VR/AR Technologies for Art Education: Students’ Perspectives and Responses

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Abstract

The possibilities of virtual realities (VR) and augmented reality (AR) technologies have motivated educators to explore the tools in various settings such as virtual art museums (Leopardi et al. 2021; Margetis et al. 2021), physical museums embedded with virtual environments (Kabiljo 2019; Roldan et al. 2019) and pre-service teacher training for teacher candidates (Dalingr et al. 2020; Hartle and Kaczorowski 2019). The use of VR/AR tools now constitutes an important instructional strategy for secondary art teachers (Han 2015). This presentation will highlight the pedagogical potential of VR/AR and undergraduate art and art education students’ perceptions of the technologies and their possibilities as educational tools and resources.

One important aspect of employing VR/AR technologies in teaching drawing and painting is that this new technology blurs the boundaries 1) between two-dimensional and three-dimensional space and 2) between drawing and painting. When students try to make a two-dimensional drawing using this tool, their creations can immediately become three-dimensional in the virtual space. In addition, they can select both tools for drawing and painting. One creative action within the VR environment can resemble either drawing or painting, depending on the setting on the control panel.

I created a discussion board forum and invited undergraduate students to share their responses to and reflections on the use of VR/AR technologies in visual art and art education. First, the students watched the Google Tilt Brush AiR video introduced earlier in this paper. In the video, professionals who are experts in a wide range of disciplines—graffiti artists, painters,
illustrators, graphic designers, dancers, concept artists, creative technologists and cartoonists—share their exploration of Tilt Brush, a VR/AR-based software designed for drawing and painting. Second, the students wrote reflections in response to the following questions: 1) What is your personal response to the Tilt Brush AiR video? 2) How do you feel about these professional artists' exploration of VR/AR technologies? 3) What kind of implications could VR/AR have for the art education field? 17 students participated in this forum, half of them was pre-art education majors while the other half was studio art majors.

Based on the undergraduate students’ responses, we can formulate some suggestions for art teachers who want to use VR/AR technologies in the art classroom. First, introduce this technology by directly connecting it to the artwork of contemporary artists or art professionals. Second, focus on the relationship between the traditional and the innovative, rather than only emphasizing the novelty of these technologies. Third, create a specific plan for the introduction of VR/AR in classes. There are various ways to encourage students to explore this new medium, including promoting collaborations or emphasizing the experience of walking into their own painting, which will most certainly make the learning experience engaging and exciting.

References


Pre-Service During a Pandemic: College Students’ Perceived Effects of Mindfulness Practices: A Mixed Methods Study

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Abstract

Being stressed in college has almost become a rite of passage and the COVID-19 pandemic has undoubtedly heightened these stress levels. The purpose of this study was to obtain more information regarding students' perceptions regarding benefits, if any, to engaging in mindfulness practices in the classroom. The study consisted of students from a small liberal arts college who were enrolled in a teacher preparation program during the 2020 Fall semester. Participants engaged in a guided meditation using the Calm app as a whole group in the beginning of class and then a gratitude journaling activity at the end of class. Students were given a survey at the end of the semester to judge the effectiveness of mindfulness practices in the classroom and to determine if these practices made an impact on students’ lives outside of the classroom.

Keywords: pre-service teacher, mental health, college students, teacher education, COVID-19 pandemic
It comes as no surprise that college students experience stress – these young adults are tasked with navigating newfound independence while determining a career path. The fact that the COVID-19 pandemic has heightened this stress is hardly breaking news. For college students pursuing a career in education, school closures and decreased interactions with children have further heightened stress levels:

“Being a college student and preservice teacher has directly impacted my stress levels while making my way through a pandemic. I am upset that it is so hard to complete field work in person. I feel like it adds more stress and I really miss seeing all the students’ faces.”

(Anonymous, Junior)

“The most difficult part of being an education major during this time has been the lack of student interactions. The children are the best part of the job, and because of the pandemic, I have had very little engagement with students which has been disappointing.”

(Name removed for blinded copy)

When enrolled in an education program, one of the more exciting aspects is stepping away from the lecture halls, going out into the classroom, and putting the theories you have learned into practice. The COVID-19 pandemic has caused instructors to become creative in ways that preservice teachers interact with children.

“For me, my stress level depends on the class...In my education courses, the courses have all changed a lot. Normally, I would be teaching at [a local high school], but because of Covid, we can’t go and I can’t get that valuable teaching experience. Last March ...I had to move all of my classes online and make accommodations and also start
virtually tutoring students to get my required field hours. That was the most stressed I have ever been...”

(Name removed for blinded copy)

“Being an Early Education major during the COVID-19 pandemic has added a multitude of obstacles that I never expected to face...I was enrolled in a class where my peers and I were to teach two eight-week classes on topics that interested us as well as our future students. In a normal year, this class would have been held in-person, but due to our conditions, I taught my classes online. This was a huge challenge because not only did I have to teach kindergarteners for the first time in my life, but I also had to lead instruction over Zoom. This was extremely stressful...

(Name removed for blinded copy)

While it is important to know what students are experiencing, it is even more important to begin to discern what coping skills are beneficial for students and to teach them ways to incorporate them into their lifestyles. This study aimed to gather data regarding the impact of practicing mindfulness in the classroom and to discern if students found themselves using mindfulness practices and techniques outside of the classroom environment. Because college students often feel as if they do not have enough time for all of the tasks they need to accomplish, self-care can often be neglected or be perceived as just another task students need to add to their “to-do” list. It was hypothesized that if students found themselves experiencing benefits from participating in mindfulness practices in the classroom, they would make these practices apart of their everyday lives.

