential but decidedly subsidiary role” (Lucas 1993:270)

For our purposes we can view the entrepreneurial university as part of a ‘system’ (being an institution) while at the same time being dependent on this ‘system’ (acting as entrepreneurial agent), the nature of this symbiotic relationship determining the university’s wellbeing and its contribution to local economic growth (Isenberg 2010). In this way the entrepreneurial university helps shape and support the local ecosystem, being able to re-configurations its attributes sustain the overall ecosystem by providing resources in terms of new knowledge and knowledge transfer that local partners would not otherwise access:

“This helps differentiate the outcomes of a successful ecosystem - high rates of entrepreneurship - from the internal processes and governance strategies that creates and sustains it. It also emphasizes the fact that there are multiple ways an ecosystem can develop” (Spigel 2015:50).

Specifically we are looking at the space within which the entrepreneurial university (as a key part of the local ecosystem) develops and functions which make them effective channels for gaining patents, issuing licences and spinning off new firms as well as having more indirect effects such as
knowledge transfer and consulting (Klofsten and Jones Evans 2000; Cohen et al. 2002). However, the diversity of entrepreneurial activity between university departments is a function of their specific environment, culture and norms (Bercovitz and Feldman 2008; Bienkowska et al 2016) making an understanding of the blended space an important research area (Kenney and Goe 2004). It is this space that we now map out in Figure 1.

**Identifying the blended space**

Figure 1 place the entrepreneurial within an endogenous growth methodological framework in that it traces the level of analysis from ‘high level’ deductive theory (found in the endogenous growth literature) and follows a trajectory of lower levels of analysis through the systems approach (identified in the innovation and entrepreneurship literature) to identify the irreducible components (institution and agency) that combined represent the general characteristics that determine the ecosystem within which the entrepreneurial university is at once supportive and a constituent.

**Figure 1: Mapping the methodological landscape**

As Figure 1 shows, adopting a constructivist methodological approach to interpreting the activities of the entrepreneurial university requires an increasing level of granularity (i.e. detail) which is best achieved using case study and grounded theory interpreted through the innovation and entrepreneurial ‘systems’ literature. For our purposes it is enough to identify the methodological space and to reference the respective theoretic themes in the literature to lay the path for the following case examples. Our purpose is the identification of agency’s role within the workings of the entrepreneurial university and to link that role to growth theory. This ‘linkage’ enables our interpretation of the case evidence to have a firm theoretic foundation. From this a more fully developed paper will follow.

A key determinant of the nature of the linkage is the distinction between systemic versus non-systemic activities on behalf of the entrepreneurial university. As part of the ecosystem the university will be engaged in a range of activities which will be classified as systemic in that they are part of the operations of an institution and include the creation of departments and units designed to deliver certain commitments e.g. the existence of a knowledge transfer unit to support university engagement with local businesses. Other non-system activities rely on the actions of individuals.
acting entrepreneurially and often undirected. It is the non-systemic activities that are of interest to us and will form the basis for two brief case studies.

The cases
The core of the entrepreneurial university concept is the issue of knowledge and the creation of ‘new knowledge’. Implicit in Solow’s (1956) growth accounting framework is the theoretical basis for linking knowledge to the growth process due to the so-called ‘Solow residual’ i.e. the growth that is unexplained by traditional factors of physical capital and labour. This variation in growth performance paved the way for an endogenously based approach to understanding the dynamics of economic growth. As we have seen, at the macroeconomic level Romer (1986) created the theoretical framework for assessing the way in which knowledge contributes to the process of economic growth. And for the entrepreneurial university means moving beyond the traditional concept of technology transfer.

We now look briefly at two cases where the Business School of the University of the West of Scotland was expected to act in the manner of an entrepreneurial university. Of interest is the time span between the two cases (nine years), a period which covers the emergence of the concept of the entrepreneurial university within the literature and its current established position as a recognised area of research. While the two cases composed different teams of staff the current author was a member of each team. In this way a common strand links the time period. Case One involves a retrospective look at the role of agency while Case Two reports on a current set of activities. Thus historic and contemporaneous activities are used to demonstrate the importance of agency within an entrepreneurial university setting.

Case One was carried out around the time of the emergence of the entrepreneurial literature and was the basis for subsequent paper (Talbot et al 2012). The case involved the Business School in the Encouraging Dynamic Global Entrepreneurs (EDGE) programme was designed to:

- reflect the global nature of today’s business world;
- deliver real economic growth;
- develop individuals and teams;
- link assessment to experiential and reflective learning;
- launch and develop an alumni-driven support network; and
- challenge preconceptions and build upon success.

This programme an international enterprise programme developed around a collaborative initiative between Columbia University, New York and Scottish Enterprise (Scotland’s main economic development agency). It involved combining internship with an enterprise development programme that laid the basis for participants to complete a series of ‘in-company projects’. Hosted in Scotland and composed of students from Canada, US, Europe and Hong Kong, the programme saw a number of Scottish universities acting as an academic and administrative hub. The essence of the Programme was to create and instil ‘new knowledge’ in the participants that would enable them to satisfy their consultancy briefs.

The design and delivery of the Programme was left to the individual university: that is, to act entrepreneurially. As the value of the ‘new’ knowledge created is uncertain its value became apparent only when the case studies were analysed. The analysis enabled the operationalization of the entrepreneurial process involved (i.e. integrating the concepts of ‘entrepreneurial university’ and ‘entrepreneurial teaching’) to be identified and assessed.

Talbot et al 2012 provides a more detailed analysis of the entrepreneurial processes and description of the new knowledge generation process. However, for present purposes we report the success of the activities of the individuals within the team (agency level) to review the entrepreneurial learning
processes involved in order to help understand the integration of the concepts of the entrepreneurial university and entrepreneurial teaching. Our contribution to the literature was to build on work of Heinonen and Hytti, to exploring the knowledge creation process by integrating the concepts of the entrepreneurial university and entrepreneurial teaching.

The objective was explore way in which the Programme enhanced the innovation and commercialization objectives of the University (UWS), enabling it deliver its strategic objectives with respect to teaching and commercialization. Designing and delivering the Programme required understanding the complex set of needs of a disparate set of participating stakeholders: client companies, university staff, participating students and sponsors (Scottish Enterprise). The agents had to understand of this complex set of needs support the entrepreneurial development process of the university.

In summary, Talbot et al 2012 report that the evidence from the three constituents of the Programme (clients, students and staff) supports the success of the endeavour. For clients the evidence confirmed that the EDGE project teams did acquire the necessary skills set to carry out difficult and substantial consultancy projects; a survey of students confirmed a high level of Programme value-add along with significant new knowledge transfer and capability enhancement, while University staff (agents) representatives saw the effect of the entrepreneurial learning environment which had been created and subsequently refreshed their own skill sets.

Case two is a contemporaneous piece of work that began mid-2017 and continues with the design and delivery of a work-based degree programme called the graduate apprenticeship (GA). This is a Scottish government fully-funded degree initiative which covers a number of disciplines to be designed and delivered by Scottish universities under a competitive tender process. The GA programme under discussion is the GA Business Management, designed to enhance the range and level of managerial skills among Scottish businesses.

Scotland rationally and currently suffers from weak productivity growth in general and across all but three of the 23 NUTS3\(^1\) level areas that comprise the Scottish economy. Figure 2 shows the recent picture with respect to productivity performance.

**Figure 2: Productivity rates by quarter, Scotland 2016-2017**

![Productivity rates by quarter, Scotland 2016-2017](image)

Source: Fraser of Allander Institute Scottish productivity statistics: Q3 2017

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\(^1\) Eurostat framework provides a uniform regional classification: Nomenclature of Units for Territorial Statistics (NUTS). NUTS3 is the lowest level of aggregation within this classification series.
A concomitant of this poor productivity is weak labour productivity as shown in Figure 3. It is important to note that Scotland and the UK’s weak productivity performance is due to low productivity within sectors and not sectoral mix. This is an important caveat and suggests that individual sectoral productivity tends to be lower than in other countries (Dolphin and Hatfield 2015). At a more granular level, this suggestion is supported by evidence from World Management Survey, showing UK management practice is mediocre, with the UK’s score is dragged down by a long tail of under-performing companies. Further evidence of a chronic problem at firm level is evidence that a major determinant of Total Factor Productivity is the ‘black box’ of the workplace, and how employers turn skilled workers and tools into products and services which customers value (UK Commission for Employment and Skills 2015).

Figure 3: Labour productivity rates by quarter, Scotland 2016-2017

Thus the focus is on firm-level activity and how to enhance firm-level behaviour around managerial skills acquisition. The UK’s Chartered Management Institute estimates that UK output is 21 per cent per hour lower than G7 comparator countries and that poor management costs the UK around £19.3b per year in lost output (CMI: Management 2020). Thus, a lack of leadership and management capability is holding back the growth of small organisations (UK Commission for Employment and Skills 2015). This is important as 99 per cent of Scottish businesses are micro-business employing fewer than 10 people.

The task for the GA Business Management is to help address this shortfall in skills through a directly government funded programme. The task for the Business School was to engage with this project, bid for a number of funded places, design a suitable delivery package and to deliver the programme in an innovative way. Again a team of Business School staff are involved, including the author who was involved in Case Two.

In terms of the skills to be imparted through Programme delivery these were identified and shown in Figure 4. These align with the key role skills play in determining improvements in total factor productivity growth, particularly at a local level.
While the University engaged with the GA programme at an institutional level (i.e. systematic), it was left to the individual staff to identify opportunities and design and deliver the Programme. That is, the staff (i.e. agents) acted in a non-systemic way to carry out this task. In the same manner of Case One, there was the presumption among the University and indeed the government sponsor that the staff will have the required knowledge to carry out this task. This is a major presumption the nature of which is revealed by the disparity in some aspects of performance of participating universities. While the Programme is at an early stage (started in September 2018) and it will be some time before a proper evaluation will take place, we suggest that differences between participating universities with respect to actions at agency level have been apparent at an early stage, particularly around the issue of recruitment to the GA programme.

Our team adopted an approach based on the smart specialisation approach mentioned earlier and engaged in a bottom-up manner using our contacts with local economic development agencies to identify companies of potential growth for whom the GA programme would be a natural fit to their growth plans. The role of so-called innovative driven enterprises was identified in an earlier Scottish government programme designed to identify key bottlenecks that inhibit the Scottish economy. The so-called regional entrepreneurship acceleration programme (REAP). Was a study that used a Global Entrepreneurship Monitor (GEM) methodology across 27 innovation-driven economies. The REAP study examined both the entrepreneurship and innovation capacities of the ecosystem in Scotland and the analysis produced seven “pillars” identified as areas of weakness and possible bottlenecks in the Scottish entrepreneurship ecosystem. These being:

1. Opportunity Perception
2. Start-up Skills
3. Networking
4. Product and Process Innovation
5. High Growth Aspirations
6. Internationalisation
7. Risk Capital

The key issue for any later evaluation will be the effectiveness of the GA on firm level productivity and value-add, and to what extent the Programme was able to address the seven pillar. This will determine the effectiveness of our targeted approach which has at it base a demand-led bottom-up approach to local economic development.
For current purposed the key point is that the nature of the engagement with the GA programme was agency based: that is, was not part of any institutional direction. The design and delivery of the Programme is also novel in that it is delivered in an online format based around a Google education platform. Again ore details will be included in a later paper.

While a more detailed analysis will form the basis of a full paper, our approach resulted in a significant over-subscription of places for the Programme in contrast to the previous year which saw significant under-recruitment (around 30 per cent of the potential places available). The oversubscription led to the 15 places under the original successfully bid attracting additional funding to support an additional 20 places representing an increase in revenue of £500k to the Business School. In addition, our approach involved minimal marketing costs (around £200) against a potential budget of around £30k.

Summary
In both cases the role of agency (the actions of independently minded university staff willing to work outside the institutional framework) to identify opportunities and design successful solutions has been assessed within the theoretic framework and methodological landscape in the tradition of an endogenous growth framework.

In both cases the success of the University’s engagement with external agencies has been dependent on the skills set and ambitions of the staff to design solutions that were novel and effective.

Importantly this engagement involved identifying ways to improve value-add and improve skill levels at a local level. This paper is the first step in developing a more focused and empirical series of papers around the role of agency within an entrepreneurial university and a fuller analysis of the operationalisation of agency.
References:


EU (2006), Entrepreneurship education in Europe. Fostering entrepreneurial mindsets through education and learning,


REAP (2014) Increasing innovation-driven entrepreneurship in Scotland through collective impact


Talbot S Whittam G Ferri P and Baynham C (2012) Enhancing academic entrepreneurial capability through the creation of new knowledge. International Journal of Entrepreneurship & Innovation, 13(3):189-

If You Can’t Find the Book You Want – Write It!
Lessons Learned Publishing a Digital Text on Literacy

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Introduction

If you don’t see the book on the shelf you want, write it.

Beverly Cleary

Publishing an e-textbook involves dedication, determination, and delight. For one of the authors, his first view of the digital version of Strategic Literacy (2017) was overwhelming. There were vivid images, everything from hornbooks to bobo dolls, amazing pictures that entertained, captivated, and educated. A combination of text, images, and online sites provided the student with the opportunity to learn in a unique and powerful way. This paper grew out of an effort to share the pride and joy of authorship and encourage others contemplating the same journey.

The Publication Manual of the American Psychological Association (2010) noted APA style is relevant to types of articles more common to business than academia. This paper combines elements of a report and a case study. Thus it falls into the APA class of “other types of articles” (p. 11). It discusses the pros and cons of e-books, to include cost, student learning, and health issues. It analyzes how to overcome instructor and student resistance to e-textbooks, and the problem of conflict of interest. It spells out how prospective authors of e-textbooks can find a publisher, and it details the experiences of five authors in publishing an interactive e-textbook.

Digital and Print

Interactive e-texts merge traditional textbooks with the most advanced electronic information and communication technologies available. They offer video, audio, powerpoints, cognitive maps, Internet links, supplementary material, testing, and the ability to download forms and lesson plans. These synergistic features engage and inform the reader, while addressing the various learning styles of the students. These unique graphic additions enhance the learning potential of the e-textbook exponentially.

When comparing e-textbooks to print textbooks, it is not so much a question of one versus the other, as it is what is right for the individual in his or her own learning environment. It is obvious e-textbooks are cheaper and lighter than print textbooks, but there is always someone willing to pay for a print textbook. At the same time, there are visual learners, bored with print texts, who jump at the chance to use a digital book. According to Jeremy Greenfield, an e-text industry expert, in his article (2013), “Students Still Not Taking to E-textbooks,” only six percent of college students now use e-text books, but usage is “migrating” in the direction of digital (p. 1).

Cost

The most important force behind the adoption of e-textbooks is price. The cost of textbooks has increased faster than tuition and fees, 800 percent in the last thirty years (College Textbooks, 2015). The average college student paid from $900 to $1500 a semester for textbooks in 2015 (College Textbooks). Publishing course materials is a 4.3 billion dollar industry (Musilin, 2013). One maker of educational videos and short films says the cost of textbooks is high because the industry is like piracy, “Everyone wants a cut of the action” (Bostwiki, 2014, p. 1). Half the cost of new textbooks goes to publishers and bookstores (ATTN: Staff). The authors receive a royalty for their work.

The textbook industry is not a free market. Students form a captive audience, with no choice in what textbooks to buy. Five companies publish 80% of the texts on the
market (Nicholls, 2012, p. 7). Publishers sometimes bundle textbooks, CDs, and learning materials students may not need or want. Another marketing ploy is the special edition. This is a textbook published for a particular university, for example, a Federal Government text that includes a section on state politics. Molly Redden (2011) in her article, “Seven in Ten Students Have Skipped Buying a Textbook Because of Its Cost, Survey Finds,” in the Chronicle of Higher Education, noted “many students are unwilling or unable to come up with more money to buy books—one of the very things that helps turn tuition dollars into academic success” (p. 1).

A study, “Demographic Data on Textbook Cost Saving Analysis, University of Michigan” (2012), by Dr. Natsuko Nicholls, Research Manager, showed students have more options besides buying a new textbook; Thirteen percent rented a textbook, eight percent borrowed a text from a friend or classmate, two percent used library copies and one percent rented an e-textbook (p. 32). Nicholls argued the cheapest course of action for students is to buy and resell used textbooks. The problem with this plan is publishers often issue new editions to put an end to the used textbook market. The study also found that if one purchased a new textbook and resold it for fifty-three percent of the initial price, the total cost roughly equaled that of purchasing a digital text (Nicholls, p. 31). Schools interested in lowering textbook costs ought to investigate this University of Michigan study at their own institutions.

Ten percent of the students surveyed did not have a book for their course (Nicholls, 2012, p. 21). Reporter Nicole Allen (2014) in an article in SPARC, “Survey Says Textbook Costs a Threat to Student Success,” wrote that a growing body of evidence links lack of a textbook to negative academic consequences (p. 1). Kristin Musilin (2013) in an article titled “High Textbook Prices Affect Student Grades, Study Shows” reported eighty-two percent of the students surveyed said they would do “significantly better” in a course, if the textbook was offered free online and the hard copy was an optional purchase.

Even though instructors and students insist reading the textbook affects students’ grades, in practice, students are often overwhelmed by the amount of reading professors expect in college. They may buy the book, but tailor their reading to the demands of a particular course. They can do well in some classes reading chapter summaries or studying vocabulary lists. In others, all they need are a professor’s PowerPoint presentations. In an interview for their study, AAgaard and Skidmore, reported that one student observed, “PowerPoint has taken the place of textbooks. Just go to class and you don’t have to have the textbook” (p. 8).

Podolefsky and Finkelstien (2006) produced evidence that science and math students who did not read the text achieved the same or better grades than those who did read the text (p. 1). They found reading the textbooks helped good students somewhat, but not average and poor students. They concluded reading the text is more a problem in the minds of instructors than students.

Administrators caught in the dilemma of rising salary and health care costs for faculty, try to save students’ money by adopting digital texts. In 2012, Yaseem Abutaleb (2012), technology reporter for USA Today, indicated Indiana University, Virginia State, University of California-Berkeley, and Cornell, all require students to buy e-textbooks in selected courses. The Louisiana State University library allows instructors to pick free e-textbooks from over 25,000 titles (LSU library, 2017). If they do not have a particular title
the library promises to purchase it. In some schools, students pay a course materials fee covering the cost of e-textbooks for all their courses. Universities negotiate with professors who write e-textbooks for their courses and e-text companies to ensure the lowest possible costs. In 2012, over half of American college students had used an e-textbook in at least one course (de Noyelles et al.).

E-textbooks offer savings of forty to sixty percent of the cost of a new print book (Traditional Textbooks, 2017). A comparable print text to the authors’ e-text, *Strategic Literacy*, cost two-thirds more and contained half as many pages. Publishers, retailers, and authors are predisposed to dislike digital texts because these books earn less profit for them than printed texts. Proponents of print books weight the argument against digital texts by adding the cost of the device used to read the e-text (Phelps, 2017). This argument might have had some merit twenty years ago, but studies show today’s college students have one or more devices on which to read their e-textbook. If they don’t have access to an electronic device, they can use the computers in the library. In the case of the authors’ text, students can also order a free printed copy from the publisher. They will miss the dynamic characteristics of an interactive textbook.

An excellent poll with striking tables and charts conducted by Harris Poll for Pearson Publishing (N=1,212), “Student Mobile Device Survey” (2015) discovered how imbedded today’s students (18-30) are in the digital age (p. 3). One in three students considered themselves early adopters of technology. African-American and Hispanic students led respondents in this category (p. 13). The survey examined student use for the following devices: smart phone, tablet, notebook, laptop, and ipad (p. 5). Nine out of ten students preferred a computer to do their schoolwork. Eight in ten regularly used a smartphone. Four out of ten regularly used two or more devices (p. 8). Students strongly believed they needed access to the internet at home, going to school, and at school (p. 36). Students believed they performed better in school with such devices and these electronic marvels made school more fun (p. 7).

**Student Learning**

Digital texts are interactive, durable, and have substantial content. Students who have reservations about e-textbooks still believe they are the wave of the future. Sixty to eighty percent of students prefer printed textbooks (Crum, 2015). Students in the humanities are more likely to use print books than those in the sciences and mathematics, even if digital books are available for free (Crum, 2015). The answer to removing these obstacles lies more with the nature of the textbook market and how instructors use e-textbooks in their classroom (de Noyelles et al., 2012).

A digital format provides interactive elements like connections to videos, a search feature, and copying not possible in a printed text. As a result, students learn differently and at a faster rate. The US Department of Education concurred that technology based instruction reduced the time students take to reach a learning objective (Szalavitz, 2012). Studies conducted at the University of Leicester in England and University of Indiana, found when the exact same material was presented in both print and digital media; there was no measurable difference in student performance (Sickling, 2013).

Seventy-seven percent of students reported an increase in motivation using digital texts (Etextbooks vs. Print books 2012). Visual students find a variety of learning styles and additional time for practice helpful in learning. Sixty-nine percent of students
observed e-textbooks changed the pace of the classroom and reported instructors had more hands-on time with students (Ebooks vs. Paperbooks, 2012). Of those students surveyed, sixty-nine percent expressed a desire to use mobile electronic devices often in class (BookWars, 2015).

There is a plethora of material comparing digital textbooks with print textbooks. A few common sense facts are not in dispute. E-texts are convenient, portable, and searchable. They are easy for publishers to update. History is a great place to start. A history book is a growing adventure. Authors can link to the most current information. They can adjust and grow with the changing environment and conditions. (Moushon, 2011).