**Review of Literature**

*College Stress*
College students and stress seem to go hand in hand. Chen, Stevens, Wong, and Liu (2019) conducted research prior to the COVID-19 pandemic and found “significant evidence demonstrating high baseline levels of stress and mental health challenges among college students” (p.443). Add a global pandemic to the mix and it is a recipe for a mental health crisis. According to an April 2020 survey of over 2,000 college students conducted by the nonprofit organization, Active Minds, one in five respondents reported that their mental health had significantly worsened during the pandemic (2021). A study conducted by Son et al. (2020) found that 71% of college-aged individuals indicated that their stress and anxiety had increased due to the COVID-19 pandemic. From this study, 91% of participants reported negative impacts of the pandemic. 89% of participants reported difficulty in concentrating, 86% reported disruptions to sleeping patterns, 86% had decreased social interactions due to physical distancing, and 82% of participants had increased concerns on academic performance (Son et al, 2020).

After accidental injuries, suicide is the second leading cause of death in college-aged adults (Turner et al., 2013). Despite the increasing need for mental health care services at postsecondary institutions, only a small portion of students committing suicide contact their institution counseling centers. Students being hesitant to reach out for help could be due to the stigma associated with mental health. Such negative stigma surrounding mental health diagnosis and care has been found to correlate with a reduction in adherence to treatment and even early termination of treatment. According to the Centers for Disease Control and Prevention (2021), 50% of people in the United States will experience a mental health condition in their lifetime, therefore it is of the utmost importance that we provide young adults with the opportunity to learn and practice coping mechanisms.
No matter our age, stress will always be in our lives and should not always be perceived as a negative. Stress can serve as a healthy response when we are feeling threatened or attacked (Khan et al., 2015). Stress can also serve as a positive motivator (Nandamuri & Ch, 2007). Thus, while some stress may positively serve us, other forms of stress may impact us negatively. When individuals struggle to employ effective stress coping mechanisms to handle a stressful situation, their feeling of stress can persist over time and, in turn, they can become at a higher risk of developing severe physical and mental problems (Auerbach & Gramling, 1998).

A 2018 study that investigated the level of stress among college students enrolled in a teacher preparation program found that the students experienced five types of stress - physiological, social, psychological, academic, and environmental (Yikealo et al., 2018). The results of the study indicated that there was a “moderate level of stress among the students” and that “out of the five domains, academic and environmental stressors were found contributing most to the students’ level of stress” (Yikealo et al., 2018, p.1). Without a doubt, academics are a major part of college life and the COVID-19 pandemic has undeniably effected the environment that students are functioning in.

More recently, through Son et al’s (2020) research involving the effects of COVID-19 on college students’ mental health in the United States, they discovered that pandemic-related stresses included many aspects such as relocation, online learning, social distancing, and anxiety over health and economics. Specifically, students are experiencing stress regarding:

- academics
- challenges of online classes
- their own health and the health of their family members
- changes in their living environment
- financial concerns
- difficulty concentrating due to distractions at home
- low motivation
- issues with sleeping - either sleeping too much, not being able to sleep or difficulty sleeping
- feelings of isolation
- lack of social interactions
- loneliness causing depressive thoughts
- eating patterns - either increased or decreased appetites

For college students who are pursuing a teaching certificate, the pandemic has only seemed to intensify these feelings as they are worried about the lack of interactions with children and teachers in the K-12 environment, the lack of socialization, and inability to work with children in-person. As teachers, a large part of the job is interacting with students - seeing the joy of discovery light their face, walking around the classroom to check on students’ progress and provide motivation. Many in the teaching field were inspired to become teachers from the relationships they formed with their own teachers as they grew up. Research conducted by Bergmark at al. (2018) investigated why individuals decide to enter the teaching profession and found that pre-service teachers aim to recreate the “caring school experiences they had from their own schooling and former teachers” (p.270). The pandemic has severely limited these interactions, likely taking a yet to be fully measured toll on the emotional health of pre-service teachers.

Benefits of Meditation
In recent years, meditation has become much more of a mainstream topic. Simply turn on the television and you may see a commercial for the Headspace app or be provided a 15-second “break” via the Calm app where a commercial shows a babbling brook and encourages the viewer to take a few deep breaths. In the book, *Buddha’s Brain: The Practical Neuroscience of Happiness*, Hanson and Mendius (2009) discuss how regular meditation promotes mindfulness which results in a decrease in stress-related cortisol levels, insomnia, symptoms of autoimmune illnesses, PMS, asthma, falling back into depression, general emotional distress, anxiety, and panic, and an increase in immune system factors, control of blood sugar in type 2 diabetes, detachment from reactions, self-understanding, and general well-being (p. 85). Meditation can aid in lowering blood pressure, heart rate, and cortisol levels while increasing attention, memory and self-compassion (Pascoe et al., 2021).

Meditation can also help people be happier and more positive in their relationships, allowing individuals to be less reactive when negative events occur in their lives (Hanson & Mendius, 2009). Prior to the COVID-19 pandemic, Huberty et al. (2019) conducted a study using the Calm app with 88 undergraduate college students and found that, after using the app for 8 week, participants had “significantly decreased perceived stress scores.” In a study investigating the benefits of meditation and mindfulness practices during times of crisis such as COVID-19, Behan (2020) found that regular practice of mediation allowed “individuals to react to their environment and anything that arises in the course of their day with more calm and equanimity” (p. 257). Teachers, even prior to a pandemic, must react to their environment with a sense of calm. When a student comes with news of abuse, teachers must react calmly. When administration places another task on always-growing to-do lists, teachers must react calmly.
Remaining calm during unexpected events and developing a sense of resilience is one of the most important dispositions a teacher can possess.