Many e-textbooks feature access across all connected components, called “bring your own device” (BYOD). One leading publisher offers e-texts that students can highlight, take notes, and view the annotations of other students. E-textbooks have properties that help students with disabilities. Dyslexics and the blind benefit from listening to the text. Students with low or impaired vision can make the text larger.

Studies show students learn from print textbooks and e-textbooks in different ways. When they want to study something seriously and in depth, they prefer print. They look at e-books as resources they can skim to find pertinent material. For this reason, they spend less time reading e-texts than they do print textbooks (Colvin et al., 2012). Students can copy lines and paragraphs in most e-textbooks and print them out. Students reading e-text with links to other sources may hopscotch through the literature. The tremendous amount of information available may result in cognitive overload and a failure to retain or translate new material into conceptual knowledge.

Studies show students do more multi-tasking when reading on screen. Maia Szalavitz, a health reporter for Time cited studies suggested students remember things longer when presented in printed form. This is because the brain interprets printed and digital text in different ways. Students read digital text twenty to thirty percent slower than print (Crum, 2015). Colvin et al. (2012) found eighty percent of the students in their study (N=259) purchased and used a paper textbook even though they had access to it online. This survey showed students often did not use many e-textbook components designed to boost learning (Colvin et al., 2012).

Lottie Nilsen (2016) reported some students favor print textbooks because they want to build a library in their field and found distractions when going online. She reported the comments of one student; “Anytime I really get on my computer, my mind and my hands automatically go to Facebook or Gmail or all the different things I do on my computer every day” (Nilsen, 2016, p. 1). The answer is that instructors must model how to use these features, explain why they are important for student learning, and counsel students on the pitfalls of surfing the net instead of reading their textbook. In print, as well as digital, it is important what you read and how you read it.

Health Issues

Print textbooks are a heavy load on the pocketbook and backs of college students. Pediatricians and chiropractors recommend students carry less than fifteen percent of their body weight in a backpack. The combined weight of print textbooks for any given day exceeds this percentage according to the US Consumer Product Safety Commission. Hence, you see many of today’s students using a wheeled suitcase to
carry their books. E-textbooks represent a significant savings in weight. A student can carry all the textbooks they need with a lightweight computer or an even lighter e-reader (Nilsen, 2016). A Harris Interactive Statistics Survey reported eighty-seven percent of students surveyed liked this aspect (Ebooks vs Paperbooks, 2012).

Studies show people with good eyesight complain about eyestrain when reading e-textbooks. However, people with poor vision love the ability to read text in a larger size, a facet of digital texts, or listen to the text. In order to avoid eyestrain, headaches, blurred vision, and dry eyes when reading digital media, students should turn down the backlights, adjust the device to avoid glare, take regular breaks, and keep their eyes moist. One eye care professional recommended an artificial tears eye spray before starting work, rather than waiting until eyes are sore.

There is plenty of good advice on minimizing computer eyestrain on the web. The American Academy of Ophthalmology stated one can minimize computer eyestrain, by blinking more often. Normally, humans blink eighteen times a minute, according to the website, but blink half as many times while using a computer. Students ought to position the screen below eye level so eyes are not wide open and look at least twenty feet away from the screen every twenty minutes, for at least twenty seconds. Students must get enough sleep and, if they wear contacts, don their glasses for "contact breaks" (Mann, 2013).

A Harvard study indicated that light-emitting devices lead to sleep deprivation. The study found that participants who used e-texts took an average of ten minutes longer to fall asleep than those reading print texts (Crum, 2015). Other studies show people who use mobile devices have a higher incidence of musculoskeletal disorders associated with repetitive strain on muscles, including carpal tunnel syndrome, neck pain, shoulder pain, and fibromyalgia. A discussion in class and quick research of the literature on health problems will help students avoid some of the pitfalls of technology.

**Using Digital in the Classroom.**

I hate those ebooks. They cannot be the future.

Maurice Sendak

Most American professors vocally and insistently dislike e-textbooks. Brian Alexander, an education columnist, reported that a survey by Casey Green of the Campus Computer Project asked professors when they would adopt digital materials, one fourth indicated “never” (p. 2). The two main considerations for professors in choosing textbooks were quality and cost. Eighty per cent of the college instructors surveyed admitted digital textbooks were cheaper, but only nineteen percent thought they measured up to the quality expected at the university level. In addition, they believed print material is authentic, natural, and fulfilling; something one can see, touch, and smell (BookWars, 2015). A clear majority of instructors were not familiar with the benefits of digital textbooks. The survey found more support for digital textbooks in community colleges than universities, but also more concern about the availability of devices for students to use them (p. 2).

Instructors persist in requiring students to purchase expensive print textbooks. Dr. Randy Brown (2013) of the University of Mary Hardin-Baylor conducted a survey (N=42) of professor acceptance and use of e-textbooks. Brown found three groups of
professors: those who opposed technology in general, those who were not sure e-textbooks were appropriate for higher education, and those who were willing to accept them when appropriate. Brown cautiously concluded, “We need much more research in this area before we jump in over our heads” (p. 212).

Student reluctance

Forty-eight percent of the students used e-textbooks in portable document format (PDF) devoid of extra features according to a 2014 study by de Noyelles et al. at Central Florida University (N=707). Many students and instructors are reluctant to accept e-textbooks because they think of stolid PDFs found online for free. The de Noyelles et al. study emphasized e-textbooks come in a variety of formats besides PDFs. Twenty-four percent of the students surveyed used e-textbooks offering interactive elements. One-quarter used free textbooks available on the Internet. Only six percent reported using an instructor-created e-textbook (p.1).

Research indicated what students prefer in an e-text. O’Hare and Smith (2012) found over fifty percent of their respondents thought the ability to print sections of digital texts was extremely important. They deemed text searching very important by almost forty percent. Students gave highlighting and annotation low importance ratings. In detailed follow-up interviews, students noted their preference for reading e-books in chunks or skimming portions of them. If they found “useful” material, they printed those pages for intensive reading (O’Hare & Smith, 2012).

Several studies showed students and faculty have a mixed, but overwhelming uneasiness about using e-textbooks. According to Rough Type (2013), some perceive real advantages in using print text: “fewer distractions, deep engagement, better comprehension and retention” (p. 1). The key of overcoming negative feelings toward digital learning lies in expanding the way instructors teach. De Noyelles et al. (2012) suggested the need for further professional development for instructors including increased awareness, instruction, and active participation.

Instructors shouldn’t introduce digital texts without adequate student preparation, a situation that unfortunately is quite common. Only a third of the instructors who use an e-textbook mention it in their syllabus. Professors should discuss the advantages and disadvantages of digital texts on the first day of class. The best way to change the minds of college students and professors is to prove to them e-textbooks, properly used, will help them accomplish their goals.

These authors examined how an instructor would explain to students how to get the most out of Strategic Literacy, (2017). During a first day discussion the instructor should remind students that, while they cannot highlight or annotate Strategic Literacy (2017), the text does have a search function, links to websites, videos, and downloads. Students can save and print important sections of the text for reading and study before a test and, if they wish, students can order a free printed copy of the text from the National Social Science Press.

The Future of E-textbooks

College students and professors think of e-textbooks only in traditional face-to-face classes. In the modern world, e-books occur in a number of different settings including online courses with an instructor, or for massive open on-line courses
MOOCs (MOOCS). The latter is a recent development among top tier universities. Harvard, MIT, and Stanford offer free or low-cost courses to a large number of students. These courses offer short engaging videos, automated tests, and games. They have a high dropout rate and typically offer certificates of proficiency rather than degrees (Learning New Lessons, 2012).

An investigation of MOOCs found a course on Chinese Language and Culture offered free by the Australian Open University Group, Open2Study. It took three minutes to sign up for a four-week course that offered a certificate upon completion and required two to four hours a week. This course featured well-designed videos by Professor Liu Chen of the University of South China located in Guangzhou, PRC. The videos were straightforward classroom lectures with visuals. There were quizzes for each of the seven or eight themes and an assessment (test) over each of the four modules. Communication among all 467 classmates is possible.

Chegg books of Santa Clara, CA. offers another model for renting or selling e-texts to college students. Their eReaders allow students to stream from their favorite device: PC, Mac, or iPad, using popular internet browsers. Chegg e-textbooks offer quick search, note-taking in the margins and 1-click note review, color-coded highlighting, visual bookmarking, inline dictionary, and Wikipedia access. Students can scan important sections and view key highlights from other students using the same e-text. Chegg study solutions offers students answers to study questions and free on-line tutoring for up to thirty minutes (Chegg website, 2017).

E-textbooks lead the way in technological innovation from MOOCs to VitalSource software than can show instructors how much students are reading and how they are doing on quizzes. The next step is McGraw Hills ALEKS math software that builds a database detailing the proficiency of each student, information used to formulate questions tailored to students based on what they find most challenging (Ross 2015). Students can create their own e-texts with software like Kindlegen and Calibre. They can put their notes, research and ideas into their own e-text and have it as a reference during their class or while they are studying for a test (Mouson, 2011).

Students can receive individualized instruction from their e-textbooks.

Conflict of Interest

Several states and universities have strict conflict of interest policies. Jane Robbins (2012) in her article, “Is It a Conflict of Interest to Assign Your Own Book,” published by Inside Higher Education, stated, “If the professor stands to gain from the adoption of the book in her institution, even if the book is judged on a set of criteria to be the best, a conflict of interest exists because she would benefit out-of-role” (p. 1). A professor, in an online response, to Robbins’ (2012) article, stated her students liked snacks as “a gesture and the mini-lesson in how publishing and royalties work.” But not everyone agreed, Another professor, Asmythe32, argued, “What a silly discussion! If a professor’s textbook is effective in communicating the subject matter and is fairly priced, the author has every right to profit from his/her intellectual work product” (online response Robbins, 2012).

The Faculty Handbook of the University of Massachusetts Dartmouth used similar language to forbid faculty members from profiting from instructor-authored
materials. It added that employees could receive no royalties or tax benefits and must fill out a Financial Disclosure and Disgorgement Form (Umass Dartmouth).

The University of Akron stated in its conflict of interest policy, “No university employee is to receive private gain arising from the sale of textbooks or other materials used in a course in which the employee is an instructor” (Summary of Principles). The policy outlines common sense courses of action for employees, who may waive royalties or other type of personal gain. They may designate the university or a recognized professional organization as a recipient of the royalties. Employees must submit proposed plans to the appropriate Department Chair. The university requires employees to sign an annual disclosure form (Akron University).

The University of Wisconsin Madison, Instructor Handbook, acknowledged that an instructor-authored textbook is often the best and only one available. It stated instructors can mitigate the appearance of a conflict of interest by placing copies of the material on reserve in the library, donating royalties to the University Foundation, reimbursing students directly who provide proof of purchase, and discussing the situation with students (cited in Pecorino).

Two factors mitigate worries over conflict of interest. First, universities are committed to reducing the cost of textbooks for students. Second, universities have dealt with the problem of conflict of interest for a long time with printed texts and have a well-developed set of procedures. There is a copious amount of comment and opinion on the subject. The Association of University Professors noted a conflict of interest is not necessarily unethical (AAUP 2004).

Psychology professor Mitchel Handelsman in a Psychology Today (2015) article titled, “Is It Ethical for Professors to Assign Their Own Books?” urged transparency as the best way of dealing with the problem. He suggested practical ways of overcoming this situation. Instructors should communicate directly to the students the reasoning behind the adoption, potential advantages, and what actual profits they make. Professors might also consider having students suggest a charity for the donation of profits (p. 1).

Philip Pecorino and Jay Weiser (2016) in “Faculty Assigning Their Own Textbooks,” emphasized that since the royalties were small and conflict of interest infrequent, an honor system was more appropriate. They related the story of one professor that bought the students who purchased their textbook dinner as a practical way of avoiding any perceived conflict of interest. E-textbook authors can solve most conflict of interest problems with a little ingenuity and great deal of transparency. The real hurdle for prospective authors is finding the right publisher.

**How to Publish a Digital Textbook**

*All the changes in publishing since 1960 are significant. There are fewer publishers.*

Donald Westlake

Like the print media, digital publishing is undergoing rapid consolidation. There are still two basic ways of publishing a digital textbook, publish it yourself, or find a middle or large sized publisher. Authors publish forty-eight percent of all e-textbooks online in PDF format. Some hire a company to enter their book on the world wide web. These books are not interactive. If one desires to self-publish an e-text with more interactivity, there is a free app for that. iBooks Author allows instructors to create
beautiful interactive textbooks for iPad and Mac. It brings content to life with galleries, video, interactive diagrams, 3D objects, and mathematical expressions in ways the printed page cannot. Apple’s iBooksAuthor helps teachers to aggregate, curate, and create their own content. iTunes expedites marketing digital books on the iTunes store, app store, and ibooks store (ibooks Author website, 2017).

Preston McAfee, formerly of the California Institute for Technology, a fierce advocate of open access to scholarly materials, published his Economics textbook *Introduction to Economic Analysis for Students* (2006) a free, open sourced, creative-commons-licensed, textbook covering introductory and intermediate microeconomics for students with a working knowledge of calculus. McAfee’s textbook is in a static PDF format. He presents students with a series of problems that they solve sequentially. The answers are at the end of the text. McAfee considered the National Social Science Press honorarium program for test marketing new e-texts a conflict of interest. Perhaps, he has moderated his opinion, now that he is the chief economist for a profit making company, Microsoft.

There are several mid-sized e-textbook publishers on the web. Prospective authors should check to see what they offer in the way of royalties and assistance in publishing work. The National Social Science Press uses a targeted email campaign and offers an honorarium for first time users who provide feedback on the text.

The NSSP website provides a catalogue of e-textbook and YouTube presentations. "The Overall Demonstration" (2010), lists and displays the interactive features of a digital textbook and invites viewers to look at the NSSP catalog. “The Instructional Educator” (2015), contains everything an instructor needs to know who has adopted an NSSP digital text: powerpoints, quizzes, and instructor’s guide. In addition, it explains the review program. The “Instructional Student Video” (2015), leads students step-by-step to access their new digital textbook. The “Thank You for Your Consideration” (2015), video sends prospective instructors a packet and password to look at digital books on the NSSP and/or send them a printed copy. It reminds instructors that NSSP sells their interactive e-textbooks at campus bookstores and online through the National Digital Book Company.

Big companies such as Apple, Amazon, and Pearson offer an amazing variety of e-texts. The Microsoft store offers technical manuals and certification. Search the website of the larger e-text book companies like Apple, Nook-Study, and Chegg. It is helpful to view e-texts similar to *Strategic Literacy* (2017) offered by these major sources. These large companies claim they are always looking for new authors. In reality they generally consider only proven authors of print texts. What they offer in the way of services and savings is more of concern to administrators than individual professors.

Pearson’s *Authors’ Website* (2017) noted “writing a textbook or digital media project is a major undertaking for a new author” (p. 1). They stated the best place to start is to write a prospectus in which the authors describe their experience and the market for their work. If authors submit a prospectus, Pearson asks that they address the advantages of this product over print and submit a prototype of the final product. They offer larger royalties for e-texts (25%) than print texts (10%). Even so, e-textbook authors make less profit than print authors because e-texts sell at a much lower price.
The author’s guide also contains a list of seven reasons why they might turn down a proposal for an e-textbook (Authors’ Guide, 2017).

VitalSource offers a million titles to over 7,000 institutions. The company licenses its catalog to a college or university. Students pay a book fee to the bookstore for e-texts for all their courses. The bookstore takes its percentage of the fee and pays VitalSource for the license. Administrators receive analytics with easy-to-use dashboards to provide snapshots of how often and how long students read their eText. These actionable insights improve student outcomes (VitalSource website). VitalSource offers educators and academic publishers a simplified way to publish e-texts. The VitalSource Content Studio authoring platform provides authors with customizable content managed through a simple interface. It gives them the tools to produce material that are standards based, responsive, interactive, and accessible (VitalSource Launches, 2016).

Suggestions for Authors

Author, Ashley Taylor Anderson (2015) in her article, “Five Things Not To Do When Creating An Interactive eBook,” had several excellent suggestions. First, she urged prospective authors to eschew a PDF format. “Interactive eBooks are a million times better than PDF eBooks” (Anderson, 2015). Secondly, she suggested that eBook authors write less. (Textbooks are an exception because of the comprehensiveness, documentation, and high level of writing required.) Third, Anderson suggested careful consideration of visuals because they are “so integral to the story you are telling.” The authors of Strategic Literacy (2017) considered images early on resulting in a colorful, vibrant finished product. Fourth, she advised authors to employ a thematic approach. The authors chose a different topic for each of the weeks of a semester. Fifth, she urged readers to emphasize a call to action. One of the strengths of Strategic Literacy (2017) is the authors stressed the vital importance of literacy throughout and urged reading teachers to strive for excellence.

An Invitation to Participate

First time e-textbook authors need to clarify their intent before publishing an e-textbook. The publishing process will test even the most resolute person. Those who have written a dissertation know the time, effort, and talent it takes to research and write an extended work. But, an e-textbook is not a dissertation. Budgeting time is imperative. A summer or a sabbatical would be ideal. However, potential authors may feel that they need to write a textbook to teach a course the best way possible for their students.

In any writing endeavor, particularly one in which the author seeks to teach others, the author is usually the one who learns the most. Writing an e-book is no exception. The initial consideration in any form of writing is to carefully ponder the intended recipients. College students destined to become elementary school instructors are technologically capable and eager to utilize their skills. E-textbooks complement and encourage their enthusiastic participation. It is time to adapt college classroom instruction to include these aptitudes in the curriculum.

Some instructors decide to produce an original textbook that provides helpful, comprehensive, and inclusive educational material for their students. Strategic Literacy (2017) is the compilation of one author’s life-long teaching passion updated and
extended to reach and teach current elementary instruction students. Five dedicated individuals joined to produce this work as a positive, all-encompassing, definitive educational textbook. The authors of this text encourage others to consider writing and especially utilizing e-textbooks in their classes.

Working With a Publisher

One major consideration for potential new e-book authors is finding a publisher. Marketing is the most vicious phase in the brutal process of publishing. Those who utilize self-publication are often frustrated. The five authors of *Strategic Literacy* learned from the experience of self-publishing three books, that marketing is crucial.

A publisher’s agreement to publish a new e-text includes a contract. Authors must read the proposed contract, discuss it with the publisher, and clarify the author’s responsibilities. Authors should consider royalties and delivery of content. One significant fact is the publisher has complete control when a book is ready for publishing. Taking the time to ask questions in this initial phase is extremely beneficial to both parties. Establish the format and style: APA or other. Determining required number of chapters and page count of each chapter is essential. Select a title to ensure it correctly describes the content indicating not only the subject area but the scope of the work as well.

One very important area is communication. Professors often have multiple email addresses, both personal and professional. Authors should establish one email address for communication with the publisher that is easily accessible, especially during school vacations. They should also create a specific file-naming convention and means of time stamping to avoid confusion. Authors should select one specific postal mailing address that is current for both classroom and vacation time in order to avoid lapses in communication.

All five authors of *Strategic Literacy* (2017) agreed on a practical and positive approach to the subject matter including helpful lesson plans and classroom activities. The authors shared a sincere goal of helping prospective instructors become the best reading, writing, listening, spelling, and speaking instructors in the world. There is pain in the process; but there is also joy in the creation of a technological approach that helps students learn and, at the same time, provides a substantial economic student benefit.

**Conclusion**

The authors of *Strategic Literacy* (2017) believe in e-textbooks and are proud of the high level of writing in this book. They urge prospective authors to consider writing an e-text and offer helpful information based on the experience. One reviewer described *Strategic Literacy* as the best and most comprehensive in its field. This paper first discussed the high cost of textbooks. Theoretically, the lower cost of e-textbooks should drive down the cost of print textbooks. However, this has not happened in a rigid market controlled by professors, bookstores, and publishers.

This paper described how and when e-texts help students learn. Evidence shows e-texts and print texts encourage student learning in many ways. Today’s students live in an audio-visual environment that fosters learning from pictures, charts, and cognitive organizers. Those with vision problems can use a simple hand-held device to increase
the size of the print of e-texts. Dyslexics profit from seeing and hearing the text. However, some studies show that, when students study to retain important material, they prefer to see it in print. This is possible with either a print or a digital book. Indeed, there is a way to read and study both types of books. When instructors select texts, they should consider the technological aptitude and interest of their students. E-textbooks provide a plethora of color, graphs, and animation to capture and retain student interest.

The reluctance of some professors to utilize e-textbooks may stem from early offerings. E-textbooks have improved exponentially since their inauguration, moving from stale PDF’s to truly challenging and exciting interactive works. Reluctant professors should revisit the current e-publications in their subject area. Some instructors might overcome their reluctance to technology, profiting from in-services and seminars and finding what media helps them maintain their high standards and achieve their classroom objectives. Instructors should at least evaluate an e-book the next time they pick a textbook or are on an adoption panel.

Instructors who wish to utilize a personally authored e-text, must determine if their institution or state will allow it and there is no conflict of interest. Once again, the answer often concerns transparency with the students. When students understand how much money they save, they are usually willing to accept the fact that the professor might earn a small royalty. Students take their cues about e-texts from their instructor. If they know that digital texts save them money and increase the possibility of a good grade, they will support them. Interactive e-texts are exciting new developments that will provide education to more people at reasonable cost.