Furthermore, engaging in meditation practices has proven to cause structural changes in the brain. Studies of people who have meditated over the long-term show changes in areas of the brain concerned with stress and anxiety (Afonso et al. 2020). When engaged in meditation practice, the prefrontal cortex, the cingulate cortex and the hippocampus show increased activity, and the amygdala shows decreased activity consistent with improved emotional regulation (Pascoe et al., 2021). Hanson and Mendius (2009) further support these findings, stating that strengthening the anterior cingulate cortex (ACC) through meditation - the part of the brain responsible for emotional regulation — “helps you think more clearly when you’re upset, and brings warmth and emotional intelligence to your logical reasoning” (p. 101). Providing pre-service teachers with tools to enhance clear thinking and to respond with warmth, regardless of being in a pandemic, is a tool that will benefit them and their students.

**Benefits of Gratitude Journaling**

For teachers, adding anything extra to the constantly growing to-do lists can cause more stress and anxiety. One of the greatest aspects of gratitude journaling is that it takes little in regard to preparation or necessary materials. According to Boggiss et al. (2020) gratitude interventions “offer a straight-forward, easy-to-deliver intervention that can be completed individually, without a heavy resource cost” (p. 9).

Hanson and Mendius (2009) have found that the benefits of practicing gratitude include lifting mood, increasing life satisfaction, and building resiliency. Emmons et al. (2019) explain the many benefits of engaging in gratitude practices such as contributing to “an increase in happiness, health, and other desirable life outcomes” while also contributing to a “decrease in
negative affect and problematic functioning, including in patients with neuromuscular disease, college students, hypertensives, patients with cancer, health care providers, and early adolescents” (p. 317). Işık, Ş., & Ergüner-Tekinalp (2017) considered the effect of engaging in gratitude practices with college students and how it relates to their adjustment to college life. The students who engaged in gratitude practices had “significantly higher post-test scores on gratitude, adjustment to university life, life satisfaction, and positive affect (Işık, Ş., & Ergüner-Tekinalp, 2017, p. 164).

As with meditation, gratitude journaling has also been proven to cause structural changes to the brain. Functional MRI scans have shown structural changes to the brain after engaging in gratitude practice. Karns et al. (2017) conducted an experiment in which individuals engaged in 3 weeks of gratitude journaling and found that “grateful people show stronger neural signatures of pure altruism in reward system regions” of the brain (p. 7). They also discovered that “gratitude biases the brain’s reward system toward rewards for others versus oneself” thus increasing individuals' altruism. Upon looking at MRI scans of the brain, the researchers found that 3 weeks of gratitude journaling engaged the ventromedial prefrontal cortex (VMPFC), the region of the brain associated with emotional processing, decision-making, memory, self-perception, and social cognition more strongly (Karns et al., 2017).

The human brain is predisposed toward negativity (Hanson & Mendius, 2009). While this trait has enabled humans to adapt and survive for millions of years, the majority of people live in a world where they do not need to have their brain engaged to constantly scan for threats. By practicing gratitude and actively focusing on positive thoughts, individuals can rewire their brain to engage in constructive practices, allowing them to perceive themselves and others in a more positive way. Intentionally practicing gratitude can assist in maintaining a positive attitude while
helping to calm the nervous system and stimulate peaceful feelings (Hanson & Menius, 2009). Instilling in pre-service teachers the ability to maintain a positive attitude and to create an environment of calm are tools that they can use in their future classrooms for their own benefit and that of their future students.

**Methods**

**Participants**

The study was conducted in a small, liberal arts, Catholic college during the Fall of 2020. Two full time professors, one from the Education Department and one from the Theology Department participated in the study. After obtaining IRB approval from the researchers’ institution, each professor used participants from one of their courses, for a total of 39 students. Students ranged in age from 19-23 years of age and were all enrolled in a teacher education program. Participants ranged in major from Early Childhood Education PreK-4, Special Education, and Secondary Education, such as History, Art, Mathematics, Biology, and Foreign Language.

The purpose of the study was to examine college students’ perceptions of engaging in mindfulness practices such as guided meditation and gratitude journaling and to determine if students experienced any benefits from these activities. Even before a global pandemic, college students have reported experiencing stress and anxiety. One of the causes of stress is feeling like there is not enough time to complete assignments and/or study. This feeling of a lack of time can cause college students to put self-care at the bottom of their priority list. Students who engaged in this study were already in attendance as it took place during their normally scheduled course meeting time. Participating in this study then enabled participants to engage in self-care while not taking away any of their “free time” or “down time.” Because of this, the study also aimed to
determine if college students found themselves engaging in mindfulness practices outside of the classroom. This study was seeking information regarding student’s perceptions of the importance of incorporating self-care strategies into their lives outside of the classroom and if they determined what was happening in the classroom so beneficial that they would make the time to practice self-care during their own time.

**Research Design**

At the beginning of each class, students would engage in a guided meditation from the Calm app, which lasted approximately 10-15 minutes. First, the College Collection was used, which involved 8 different meditations ranging from an Introduction to Mindfulness to meditations addressing stress, concentration, balance, sleep, self-compassion, and purpose. The College Collection, authored by Tamara Levitt (2020), is said to “help students ride the rollercoaster of college life.” After the College collection meditations were completed, participants then completed the 21 Days of Calm series which is a series said to “integrate mindfulness into your everyday life” (Levitt, 2020). The 21 Days of Calm series involved topics such as non-reactivity to sound and emotions, the judging mind, impermanence, loving kindness, and catching and questioning our thoughts. The guided meditations involved different mindfulness and meditation techniques including mindfulness of breathing (using the breath as an anchor to the present moment), compassion-focused meditation (using loving kindness, and awareness of others’ and our own suffering to be in the present moment), the body scan (being aware of each part of the body in turn as an anchor for the present moment and for where we hold tension and stress in our bodies) as well as body awareness (concentrating on our feet in contact with the earth or our hips on our seat to ground to the present moment) (Behran, 2020). Students would engage in these guided meditations as a whole group. The lights would be
dimmed, the classroom door closed, and the meditation would be played via the classroom desktop computer via the projector speakers to the entire group. At the end of the meditation, the class would proceed according to the syllabus, covering the intended material for the day. The gratitude journaling practice took place at the end of the class time. Towards the end of class, students were encouraged to take the last five minutes of class to list approximately five things that they were grateful for in their life. Upon start of the study, participants were given notebooks to use as their gratitude journals. Participants were instructed that the gratitude journals were to be their private property and that they would never be collected or read by the researchers.