E-textbooks are the intimations of the future. Some instructors may avail themselves of the opportunity to produce an e-textbook to share valuable information about their academic area. The authors of this paper issue an invitation to join in the endeavor to be part of the future of educational textbooks and offer helpful and necessary information for prospective authors including the assistance they can expect from a publisher and outlining the advantages and disadvantages of individual, middle sized, and large publishers. The growth and future of academia lies in encouraging and including technology and developing bright, colorful, interactive, and informative e-textbooks.

Resources


Beverly, Cleary Quote (2018) Retrieved at <Quotesgram.com>


Ebooks vs. paper books (2012). Retrieved from <https://www.youtube.com/watch?v=NvkprzbrvJQ>


Maurice Sendac (2018). Retrieved at <goodreads.com>

Moushon, J. (2011, February 28). E-Textbooks: How do they stack up against traditional...
Abstract: Mathematics Lessons Authoring System (MLAS) is an intuitive platform which allows teachers, who do not know the programming know-how, to author and deploy mathematics lessons on the Web. It uses a combination of the latest Web standards to deliver educational math content that is engaging, interactive, and interoperable. Dynamic lessons can be created and reused with little effort and time by using lesson templates. MLAS offers a growing library of virtual manipulatives which allows teachers and students to create, modify, and interact with. Moreover, people with programming background can contribute to MLAS and expand its library. This paper focuses on the system design and architecture which allows MLAS to provide a user-friendly experience while being supported by an organized multi-tier structure which preserves the data and functionality of the system.

1 INTRODUCTION

Web-based Mathematics Education (WME), started in 2003, is a mathematics education system that uses the Web to enhance the quality of education (Wang et al., 2006). It aims to deliver classroom-ready, dynamic, and hands-on lessons and modules to teachers and students. WME platform is the outcome of a collective effort involving computer scientists, educational specialists, school teachers, curriculum developers, and 6th and 7th graders. In WME approach, mathematical lessons are offered as collection of Web pages using cutting-edge Web standards such as PHP, JavaScript, Document Object Model (DOM), and MySQL database. These Web pages are connected through a giant architecture that allows easy interoperability and sharing across different schools in NE Ohio region participating in the WME project. While those WME lessons demonstrated to be effective and powerful in teaching/learning mathematics, it is necessary to say that from a programming perspective, the process of creating lessons is normally long and challenging. Each WME lesson needs to be individually hand-coded and should comply with certain requirements and follow certain protocols in order to work as intended. Further, teachers themselves are limited when it comes to modifying their lesson plans and content and they need to seek help from an experienced developer at WME every time they plan on doing modifications. In the early days of WME, where the number of participating schools and teachers was small, these issue were not a big concern. However, as WME expanded and with more active users experimenting with the platform, the need to automate and customize the creation and modification of those lessons was very clear.

The on-Web MLAS (Khasawneh and Wang 2012; Khasawneh, 2012; Khasawneh and Algosaibi, 2013) is an independent, but interoperable, system which falls under the big WME project. MLAS features a well-organized architecture that abstracts all aspects of manipulating content. With MLAS, the process of creating WME lessons is automated and has become very simple. Content-rich lessons can be created with few mouse clicks without expecting any programming background. Editing lessons enjoys the same simplicity and assumes no advanced computer skills as well. Authored lessons could later be reused and shared if the teacher decides to do so.

Because MLAS can be thought of as a Content Management System (CMS) for mathematics education, it might be relevant to explain some terminologies that will be used in this paper. Manipulatives, in general, are any objects, such as coins, tiles, or even a paper that is cut or folded, used to help students understand abstract math concepts such as fractions and percentages in an active, hands-on approach (Smith, 2009; Boggan et al., 2010). With the advent of the Web and its potential in enhancing the quality of education in general, and the math subject in particular, a new term has come into existence, “virtual manipulatives.” This term refers to those manipulatives that cannot be “touched” but rather can be “seen” on a computer screen, allowing students to explore them using computer hardware, such as a mouse and keyboard. A great deal of research has been conducted to assess the learning outcomes of virtual manipulative in math education - (Desoete, 2016; Olson, 2017; and Furner, 2017) just to name a few. Other research on virtual manipulatives has been investigated in other areas like physics (Olympiou, and Zacharia, 2018). Results dominantly agree that virtual manipulatives make significant impact on students learning and can even make a positive impact on their attitude, confidence, and belief.
Another study (Kim, 2017) was conducted to examine the effects of virtual manipulative on children’s algebraic thinking in their early math education. Data collected included pretest and posttest surveys for algebraic thinking. “This study found that student’s test scores improved significantly in overall math scores, showing that there was a statistically significant difference in the pretest and the posttest through using virtual manipulatives”.

MLAS deals with a math lesson as a collection of virtual manipulatives. MLAS features a growing library of customizable virtual manipulatives. When authoring a lesson, a teacher may include one or more interactive virtual manipulatives. The manipulatives can be customized and can interact with one another or questions and comments in the lesson page.

We believe that MLAS is different from existing systems in the same space; not so much in the way that we think is necessarily better, but certainly more flexible. Some of these systems are Web-oriented and can be accessed with a Uniform Resource Locator (URL), while others come in downloadable software packages. The usability of these applications varies significantly.

Most online systems that give teachers the ability to edit mathematics content come in worksheet format. In (Superkids Math Worksheet Creator) and (Math Fact Café) for example, a user can print a PDF document containing a number of computer generated series of mathematical calculations. The output on the worksheets relies on the user’s input parameters such as range, minimum, and maximum, or it can be fully generated by the system. Once printed, those worksheets cannot be edited and fail to take advantage of technology, serving only as supplements of textbooks.

The famous NSF-project (National Library of Virtual Manipulatives) (NLVM) is no longer a reliable resource to learn math. It uses Java applets that are now obsolete and no longer run on almost all Web browsers. The NLVM now provides an alternative called (MattiMath) that is an “offline” version of those manipulatives that needs to be download on each target machine. In addition, the offline version is no longer free and requires the purchase of the product.

In (E-Learning Authoring System), an e-learning authoring system is presented. It provides users with an HTML editor to allow them to write and style text, upload images, and ask questions. However, this software package is not subject-oriented and is not intended to focus on any one discipline. Further, the relatively high cost of the system might be a barrier against its use.

Other systems like (Khan Academy) and (IXL) provide a wide range of math manipulatives that focus on certain topics and strengthen particular skills. While these system pose to be great learning resources, they are intended to be used “as is” and lack the ability for teachers to customize their lessons in ways they see appropriate. At WME, we realized early on from our discussions with math teachers that they always desire flexibility when creating content. They seek to write their own explanations, pose their own questions, and conduct their own assessments.

Further, teachers indicated that several of those resources are often way to broad or too narrow for their focus.

MLAS addresses the above shortcomings and is being used by several educators to provide open-access solutions that do not only adapt to the frequent changes of technologies but also respond to feedback received from live users. Working closely with schools partners enabled the creation of a system that meets their needs.

### 2 MLAS DESIGN AND ARCHITECTURE

As appears in (Ruzza et al., 2017), Information Architecture (IA) is an important pillar of any successful website design as it controls how different website components interact with each other to deliver a pleasant user experience. IA also deals with the structuring, the relationship, and the connectivity among the constituent parts of a website. That means, site architecture is a foundation for placing page content. As a result, site architecture should be carefully studied and designed in the early stages to avoid problems and preserve data integrity. Because our main target audience is very young, MLAS aims to help students focus on learning instead of trying to understand how to navigate through the system.

MLAS manipulatives are dynamic and customizable, and a poor design of those manipulatives could limit our intended learning outcomes (Young et al., 2018). We will now look at the MLAS per-student and per-teacher top-down organization.

![Figure 1: Top-down organization of MLAS (per student).](image-url)
lesson pages that convey a particular concept. Typically, each TM would contain a list of LPs where each one relates to a particular mathematical concept. For instance, a probability module can have a lesson on tossing coins and the probability of getting certain outcomes. Finally, the user selects the desired lesson to view. Without a doubt, the TMs and LPs are developed by a curriculum director and educational experts at WME and should abide by some content standards (such as Number Operations and Geometry) as recommended by the National Council of Teachers of Mathematics.

Teachers, on the other hand, are required to log- in in order to be able to author, edit, and deploy lessons under pre-defined TMs pertaining to certain grade levels. Figure 2 below illustrates MLAS per- teacher organization.

![Figure 2: Top-down organization of MLAS (per teacher).](image)

Figure 2 above shows the connection to a database (MySQL). Since description and details such as lesson content and TMs need to be always preserved, a persistent storage is needed to capture those values in a structured way for efficient and easy retrieval. For instance, once a teacher logs into the system, a list of all lessons authored by that teacher will be listed and ready for view or edit. MLAS architecture and database provides a sound physical and logical organization that permits:

- Sharing lesson content among different users.
- Ability for customization.

Each lesson is composed of a set of individual components. A teacher is allowed to edit the content of each component at any time. Also, adding new more components is permissible on a per-teacher basis.

The overall MLAS system design capturing both student and teacher views is depicted in Figure 3.

![Figure 3: MLAS system design.](image)

### 3 MLAS DATABASE STRUCTURE

A database is an organized collection of data, typically in digital form. The data are typically organized to model relevant aspects of reality in a way that supports processes using this information. The term database system implies that the data is managed by some level of quality and this in turn often implies the use of a general-purpose Database Management System (DBMS). A DBMS is generally a big software system that meets many usages requirements and needs. MLAS uses the MySQL DBMS.

As discussed earlier, MLAS uses a suite of Web technologies, including the powerful scripting language, PHP. The purpose of a database-oriented system is to store data and information in a structured and safe place (the database), so that the data can be easily loaded and placed on Web pages once requested by a client Web browser. Essentially, we have two components namely the Web server hosting the database holding relevant data in a set of tables, and the browser seeking to render standard HTML pages requested from the server. To manage data in those tables, the Structured Query Language (SQL) need to be used.

The PHP is the intermediary that can handle both languages. With PHP, we can control the layout form of the site as “blueprints” in HTML. PHP also provides native support to MySQL database and issuing SQL statements can be done effortlessly with its support. Below is the sequence of steps that occur once a PHP page in a database-oriented application is accessed:

- The Web browser “requests” a given page with a URL.
The Web server, assuming PHP is installed, recognizes and parses the request and will then send an output to the browser. (Normally in HTML format).

- PHP commands successfully connect to MySQL and request content (For example, show all users with first name “John”).
- PHP script stores the content in variables and can output them with the “echo” command.
- Server-side PHP delivers HTML content to the Web server, which will forward it to the requesting Web browser.

Figure 4 below illustrates the overall design and structure of MLAS database infrastructure.

Figure 4: Database Structure of MLAS.