**Data Collection**

A mixed-methods study was conducted to collect qualitative and quantitative data after 14 weeks of intervention. During the last week of the semester, participants were provided a weblink to answer questions regarding their perceptions of engaging in the guided meditation and gratitude journaling during class. An anonymous survey was administered via Survey Monkey and consisted of 10 questions - seven questions were multiple choice and the last three questions were open-ended, short answer. Participants were provided with time during class to answer survey questions and 39 participants completed the survey.

**Results**

At the end of the semester, after participating in 14 weeks of guided meditations and gratitude journaling, a survey was given to collect participants' perceptions. Quantitative data from multiple-choice questions provided percentages that were analyzed and interpreted in the following results. Of the 39 participants who completed the survey at the end of the semester, 61.54% agreed and 39.5% strongly agreed that the guided meditations helped them to alleviate
stress. Regarding participants’ increased concentration, 48.72% agreed and 23.08% strongly agreed that the guided meditation helped them to focus in class. Finally, because of the guided meditations, 56.41% of participants strongly agreed and 38.46% agreed that they felt a sense of calm after the guided meditations.

When asked about gratitude journaling, 48.72% of participants agreed and 30.77% strongly agreed that after journaling, they felt an overall sense of wellbeing and happiness. After journaling, participants felt themselves able to be more optimistic and positive according to the 53.85% of participants who agreed and 30.77% who strongly agreed. Further survey data found that 41.03% of participants agreed and 33.33% strongly agreed that after journaling, they felt an increase in empathy and self-compassion.

Study participants also had the opportunity to respond to open-ended questions to describe their overall experience completing the guided meditations and gratitude journaling in class. Open coding was used with the qualitative data from open-ended survey questions to determine emerging themes. Themes from qualitative data included overall reaction to the mindfulness intervention and perceived benefits. After being surveyed, 37 out of 39 participants responded positively to engaging in the guided meditations and gratitude journaling. One study participant stated, “I have never meditated before this class and honestly I can say that I absolutely loved it! I feel like I have gained so many positives...I have more patience, a positive attitude, and ways to decrease my anxiety!” According to another study participant, “I loved it and felt like it completely transformed my mental health.” A third study participant stated that they enjoyed meditating and gratitude journaling because they were able to “…get into the groove of relaxing before class. I also liked the gratitude journaling because often we do not
make the time to self-reflect on how many great things are happening that we should be grateful for.”

An additional occurring theme was an increased sense of calm and decrease in stress. One participant stated that the meditations provided them “...a chance to relax during the hustle and bustle of school, work, and life events. With my schedule being so incredibly hectic and stressful, the meditation allowed me to get organized.” A second study participant remarked that the meditations “really helped me relieve stress and journaling gratitude helped me realize the important people and activities in my life.”

More impactful is that some participants noted feelings of calm carrying over into their other classes throughout their day and/or their week. One participant stated “I always felt a great sense of relief after meditation and I could definitely see a difference in my motivation for the rest of the day after each session.” Other participants stated that the meditations at the beginning of class enabled them to begin their day with a calm mindset, “It was a great way to help start the day and calm down before learning in other classes.” The meditations also provided students the opportunity to be more present in class, “It helped me understand what was important and what was not. It helped me reset and channel my stress to get down what I needed to get done.”

Participants also expressed that the guided meditations helped to increase their focus in the classroom setting. One participant stated, “It was a fantastic experience that I looked forward to every class because it helped me focus and calm my mind which I have learned is constantly busy.” Another study participant stated that it helped them to attend class “...with a clearer mind so I may better pay attention and comprehend more fully what is presented in front of me.”

Regarding the gratitude journaling activity, study participants found it to be a beneficial way to focus on the positive aspects of their lives as opposed to the negative. One participant
stated that “Gratitude journaling was a nice way to remind myself of the good things I had.” while another felt that “…the journaling helped me to focus on good rather than bad things.” An additional study participant remarked that “…this experience made me realize I had so much more in my life to be grateful for than I ever really thought about.”

Participants were also asked if they found themselves using any of the practices (meditating or gratitude journaling) outside of the classroom. Approximately 74% of participants responded that they had added meditation and/or gratitude journaling to their daily life outside of the classroom. Of the 39 participants, 23 participants indicated that they had started meditating on their own time. One participant stated “…as we got closer to finals, I used some meditation sessions to relieve any stress and this helped me a lot” while another stated, “…I try to meditate for at least 30 minutes 5 times a week”

One reason for using meditation outside of the classroom setting was to aid with sleep. Six participants mentioned that they were using guided meditation to help them fall sleep at night. One study participant stated that they had “…never really been one to do any type of relaxation method, but I found it to be really helpful. I even went on to start using them at night to help me sleep, because I get pretty bad anxiety attacks.”

Five participants indicated that they had bought the Calm app to continue meditating outside of class. One study participant stated that “…After completing a few sessions of mindfulness in class, I downloaded the program and started using it daily. I can honestly say that it has helped me deal with my stress and anxiety in incredible ways.” Furthermore, seven participants responded that they continued to engage in gratitude journaling on their own time. One participant remarked that they “…started to gratitude journal when it felt like everything in the world sucked. It was a good reminder of the positives in my life.” Lastly, five participants
indicated that, while they had not yet started to engage in meditations or gratitude journaling outside of the classroom setting, they hoped to do so in the future.

**Discussion**

This study examined the impact of practicing mindfulness in the classroom on preservice teachers’ stress levels and to discern if students found themselves using mindfulness practices and techniques outside of the classroom environment. Benefits of guided meditation include increased concentration, sense of calm and decrease of stress. While the benefits of gratitude journaling include an increase in empathy and self-compassion, ability to be more optimistic and positive, an overall sense of wellbeing and happiness. With the stress that the pandemic has placed on college students and teachers, these benefits are important to contribute to the education of a resilient and positive future educator.

While examining the effects of COVID-19 on college students’ mental health in the United States, researchers found that the long-lasting pandemic situation is bringing negative impacts on higher education (Son et al., 2020). The findings of their study highlight the urgent need to develop interventions and preventive strategies to address the mental health of college student. The students who participated in this study broadly agreed that guided meditation and gratitude journaling were effective ways to manage stress and increase focus.

In their research conducted with college students enrolled in a teacher preparation program, Yikealo et al. (2018) encouraged “college communities to take concrete steps towards the improvement of the learning environment and subsequently mitigating the adverse impact of stress on students’ wellbeing and learning outcomes” (p. 1). However, their article did not provide guidance on which steps to take. Engaging students in mindfulness activities such as
guided meditation and gratitude journaling are two steps that colleges and universities can take to improve the mental wellbeing of their students.

It is important to consider that instructing students to meditate outside of the classroom setting could be perceived as adding yet another item to their to-do lists. This study also showed the efficacy of engaging in mindfulness practices, such as guided meditation and gratitude journaling, inside of the classroom setting. By enabling students to engage in these practices in the classroom, an environment in which they are already scheduled to be in, additional tasks are not being added to their workload or creating any additional stressors in their lives. College students time is limited and they may feel pressure and stress when trying to cram those hours full with classes, studying, club meetings, extracurriculars, sports, a job, research, working out, time to socialize, etc. According to one participant, it was helpful to not have to worry about mindfulness practices taking time out of their already busy schedules:

“It was a pleasant way to reflect on what’s been going on without having to worry about wasting time. With the journaling, I think that it helped remind me about what I’m truly focusing on in life and let me reflect on where I am.”

Limitations and Future Considerations

Limitations in research included a small sample size due to the number of students enrolled in the institution where the research occurred. Demographic variance was also limited due to the setting of the study. The study took place at a small, private, Catholic, liberal arts college located in a rural setting which resulted in a limited profiles. It also would have been beneficial to have conducted a survey prior to the intervention for data collection to discern for perceived growth, if any, from participants after participating in 14 weeks of mindfulness practices.
An additional limitation to the data was that the primary researcher was the instructor of one of the courses where participants were recruited. Students were informed that their consent was voluntary and would not impact their grade in the course. Students were provided the opportunity to wait outside the classroom or sit in the classroom and not engage in the mindfulness exercises if they chose to not participate in the study. While one student chose not to participate in the study, students may have felt pressure to participate due to their instructor being the primary researcher.

The last survey question that participants were invited to answer was if they would make any changes to the experience. They were asked to make any suggestions for the future - anything they would like to add or change regarding their experience of mindfulness practices in guided meditation and gratitude journaling. Two of the recurring themes for recommendations for changes were shorter meditations and more structure to the gratitude journaling. Some participants remarked that they found it difficult to sit for the longer meditations while others stated that they had a desire for different journal prompts.

As a result of this research, shorter meditations were produced for students at the institution where the experiment took place. A grant was obtained and guided meditations were produced specifically for the college community. Using the feedback from the students in this research, guided meditations were written that were tailored to the students’ experiences (midterms, finals, etc.). These meditations were scripted to be between 5 and 7 minutes and were recorded by prominent figures on campus. The meditations were released weekly to the entire campus community.

Further research should concentrate on the resilience of teachers and whether or not engaging pre-service teachers in practices such as meditation and gratitude journaling decreases
the current rates of teacher burnout. Longitudinal studies should include determining if pre-service teachers who engage in practices such as meditation and gratitude journaling take these practices into their future classroom and if/how it impacts their future students.

When implementing mindfulness practices into a course, it is important to take into consideration the amount of time available in the course, the content curriculum that needs to be covered, and how to best work the mindfulness exercises into the course while still effectively covering the necessary material. While gratitude journaling can be completed relatively quickly, engaging in guided meditations may take more time away from the course. It is important to be aware of the time of the guided meditations and to be proactive in selecting meditations that have a timeframe and theme that work for the course. If students are worrying about the meditations taking too much time away from their course instruction, any benefits to mindfulness exercises will be negated.

Conclusion

“I have incorporated mindfulness into my life, and it makes it better. Taking just ten minutes a day to breathe and reflect really does make a difference in stress levels. I have noticed that I have become less reactive and more patient with mindfulness.”

(Anonymous, Junior)

Educators are often working more than ever before to ensure both the academic and emotional success of students. As individuals in higher education who are responsible for producing the next generation of teachers, teacher educators need to ensure that future teachers have the capacity to respond appropriately to the environment around them and the resiliency to remain steadfast when the world around them is shifting. Engaging students in mindfulness practices such as guided meditation and gratitude journaling provides pre-service teachers with a skillset
to use for the betterment of themselves and their future students. These practices take little by means of planning and resources and are easily available to all. It is important that, while pre-service teachers are academically ready to teach, they also must be emotionally prepared to teach and to instill their emotional resiliency skills in their future students.

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Seeds to STEM: Cultivating Early Nutrition, Literacy, Numeracy and STEM Knowledge and Skills in Teachers, 3-5 Year Olds, and Families Through a Bilingual Asset-based Curriculum in Two Major Cities.

Topic: Early Childhood

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Seeds to STEM: Cultivating Early Nutrition, Literacy, Numeracy and STEM Knowledge and Skills in Teachers, 3-5 Year Olds, and Families Through a Bilingual Asset-based Curriculum in Two Major Cities.