- As we can see from the above figure, MLAS has a backend database support consisting of the following tables:
  - The Units table holds information regarding all existing TMs, lessons, and grade levels and their interrelations. For example, this table reveals what modules for a certain grade level exist. Also, every module and grade level has a unique id number to allow easy correlation among them.
  - The Progress table is relevant because it stores all user activities performed on each lesson. It is especially helpful in the editing process and saves lots of time and effort. This table stores properties about the components of a lesson (known as a section) such as section’s name, the lesson id number, and the time and date when that lesson was created.
  - The Lessons table captures even the archaic details of every lesson in MLAS. It assigns a unique id to every lesson for easy access and retrieval. It also reveals other details about each lesson such as its author’s name, lesson creation date and time, the module to which the lesson belongs, and whether the lesson is visible to others (public) or only the author can access it (private).
  - The Sections table is responsible for storing relevant information about the sections. In MLAS, a lesson can be defined as a set of sections. Each section can be edited, deleted, and moved up or down the lesson at any time. This is perhaps the largest table as it captures the HTML constituents of all sections across all existing lessons. It seems obvious that this table must have a dedicated field indicating the particular lesson to which a section would belong.
  - The Manipulative table stores the details and embedded codes of the added-on manipulatives by MLAS users (Khasawneh and Algosaibi, 2013). Dedicated fields to capture the HTML, JavaScript, and CSS files of those manipulatives are in use.
  - The Users table stores information about our users necessary for successful sign-on. These include their usernames and encrypted passwords.

4 POST AND GET

When working with PHP, we often need to pass variables from one page to another in our projects. This is very common especially when we are dealing with HTML forms that require the user inputs. In HTML, one can specify two different submission methods for a form (POST and GET). The method is specified inside a form element, using the method attribute. The difference between method="POST" and method="GET" lies in the form of data encoding. The GET method implies that data is to be
encoded by the browser into a URL, while the POST method implies that data will be inside the message body of the HTTP request.

Inside the form, we can assign a name (through the name attribute) for every input element (<input name="someName" ... />). Once the form is submitted, PHP stores all the submitted values into an associative array, $_POST or $_GET, depending on the selected method in the form declaration. The values of name attributes represent the keys in those associative arrays. For example, to get the value of the element above (<input name="someName" ... />), we can do: $POST['someName'] assuming the form submission method to be POST.

Assuming GET method is selected, this will generate a URL with a set of “var = name” pairs. For example a URL with GET request might resemble: http://www.site.com/index.php?name=Paul

Everything after the question mark is an HTTP query string. An HTTP query string can contain both variables and their values. The HTTP query string above contains a variable called “name” with the value “Paul”. An HTTP query string can have any number of “var = value”. However, each pair of these has to be separated by an ampersand sign. The following URL is a perfectly valid URL: http://www.site.com/index.php?name=Paul&age=20&major=CS

The PHP code snippet below shows one way of how dynamic page inclusion could happen depending on values passed through the URL.

```php
switch($_GET['major']) {
    case 'CS':
        include 'cs.php';
        break;
    case 'math':
        include 'math.php';
        break;
}
```

MLAS uses $_GET array extensively to generate content on the fly. This gets critically important as each lesson gets a unique ID once created, this ID poses as a reference point for all manipulatives within that lesson which is necessary for content creation and modification.

5 TEACHER VIEW AND STUDENT VIEW

MLAS manipulatives are built with customization among the highest priorities to maximize the learning outcome. This means that a manipulative can appear to students in different forms and possibly with different inputs. Obviously, a teacher is the one who controls the form in which a manipulative would look to students. Because of this, two intuitive “views” need to be implemented – one for the teacher and one for the students. The view for a manipulative in the authoring stage where customization is possible is the teacher view, while the view of a manipulative in the lesson page where no customization is possible is the student view.

Clearly, a teacher has the ability to customize and edit details, values, and contents of a manipulative before it gets ready. Such customization, indeed, does call, in most cases, a set of JavaScript functions behind the scenes that can cause a change in the page structure through a series of generating new and/or editing existing HTML elements. For example, when a teacher clicks on a manipulative to appear, a JavaScript function is called and will dynamically generate a large number of HTML elements (template) that will be rendered by the browser and displayed in the page. This template is the basis of customization and flexibility that we are after. The template also establishes the teacher view and will not be seen by students. However, the student view might rely primarily on it. Once the teacher finishes customization and is ready to progress, a click on “Finish” button would unnoticeably gather all needed data from the template the manipulative needs, including perhaps newly generated HTML elements through the teacher’s customization, to be structured and previewed seamlessly in the lesson page (student view). This click would, most of the time, generate minimized HTML elements to be saved into the database and thus the manipulative becomes posted so students can see it -- unnecessary data that guide the teacher to use the manipulative are of no use for students and do not need to be saved. The teacher through the customization process will unintentionally control the part (HTML elements) to be stored in the database. When students access a lesson page, HTML elements from database are retrieved and rendered in the page. Finally, the two views are related, but not necessarily identical. To put it simply, the teacher view controls the final look (student view). Figures 5 and 6 below show the clear distinction between the two views for the same editable manipulative.
6 CONCLUSION

In this work, a combination of technical and infrastructural description of an on-Web lesson authoring system for mathematics education, MLAS, was introduced. Since its creation, MLAS has been an effective and beneficial system for teaching and learning. It is being used in several schools and continues to receive positive feedback from users. Due to its simple, yet powerful design, the system motivates school teachers and mathematics experts to frequently contribute to the curriculum to enrich students’ perception and help them develop positive attitude towards mathematics. MLAS provides an exciting environment for students to learn mathematical concepts in a friendly environment and in hands-on manner.

To strengthen MLAS and to increase its topics of instructions, this work can be expanded by adding more virtual manipulative. This includes interfacing MLAS to other projects created within the WME project like GeoSVG to create dynamic, interactive geometry manipulatives.

REFERENCES


Title: Natural History Museums Play a Role in Post-secondary Biology Education

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Topic Area: STEM Education

Abstract

National history museums (NHM) have a rich history as the repository of extensive biology and geology collections. The displays are enjoyed by the public but in reality the majority of the specimens are only seen by students, researchers and scientists. These hidden collections are used for comparison and identification of species, and for biodiversity and evolutionary studies. Field trips to NHMs are enhanced by pre- and post-visit assignments with well-developed learning objectives.
Natural History Museums Play a Role in Post-secondary Biology Education

Introduction

National history museums (NHM) have a rich history as the repository of extensive biology and geology collections slowly collected over time (Johnels, 1973). What is seen by the public are the displays created to provide context and provide information about the animals and plants from the past and the present (Fayenuwo & Amusa, 2010). Educating the public as interpretive centres, NHMs provide an enriched environment to promote learning using a variety of learning styles.

Displays are can be spectacular and many NHMs attempt to actively engage the public right from the beginning by having impressive architecture with large galleries featuring amazing dinosaur fossils. Some NHMs have gone even farther, such as the Oxford University Museum of Natural History, where many of the displays are accessible and touching the displays is encouraged. Often a NHM will have an audio aspect to some of the exhibits which explains what is going on in the exhibit or gives further detail about the specimen being presented. For those who enjoy reading, each specimen and exhibit comes with a description of the origin, the name, and some other interesting facts for the public to be able to read and learn further. By having simple explanations understood by all, the stereotype that museums and sciences can only be understood by the scientific community is removed (Pereira et al. 2011). Often NHMs have informative websites, with an overview of their exhibits and deeper information for those interested including activities and maps.

NHMs are popular destinations for families and tourists, with outstanding attractions they can provide unstructured, enjoyable educational experiences in a social atmosphere. Over the last 45 years in the United States the percentage of Americans who visit a museum at least once a year has increased from 10% to 40-60%; museums have become a place where individuals go to find meaning and make a connection with the exhibits and galleries (Falk & Dierking, 2000). The British Natural History Museum in London, Great Britain, had around 4.7 million visitors during the 2017-18 year (Natural History Museum, 2018), see Figure 1.
Natural History Museums Play a Role in Post-secondary Biology Education

Figure 1. British Museum of Natural History summer 2018, photograph SL Gillies.

Non-formal institutions such as NHMs are efficient educational tools as they facilitate the transfer of real world experience to knowledge due to their highly interactive way of learning (Krishtalka & Humphrey, 2000, Palavitsinis et al. 2012). Exhibits are set up to captivate visitors and promote connections between their new discoveries and their daily lives. This is specifically pertinent when national history museums are displaying exhibits concerning global and environmental issues. The educational opportunities at museums are presented for individuals of all age groups and backgrounds. Researchers looked into whether individuals actually learn anything or take away experiences from their visits to museums. Results indicated that although visitors often times seem to stroll with little intention, there is retention of knowledge and the exposure to exhibits plants a seed about certain topics in the visitor’s mind. The topics can reappear when visitors return to the place they live, they are able to make connections that pertain to them (Falk & Dierking, 2000).

The role of NHMs in more formal educational settings, such as school field trips to a NHM, is well researched. Bamberger and Tal (2008) found the most prominent student outcome from a NHM visits was the concrete experience from viewing an exhibit, this aided students to understand not just the scientific concept they were viewing in the NHM but assisted them in overall learning. A study by Reiss et al. (2016) also emphasized the importance of bringing students to museums so that they can be engaged with science by using actual specimens (Reiss et al. 2016). Two other prominent student outcomes were promoting the connection of knowledge to school science and increasing student-student interactions that promoted learning (Bamberger & Tal 2008). Science literacy in students increase after visits to national history museums; opportunities arise at museums for students to be active participants in their learning when manipulating objects, playing interactive games, and when walking through stimulating visual models (Ramey-Gassert et al. 1994).
It is the role of museums to keep up with the advancement of technology to incorporate it into their displays (Markaki & Sotiriou, 2012). The interactive aspect to museums is also important in bridging the gap and relating together formal and non-formal education, formal being the typical classroom setting and non-formal being education activities and in this case museums (Markaki & Sotiriou, 2012), this allows for various styles of learning to be more interesting to the visitors.

Many NHMs have well developed websites with teacher and student activities and may also provide guided tours and workshops. These activities may be aimed at various age groups: primary, middle school and high school only; however, some also accommodate undergraduate level students.

<table>
<thead>
<tr>
<th>NHM</th>
<th>For Students</th>
<th>For Educators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smithsonian NHM</td>
<td>Learning Lab</td>
<td>PD opportunities</td>
</tr>
<tr>
<td></td>
<td>Digital Game Center</td>
<td>Teacher Resources</td>
</tr>
<tr>
<td>Royal BC Museum</td>
<td>Digital Classroom</td>
<td>Teacher Resources</td>
</tr>
<tr>
<td></td>
<td>School Field Trips</td>
<td></td>
</tr>
<tr>
<td>Museum of Natural History London</td>
<td>School Field Trips Workshops</td>
<td>Teacher Resources</td>
</tr>
<tr>
<td>University of Oslo Natural History Museum, Norway</td>
<td>No information on English site</td>
<td>No information on English site</td>
</tr>
<tr>
<td>Oxford University Museum of Natural History</td>
<td>Digital Learning Zone</td>
<td>Public Talks</td>
</tr>
<tr>
<td></td>
<td>School Field Trips: All Education Levels</td>
<td></td>
</tr>
<tr>
<td>Goteborg NHM</td>
<td>No information on English site</td>
<td>No information on English site</td>
</tr>
<tr>
<td>National Museum of NH, Paris</td>
<td>No information on English site</td>
<td>No information on English site</td>
</tr>
<tr>
<td>American Museum of Natural History</td>
<td>School Field Trips</td>
<td>PD Teacher Resources</td>
</tr>
</tbody>
</table>

Classroom settings can be very repetitive and students can lose interest and focus and actually pulls them further away from the education system, with the use of museums, teachers are able to show students that there is also a hands-on aspect to learning ((Pereira, Soares, de Paula, & Coutinho-Silva, 2011).