Abstract: The Academy of Natural Sciences of Drexel University, GrowingGreat and the School of Education of Drexel University have developed a new early nutrition, STEM and literacy program. The mission of the Seeds to STEM program is to empower very young children along with their families and teachers to make healthy food choices through an inquiry-based nutrition, STEM, literacy, and garden education program. Seeds to STEM is being piloted in two U.S. cities -- Philadelphia, PA, and Los Angeles, CA -- among low-income Black and Latino families with children 3-5 years old and their teachers. Seeds to STEM has three product deliverables:

1. An inquiry based curriculum about early childhood nutrition and kindergarten readiness that integrates STEM, literacy, and numeracy learning through experimental activities growing food inside classrooms, urban gardens, and family homes;
2. Professional development and in-class coaching for accredited and under-accredited pre-K educators including, as an innovation, home-based care providers – because low-cost home-based childcare options are often chosen by low-income families; and
3. Programs that empower families to learn together, understand kindergarten readiness, and become more connected to health and nutrition resources in their communities.

Educators across disciplines agree that early childhood interventions have strong potentials to show lifelong benefits when children are exposed to high-quality programs. The three pedagogical frames for Seeds to STEM are grounded in research as well as extensive museum-based practice in: 1) inquiry-based STEM teaching and learning; 2) stimulating play, curiosity, and roleplaying for educating 3-5 year olds; and 3) a strengths-based approach to culturally appropriate education for children and their families from culturally diverse backgrounds. High quality early education programs are defined by the National Association of the Education of Young Children (NAEYC) as: integrating diversity, culture, self-concept/ autonomy, physical and social integration, developing age-appropriate skills, and integrating input and respect for communities served. Specific Aim #2 of this SEPA program proposes strategies, based on prior data, that engage families in children’s learning and broadcasts nutritional messages more broadly among the communities served.

The three aims of the project with deliverables and outcomes:
Aim #1: Design, pilot, and iteratively evaluate a bilingual nutrition curriculum for 3-5 year olds and related professional development for pre-K educators that is appropriate for early childhood education centers and home-based child care providers in low income urban areas (in Philadelphia, PA and Los Angeles, CA).

Frameworks for Seed to STEM Curriculum and Professional Development Seeds to STEM (S2S) curriculum has four overarching themes (Food Fundamentals; Healthy Choices; Cycles in the Garden; Community Connections) supported by sixteen inquiry-based lesson plans that, at first, build upon teachers’ knowledge of commonly-used early childhood curricula on health and nutrition (KidsHealth, Healthy Habits for Life, Choose MyPlate). S2S is rooted in research-based
practices for early STEM and literacy learning and teaching: 1) inquiry-based instruction; 2) play-based learning; and 3) culturally relevant teaching.

In order to make these theoretical frameworks more accessible to early childhood educators, S2S will use five guiding questions for teachers to consider as a frame for the implementation of STEM lesson plans and gardening activities:

1. How can I make these experiences open-ended and inquiry-based?
2. How can I encourage children to play and role-play with science and math?
3. What are my opportunities for supporting language development?
4. Am I including a mixture of items, some culturally familiar and some novel?
5. Am I a co-explorer with the children, not the expert?

Aim #2: Increase nutrition and STEM literacy among participating families with preschool children, empowering them to learn together and increasing their knowledge of and connections to local urban gardens, food markets, and community resources for health and nutrition information.

Aim #2 will use the following engagement strategies and programs:
- Each family will receive take home activities directly related to classroom activities in the S2S curriculum, specifying for adults how these skills relate to kindergarten readiness.
- A Family Guide that includes 30 pre-K activities for home use and if desired
- Gardening ideas for at-home vertical planting pot.
- Quarterly Festive Events with workshops for interested parents in Philadelphia and L.A.

S2S family programs have three intended outcomes. Families will:
1. Understand the importance of EC nutrition, STEM skills, numeracy, and literacy;
2. Understand connections between the S2S curriculum & kindergarten readiness;
3. Gain more knowledge about local resources for nutrition and health (e.g., urban gardens, food markets, libraries, churches, pantries, and community clinics and health services).

Aim #3: Validate and nationally disseminate a culturally relevant, NGSS aligned three-pronged model of curriculum design, professional development for pre-K educators, and educational programs for urban families.

Project Research Plan: Note: For the purposes of this project, the acronym, STEM, will refer to science, technology, numeracy, and nutritional health.

Aim #1. Design, pilot, and evaluate program materials for increased teacher efficacy and student knowledge.
- Hypothesis A1O1: Educators will increase their self-efficacies of STEM (science, technology, numeracy, nutritional health) and literacy content (above control)
- Hypothesis A1O2: Educators will increase their implementation of STEM (science, technology, numeracy, and nutritional health) and literacy content (above control)
• Hypothesis A1O3: Students will increase their knowledge in STEM (science, technology, numeracy, and nutritional health) and literacy content (above control)

Aim #2. Increase nutrition & STEM literacy among low-income urban families with preschool children.
• Hypothesis A2O1: Families will increase their understanding of the importance of STEM (as above) and literacy content for their child(ren) (above control)
• Hypothesis A2O2: Families will increase their understanding of connections between early STEM (above) and literacy content and readiness for kindergarten (above control)
• Hypothesis A2O3: Families will increase their knowledge about local resources for nutrition and health (above control)

Aim #3. Validate and nationally disseminate model.
• Hypothesis A3O1: Model will be NGSS aligned, culturally relevant, and meeting intended impacts among audiences who are under-represented in STEM.
• Hypothesis A3O2: Products & research will be produced and disseminated nationally.

The following table describes anticipated data collection and analysis.