**Role in Research and Post-secondary Education**

In addition to promoting education of the general public and younger students many NHMs associated with Universities have undergraduate and graduate research as part of their prime mandate (Taylor 2012). Undergraduate courses and graduate degrees may be offered through the NHM.
The majority of the specimens held by NHMs are seen by only a few. Students, researchers and scientists use these hidden collections for comparison and identification of species, biodiversity and evolutionary studies, and aid in public health and safety issues. NHMs preserve old fauna and flora to avoid deterioration, and contain permanent records of the specimens present in the museum (Fayenuwo et al. 2010). One research role of NHMs is to further the identification of species, and taxonomists visit different national history museums to increase their knowledge about different species and to obtain training regarding techniques of taxidermy for different species (Suarez & Tsutsui, 2004). Museums also loan their unique specimens to researchers when needed (Suarez & Tsutsui, 2004).

In recent years the contributions of museum collections have not just been limited to the physical examination of specimens. Advances in genetics and DNA sequencing technologies have allowed for additional data to be obtained from museum collections. Sequencing the DNA of specimens and comparing it to other species has provided evidence of previous errors in taxonomic classification. For example, when researchers sequenced the mitochondrial DNA of otter species classified as *Lutrogale perspicillata*, smooth-coated otter, in US and European museums they found that the specimens had been mislabelled and that they had actually belonged to three different species of otters (Barbanera, Moretti, Guerrini, Al-Sheikhly, & Forcina, 2016). The researchers were able to carry out this study as several museums provided them with skin from the skull cavity of the otters, DNA was extracted, amplified through PCR, and sequenced (Barbanera et al., 2016).

This study showed how museum collections and new technologies were used together in order to generate more data and correct mistakes in classification. A problem that the researchers noted with the DNA sequencing was that samples would have to be partially destroyed in order to generate the information. Therefore, the researchers noted that the value of collections came both from the potential data that they could provide, in this case DNA sequencing, and also their preservation for future use. They stressed that the effective use of DNA technologies would have many benefits but that individual researchers would have to rationalize and take responsibility for the destruction of samples (Barbanera et al., 2016).

The dodo bird is a prime example, even though it has been extinct for many years, Oxford’s Museum of NH has maintained a sample with real tissue that has allowed researchers to discover the DNA relationship this extinct bird has with current birds like the pigeon. The complete sequencing of the dodo genome may soon be complete. Researchers have also sequenced the genome of several extinct species from museum collections, such as: Tasmanian tiger, passenger pigeon, quagga, and the little bush moa.

Biological collections at NHMs can play a role in identifying and tracking the source of infectious diseases (Andrew & Neil, 2004). The importance of these collections is clear as the potential for pandemics, such as the recent outbreaks of SARS, H1N1, and Ebola have shown us, we are vulnerable to transmission of new diseases between wild or domesticated species and humans (DiEuliis et al 2016).

Collections are often used to trace infectious diseases to help identify their sources or even identify current diseases and influenzas (Suarez & Tsutsui, 2004). For example, the 1918 influenza outbreak killed 20 to 40 million people worldwide (Crosby, 1989). Bird specimens stored in the Smithsonian were compared with humans who had passed away from influenza in the 1918 outbreak (Taubenberger, *et. al.*, 1997). This research showed that the virus was passed
from birds to humans as previously thought (Suarez & Tsutsui, 2004). NHMs can permit researchers to identify natural reservoirs or carriers of disease and permit us to take precautions in the future (Suarez & Tsutsui, 2004).

The West Nile virus was responsible for 4,156 human cases in 2002 in the United States (CDC, 2003), with a fatality rate of 2% (O’Leary et al. 2004). Museum specimens of mosquitos collected from as far back at 1914 are being studied to determine the time that the virus was introduced into avian populations in the United States (ANS, 2003). As well, NHM voucher mosquitos were used to identify the species in order to track the vectors responsible for the spread of the virus (Goddard et al. 2002).

Museum collections are being used in research to help us identify environmental contaminants and the timing of the exposure (Suarez & Tsutsui, 2004). For example, Berg et al. (1966) was able to estimate environment mercury contamination by measuring mercury found in feathers of birds collected over a 100 year period in Sweden. In another case, museum collections are being used to determine a baseline level of mercury in fish to compare current levels to use as a safety comparison measure (Suarez & Tsutsui, 2004). With 1.6 million Americans at risk of mercury positioning this baseline provides a comparison to help identify how dangerous current mercury levels are in fish (EPA, 2002).

University of California Berkeley NHM goal was to have continuing records of the distributional data of fauna in the region; University of California Berkeley’s NHM was founded over a century ago, establishments accumulate data and become a place where individuals can gather to access this data. With access to large varieties of data, individuals compare species to others and analyze patterns of regions or species over time (Shaffer, Fisher & Davidson, 1998). Specifically, with distributional data, documentation and records can be kept for the decline of certain species in an area and newer species in the area can be identified. Fossils are brought to various national history museums, where they are stored, and they are an invaluable tool for the comparison of species. They are particularly important because through the study of fossils, the evolution of species can be documented (Johnels, 1973).

Natural history museums are actively involved in making their collections available on-line through digitization. The quality and quantity of digital collections for each museum depends up the availability of funding, staff and training (Vollmar et al. 2010). Blagoderov et al. (2012) suggests fast digitization of whole collections with little metadata is more efficient, as they calculated it would take 23 years to complete the digitizing just the ~30 million insect specimens of the Natural History Museum, London. Hebert et al. (2013) recommends for a more intensive digitization process that includes DNA barcoding and distributional data. In this system in three months a team of five individuals can sample tissues, photograph and digitize data from 10,000 species. Another nine months is required for production of barcodes for these samples (Hebert et al. 2013).

Natural history museums are still working to fill in the gaps for underrepresented taxa in digital collections. For example, parasites are an important part of ecosystems and parasites are unrepresented in digital natural history collections (Bell et al. 2018). Notes for Nature was developed by Hill et al. (2012) to address the problem of the digitization of collections, and it has been introduced as a citizen science tool for the general public to become involved in the digitizing of collections. The expansion of digital collections does not diminish the value of a physical visit to a NHM.
Post-secondary field trips to NHMs

Student visits to NHMs benefit from pre-trip preparation and post-visit assignments (Dewitt & Storksdieck 2008). Many studies have shown that both child and adult learning is enhanced when pre-trip learning on the subject area is provided (Falk & Adelman, 2003; Falk & Dierking, 1992, 2000). To facilitate our post-secondary students’ learning we required them to read pre-trip journal articles on the evolution of flight in birds, and the roles of NHMs. To reinforce the material in the pre-trip literature, students were tested on the material.

Anderson (1999) developed principles on which to base development of post-museum visit assignments. These principles can be summarized; activities should extend beyond the visit and relate to the broader scientific principles rather than the exhibits themselves, not be too prescriptive in their approach, and allow flexibility (Anderson 1999). Following these principles we developed two student post-visit assignments and used them after visits to the Smithsonian NHM and New York NHM in 2015 and again after visits to London NHM, University of Oxford NHM, and Paris NHM in 2018.

1. To utilize the fossil displays and their role in their understanding of evolution, students were given an assignment to view dinosaur and bird fossils and analyze them. They were then to write a fully cited essay on the evolution of flight in birds.

2. Students were required to write a fully cited essay on the modern roles of NHMs and were given the flexibility to write about any aspect of the many roles of NHMs.

Figure 2. UFV students getting tour at Oxford MHN summer 2018. Photograph SL Gillies.
Natural History Museums Play a Role in Post-secondary Biology Education

**NHM Tours**

Oxford’s Museum of Natural History has tours and activities specifically for university student groups. These tours can be tailored to the interest expressed by the instructor, and amazingly, are free. In 2018 we took a group of 36 undergraduate students to Oxford’s Museum of Natural History and were given two separate tours. One tour focused on their collection and its use in research. The second tour focused on the role of the museum in public education, see Figure 2. They told us about their philosophy about educating the public and we were able to see their many collections not available to the public, including their Dodo bird. We were also very fortunate to have a presentation from a research scientist working at the museum, students were able to ask questions and interact with the researcher. Students were then given time to view the displays on their own.

Learning objectives are an excellent way to focus a field trip and can lead to deeper learning in students (Jones 2015). Learning objectives can assist in creating assignments to facilitate the transfer of knowledge and skills. In preparation for trips to NHMs we developed the following learning objectives.

- Evaluate the role of Natural History Museums in research
- Compare the history and evolution of flight from fossil collections
- Assess the importance of the NHMs in enhancing the education of the general public
- Explain the process of fossilization
- Interpret the ecological role of the organisms from their fossilized remains
- Analyze the diversity of an ecosystem from the organisms displayed
- Analyze the natural variation in a species from the displayed organisms/collections

There are many potential suitable pre-trip assignments for undergraduate biology students. Such as: developing a phylogenetic tree on a group of fossils known to be present in the museum, utilizing information from the NHM on-line collection to estimate biodiversity of a region, to reading related journal articles. For our pre-trip assignment we selected six journal articles on the roles of NHMs and two on the evolution of flight in birds for students to read. Students had several exam questions on the journal articles prior to the visit. Upon arrival at the NHMs students had a background on the topic areas for the assignments and on NHMs in general, and had some direction in their viewing of the NHMS. Students were also comfortable asking NHM staff and researchers questions.

We recommend instructors consider what they wish their students to learn when planning a visit to a NHM and design related learning objectives, pre-and post-trip assignments. On the field trips to the NHMs our students were required to journal their visit as well as locate and analyze fossils spanning the evolution of flight. The two post-trip assignments were to write review papers on a) the modern roles of NHMS and b) the evolution of flight in birds.

**Acknowledgements**

We would like thank UFV and the Biology study tours 2015 and 2018.
Natural History Museums Play a Role in Post-secondary Biology Education

Citations


Anderson D. The development of science concepts emergent from science museum and post-visit activity experiences: Students' construction of knowledge (Doctoral dissertation, Queensland University of Technology).