Table 2. Alignment of Program Outputs/Hypotheses with Data Sources

<table>
<thead>
<tr>
<th>ABBREVIATED PROGRAM AIMS &amp; OUTCOMES</th>
<th>DATA SOURCES / PARTICIPANTS / COLLECTION TIME</th>
<th>DATA ANALYSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AIM 1. DESIGN, PILOT, &amp; EVALUATE PROGRAM MATERIALS FOR INCREASED TEACHER EFFICACY &amp; STUDENT KNOWLEDGE.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1O1 Educators’ increased self-efficacies of STEM (science, numeracy, nutrition &amp; health) and literacy content (above control)</td>
<td>Teacher Efficacy Beliefs Inventory Surveys for each content area / Intervention, Control, &amp; Extended Support Teachers / Beginning &amp; End of Year</td>
<td>Factorial ANOVAs to evaluate for baseline to end-of-year teacher STEM self-efficacy changes within groups over time and differences between intervention, control, &amp; extended support groups</td>
</tr>
<tr>
<td>A1O2 Educators’ increased implementation of STEM (science, numeracy, nutrition &amp; health) and literacy content (above control)</td>
<td>Focus Group Interviews / Intervention, Control, &amp; Extended Support Teachers / End of Year</td>
<td>Thematic Analysis to identify and compare themes related to teacher perceived self-efficacy and implementation from intervention and control groups</td>
</tr>
<tr>
<td>A1O3 Students’ increased knowledge in STEM (science, numeracy, nutrition &amp; health) and literacy content (above control)</td>
<td>Content Specific Task Surveys / Intervention, Control, &amp; Extended Support Teachers / Beginning &amp; End of Year</td>
<td>Factorial ANOVAs to evaluate for baseline to end-of-year teacher STEM task implementation changes within groups over time and differences between intervention, control, &amp; extended support groups</td>
</tr>
<tr>
<td>A1O3 Students’ increased knowledge in STEM (science, numeracy, nutrition &amp; health) and literacy content (above control)</td>
<td>Student Observation Checklists / Students of Intervention &amp; Control Teachers / Beginning &amp; End of Year</td>
<td>Factorial ANOVAs to evaluate for baseline to end-of-year student STEM knowledge change within groups over time and differences between intervention, control, &amp; extended support groups</td>
</tr>
</tbody>
</table>

**AIM 2. INCREASE NUTRITION & STEM LITERACY AMONG LOW-INCOME URBAN FAMILIES WITH PRE-SCHOOL CHILDREN.**
| A2O1 Families’ increased understanding of the importance of STEM (science, numeracy, nutrition & health) and literacy content for their child(ren) (above control) | Parent Survey / Adult Family Members of Students from Intervention & Control Teachers / Beginning & End of Year | 2-Between, 2-Within Factorial ANOVAs to evaluate for differences in family understanding of STEM & literacy importance, connections to kindergarten readiness, and knowledge about local health/nutrition resources changes within groups over time and differences between intervention and control groups |
| A2O2 Families’ increased understanding of connections between early STEM (science, numeracy, nutrition & health) and literacy content and their child(ren)’s readiness for kindergarten (above control) | Focus Group Interviews / Adult Family Members of Students from Intervention Teachers / End of Year | Thematic Analysis to identify themes related to intervention family understanding of STEM importance, relation to kindergarten readiness, and knowledge of health/nutrition resources |
| A2O3 Families’ increased knowledge about local resources for nutrition and health (above control) | Reflective Questionnaire / Program Implementation Team Members / End of Year | Content Analysis for open-ended items |

**AIM 3. VALIDATE AND NATIONALLY DISSEMINATE MODEL.**
| A3O1 Document model is NGSS aligned, culturally relevant, and meeting intended impacts among populations under-represented in STEM. | Reflective Questionnaire / Program Implementation Team Members / End of Year | Descriptive Statistics for closed-ended items |
Over the five years of the Seeds to STEM project it is anticipated that 150 early childhood education providers and almost 2,500 children will be served.

**Preliminary Findings**

This project is in its initial stages. However, by the time of the conference presentation, preliminary findings related to *Aim 1: Design, Pilot, and Evaluate Program Materials for Increased Teacher Efficacy & Student Knowledge* will have been collected and analyzed. Thus, this presentation will share curricular developing insights as well as research findings related to collaborative instrument development and validation, baseline educator teaching efficacy and implementation strategies, and student content knowledge.

**Acknowledgements:** Seeds to STEM is a [Science Education Partnership Award](https://www.nih.gov) grant from the National Institute of General Medical Sciences at the NIH.

**Work To Date:**

- ✔ Tested and validated 3 new research instruments
- ✔ Developed professional development workshops for early childhood educators
- ✔ Developing Seeds to STEM Curriculum
- ✔ Recruited cohorts both in Philadelphia and Los Angles

Examples of curriculum developed on following pages.
Seed Sleuths

You will need:
- A cutting board and a knife for the adult
- Four types of fruit: one with one seed (avocado, cherry, peach), one with several seeds (apple, pear, lemon), one with many seeds (pomegranate, pumpkin, watermelon), and one with seeds on the outside (blackberry, raspberry, strawberry).

Snacks for tasting: edible seeds like shelled sunflower or pumpkin seeds.

1. Explain to the children that not all parts of fruits and vegetables are edible and to always check with an adult before eating something unfamiliar.
2. Line up the fruit on the cutting board. Cut the fruit with one seed in half, the fruit with several seeds in thirds, and the fruit with many seeds in quarters, so that they are easier for the children to dissect.
3. Pass around the fruit pieces and discuss halves, thirds, quarters, and whole fruit.
4. Discuss how each fruit smells, feels, and looks.
5. Ask the children to count how many seeds are in each fruit and discuss their scientific observations.
6. Offer the edible parts of the fruit to the children to eat.
7. Pass out shelled sunflower or pumpkin seeds to study and eat.