Natural History Museums Play a Role in Post-secondary Biology Education


A Study on Educational Administration Pre-service Thinking on

Best Practice in Educational Leadership:

Preliminary Data

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Hawaii International Conference on Education

17th Annual Conference

January 5-9, 2019
Abstract

This paper looks at preliminary data from an ongoing research initiative investigating how future educational administrators think about and act on “Empirical Evidence” and “Craft Knowledge.” First, the paper gives functional definitions for “empirical evidence” and “craft knowledge,” and discusses their connection to thinking about “best practice” within the context of K-12 public school administration. The paper then presents preliminary data describing how students in a university program leading to certification as K-12 principals actually use what they individually perceive as “empirical evidence” and “craft knowledge” in decision making. The paper presents the preliminary data from a multi-year research agenda focused on analyzing the cognitive schemata administrators use in decision making, built on the use of symbolic interactionism (Blumer, 1969) and concepts of espoused theory and theory-in-use (Argyris & Schon, 1974). This present study extends previous research by the author (Hunter, 2001; 2005; 14; Hunter, J, and Greenfield, W., 2006; 2015; Hunter, J., Larsen, D., Aller, W. and Robertson, W., 2014; Larsen, D., & Hunter, J., 2014) through the use of surveys to explore how the students mentally differentiate between the craft knowledge and empirical evidence in various decision making situations. The preliminary data from the surveys used with this group of pre-service K-12 administrators in one university program suggest that their thinking about good educational administrative practices are weighted toward the use of craft knowledge over empirical evidence.
A Study on Educational Administration Pre-service thinking on Best Practice in Educational Leadership: Preliminary Data

Introduction

In earlier stages of this ongoing research agenda, the author developed definitions for empirical evidence and craft knowledge (Hunter, 2018). The work from that part of the research provides a filter for observing the current paper’s key questions related to how students in an educational administration program leading to certification to serve as K-12 principals view best practice. Without defining the terms, it is very difficult to sort through the mountain of evidence presented by both peer-reviewed research, and less formal publications that focus on school leaders’ craft knowledge. In this paper we first look at empirical evidence and compare it to the idea of craft knowledge in educational administration. By defining empirical evidence and craft knowledge and discussing how they are related to leadership in public schools, the author develops a definition for “best practice” that is related to the actual use of either craft knowledge or empirical evidence by the subjects in this study. After defining terms, the paper examines the survey data used to determine study subjects’ thinking.

Definition of Terms

In exploring the core question (What do students—who are in an educational administration program leading to certification as K-12 administrators—use to guide their thinking and actions?), key concepts that continued to emerge from the literature were related to the ideas of espouse theory and theory-in-use (Argyris, & Schön, 1974). Much of the literature related to theory and practice references espouse theory and theory-in-use, encompassing teacher education and principal preparation programs. Espouse theory can be simply described as what we say we believe. Theory-in-use, in contrast, is what we actually do. These two concepts relate that at times people say they believe one thing, but can often unconsciously behave in a manner contrary to what they say they believe.

Embedded in espouse theory and theory-in-use is the core concept of “theory.” Theory, broadly defined, is “a plausible or scientifically accepted general principle or body of principles offered to explain phenomena” (Merriam Webster, n.d.). Therefore, we see that theory technically undergirds
mental constructs intended to guide our actions. That “theory,” in non-technical terms could be personally developed views that individual holds about how things work, and may not necessarily be informed by formal, peer-reviewed research, evidence, or grounded theory. So, this “theory in use” of an individual may or may not be informed by “best practice” as understood in a scholastic manner. However, in education, business, and our personal lives, it is the construct--or the “theory-in use”--that guides us in making personal and professional decisions and judgments. Theory development, guided by broadly accepted research paradigms, emerges from empirical evidence that elucidates individual or small group experience, and attempts to examine, describe and explain behavior and concepts that are generalizable (Gall, Gall, & Borg 2007); this type of theory, that which is grounded in research, would formally and scholastically be considered “empirical evidence” and explains “best practice.”

With these background terms briefly explained, we will take a deeper look at empirical evidence and compare it to the idea of craft knowledge in educational administration.

**Empirical Evidence and Craft Knowledge**

What exactly is empirical evidence as compared to craft knowledge? The concept of empirical evidence is part of empirical research, which emerged from the scientific process of observation, inductive reasoning, testing, evaluation, and generalization (Gall, Gall, & Borg, 2007). A simple definition of empirical research is “research using empirical evidence. It is a way of gaining knowledge by means of direct and indirect observation or experience” (Wikipedia, n.d.). The definition of empirical evidence, by extension, is “the record of one’s direct observations or experiences which can be analyzed quantitatively or qualitatively” (Wikipedia, n.d.). In common parlance, then, empirical evidence is simply:

**The inductive and deductive particulars documented through the observation, testing and evaluation process, in the pursuit of theory building or confirmation.**

To build theory, researchers often use the “grounded theory” approach; the researcher analyzes observable data through a process of constantly gathering, comparing, and analyzing the data against
PRE-SERVICE THINKING ON BEST PRACTICE

itself (Strauss & Corbin, 1998). This leads to a “theory” that is grounded, or based on the empirical evidence.

Bush, & Glover (2014) assert that “understanding theory provides a guide to leadership practice for principals and other leaders. It widens horizons and avoids drawing only on the inevitably limited individual or collective experience of any school’s leaders” (p. 565). They are suggesting that the purpose behind empirical research, and by extension, theory, is to develop guidelines for effective practice. Within Bush and Glover’s comments, they note that theory helps practitioners develop an understanding of effective practice that is broader than individual experiences. Following that line of thinking the present study’s author explored the concept of individual and collective experience in the literature, and constantly encountered the term “craft knowledge” used to represent individual and/or collective experience, and the knowledge contained in that experience. What is craft knowledge?

Grimmett, & MacKinnon (1992) define craft knowledge as “a particular form of morally appropriate intelligent and sensible know-how that is constructed by teachers…in the context of their lived experiences and workaround issues of content related and learner focused pedagogy” (p. 396). Craft knowledge related to teacher practice is well documented. However, using the search terms “craft knowledge,” “educational leadership,” “principal preparation,” and various derivatives of those terms, a broad search revealed that craft knowledge is not well researched or understood in the educational administration literature. Therefore, this study’s functional definition of craft knowledge in educational administration draws upon research from teacher education and defines craft knowledge as:

A person’s contextual and functional know-how, based on personal experience in their local and unique work environment.

In summary, the two figures below represent the concepts of empirical evidence (Fig. 1) and craft knowledge (Fig. 2). The key difference is that empirical evidence is based on a rigorous process of observation that is aimed at creating generalizable principles (or theory) that apply across broad populations. In contrast, craft knowledge is based on a less formal process that is centered on an
individual’s experience and is not necessarily generalizable across populations, other than that individual’s location, or a closely matched comparison.

![Diagram 1](image1.png)

*Figure 1. Based on Gall, Gall, & Borg (2007). Empirical evidence and research is a formal process intended to generalize principles, or “theory.”*

![Diagram 2](image2.png)

*Figure 2. Based on Argyris, & Shone (1994); Kolb (1984). Craft knowledge: informal process intended to inform personal practice.*

Using these as working definitions, the author developed the survey to assess how students in a training program to become future K–12 principles thought about decision-making. The survey, excluding demographic questions, included 10 questions on craft knowledge and empirical evidence. Below, is a summary of the key questions from that survey that indicate the pattern of thinking for these pre-service administrators.

**Survey Results**

**The Survey Instrument and Population**

The survey was sent to all students enrolled in one education administration certification program. This included students who were studying to receive their initial K–12 certification to serve as
school principals and students who were exemplary veteran leaders studying to receive their certification to serve as K–12 school superintendents. This particular paper focuses only on those students who were working on certification to serve as school principals. These students are veteran teachers serving in public K–12 schools, and who are being supported by their school districts and supervising principals in the students’ pursuit of a future career in education administration. After eliminating the surveys completed by those students seeking superintendent certification, and eliminating the non-respondents, there were 38 surveys used for this preliminary data analysis. Analysis was performed using Qualtrics software, version 2018 (Qualtrics, Provo, UT). These 38 surveys represent an 86.84% response rate for the individuals choosing to initially examine the survey instrument. The respondents were 55.56% female and 44.44% male. Using Qualtrics’ cross tabulation analysis function, data showed an extremely low probability of significance that any of the questions were answered qualitatively different as a result of gender (Chi-square range 3.15-0.79, with p-values in the non-significant range of .99-1.0). This cross tabulation analysis result of non-significance held true when cross tabulation analysis was conducted on each question, and in consideration of the demographic data on age (73.64% between 36–55), and years as an educator (range= 4 to 32; average= 12.63). In summary, there was no significant difference in respondents’ answers based on any of the demographic variables.

The Questions

Of the 10 core questions in the survey, the following six questions were centrally concerned with the topic in this paper—that is, the understanding respondents’ views of craft knowledge and empirical evidence.

1. Given the typical day in your leadership role, there are an abundance of decisions you make, influence, or help others through [often those decisions are of the “black/white,” “right/wrong” nature, and are covered by basic policy, or administrative procedures]. Of these “right/wrong” decisions, how often are they based on your Craft Knowledge or Empirical Research Evidence?
2. How often are those decisions nuanced, not clearly directed by policy or administrative procedures, and which require you to exercise judgment which is based on your personal/professional beliefs or values?
3. How often do you feel compelled to set aside your personal/professional experience (Craft Knowledge) in decision making?

4. How often do you feel compelled to set aside your knowledge of researched “best practice” (Empirical Evidence) in decision making?

5. How often do you feel your Craft Knowledge is in conflict with Empirical Evidence from research?

6. When you are compelled to make a challenging decision, what source do you use to help create a course of action?

**Data trends**

The survey showed that pre-service administrators tend to rely more on craft knowledge than empirical evidence. Below, the data is presented in graph form.

**Question 1:** Of these “right/wrong” decisions, how often are they based on your Craft Knowledge or Empirical Research Evidence?

![Graph showing the frequency of decisions based on Craft Knowledge or Empirical Evidence.]

**Question 2:** How often are those decisions nuanced, not clearly directed by policy or administrative procedures, and which require you to exercise judgment which is based on your personal/professional beliefs or values?
Question 3: How often do you feel compelled to set aside your personal/professional experience (Craft Knowledge) in decision making?

Question 4: How often do you feel compelled to set aside your knowledge of researched “best practice” (Empirical Evidence) in decision making?
Question 5: How often do you feel your Craft Knowledge is in conflict with Empirical Evidence from research?
Question 6: When you are compelled to make a challenging decision, what source do you use to help create a course of action?
References


Merriam-Webster (n.d.) Retrieved, March 2016 from

https://www.merriam-webster.com/dictionary/theory


https://en.wikipedia.org/wiki/Empirical_research
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2019 Conference Proceedings

We would like to thank all those who attended the 2019 Hawaii International Conference on Education. We look forward to seeing you at the 18th Annual Conference to be held in January 2020. Please check the website this February for dates and further details.

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