**WHAT PARTS EACH FRUIT CAN WE EAT?**
- How do fruits carry seeds?
- What animals besides people eat seeds?
- What is the difference between the seeds we can eat and the seeds we plant?
- What is in food that helps us grow up healthy?
- Why does fruit carry so many seeds around?
- Where does each fruit come from?

**DISCOVER**
Fruit is an easy, delicious snack that contains carbohydrates that give us energy. Seeds that we can eat contain proteins that help our bodies grow and fats that help our brains function. We feel better and are healthier when we eat meals that contain all three nutrients: proteins, fats, and carbohydrates.

**SING**

**Apples and Bananas**
I like to eat, eat, eat,
Apples and bananas.
I like to eat, eat, eat,
Apples and bananas.

During each new verse, change the sounds to a new vowel.
Example: Change sounds to an Aa:
I like to ate, ay-ples and ba-nay-nays.
Example: Change Aa sounds to an Ee:
I like to eat, ee-ples and bee-nee-nees.

**READ**
A Fruit is a Suitcase for Seeds by Jean Richards, Millbrook Press, 2002.
Teaching Tips

GrowingGreat activities encourage children and adults to learn and play together. We suggest you alternate between quiet, focused time and moving and playing. For this activity, we start with the story, then get up and do the song and hand motions, and finish with the hands-on science activity and snack.

1. Do you encourage children to play with science?
   We focus on process rather than content. We allow children to practice STEM (science, technology, engineering, and math) skills such as testing hypotheses and problem solving. In this activity, we explore a botany question using scientific classification and dissection. What are seeds and what is their relationship to the fruit we eat? In the story, you’ll notice that some vegetables that we eat are actually classified as fruit. Peas are seeds that are found in fruit called pea pods. We also introduce early math concepts like addition and division.

2. Are there opportunities for language development?
   We read stories, ask questions, and sing songs to connect with students and teach vocabulary. We stop throughout the story to allow children to talk about what we’re reading. This activity reinforces understanding of vowels with song and asks students to use words to describe their observations.

3. Are the experiences open-ended?
   We offer more than one way to engage with materials in a setting where there can be more than one right answer. We ask open-ended questions and listen to children’s answers to encourage discovery.

4. Do your environment and materials include a mixture of familiar and new things?
   We provide authentic, real-life experiences that encourage children to ask “why,” using edible materials from the garden and grocery store. We encourage children to incorporate the nutrient-dense food they like from this activity into their daily diet.

5. Are you a co-explorer with the children, not an expert?
   We allow children time for self-directed experimentation. We can play and be messy too.

GrowingGreat’s mission is to empower every child to grow up healthy through science-based garden and nutrition education. Does your school have a garden or nutrition education program? Email info@growinggreat.org for more information.

Written by Stephanie Hartney
Illustrated by Dennis Smith

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Engaging Women in Engineering: Introducing Engineering Concepts into a Natural Science After-school STEM Program

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Engaging Women in Engineering: Introducing Engineering Concepts into a Natural Science After-school STEM Program

In this case study we describe the collaboration between museum staff, College of Engineering faculty, researchers from School of Education and students to transform a highly successful natural science program into a natural science and engineering program.

**Background:** Women in Natural Sciences (WINS) is a free after-school and summer science enrichment program at the Academy of Natural Sciences of Drexel University. Founded in 1982, WINS has introduced almost 1,000 high school girls to future careers in science and other professions by providing hands-on science workshops, career and college exploration, and positive youth development. In addition to a strong emphasis on academics and science, WINS also provides a uniquely nurturing environment, a community of like-minded friends, and experiences not typically found in school.

WINS I begins in the summer after 8th grade with eight weeks of environmental exploration in and outside of the city. The summer concludes with an exciting weeklong trip to the Poconos where the girls get a chance to apply the knowledge and skills obtained throughout the summer. During the school year, weekly workshops and monthly field trips give the girls the opportunity to be directly involved with the scientists, collections, and resources of the Academy.

Project data indicates that WINS’ students graduate high school at higher rates than their peers and major in STEM fields at higher rates than their peers and national averages for Black and Latinx women. Quantifiable data is collected primarily via pre-post open-ended surveys that elicit data on attitudes toward STEM and career goals among WINS women three times during high school. Surveys are also sent to alumnae in college every two years. Data from 2009-16 show that 49% of incoming rising 9th graders enrolled in WINS already aspiring to a STEM career. Of this 49%, 32.5% anticipate a career in medicine, 4.6% in computer science and engineering. By the end of high school, 17% of those who initially indicated a preference for medicine have shifted their interests to another STEM field -- and the total number of 12th grade students focused on STEM careers rises by nearly 20%.¹ 100% of WINS alumnae graduate high school and 97% attend college (as opposed to 51% of seniors graduating from the SDP).² Follow-up surveys found that 88.5% of WINS alumnae earned a four-year college degree. Of these, 54% of WINS alumnae earned STEM degrees, primarily in the natural and health sciences¹ -- as compared to only 1% of all African American students graduating from the SDP.² 5.7% of respondents reported undergraduate degrees in engineering.¹ The small but stable number of WINS graduates who pursue careers in engineering despite a relatively small number of experiences in these fields that
were offered to WINS students gave us confidence that we could increase the number of alumnae who pursue higher education in engineering.

In 2018, the WINS program started the EngWINS program funded by the NSF iTEST program (Award #1849735). Although the pandemic put the project on hold, the project team managed to pilot engineering lessons virtually with students. And this year the eight-week (summer) and weekly (school-year) natural science curriculum of the WINS program will include 30 new engineering components. Examples of curriculum topics include designing clean water distribution systems, innovative technologies to dispose waste, food supply chains and designing safe and efficient packaging, renewable and non-renewable energy production, sustainability, and environmental justice. Continuing throughout the school year, the curriculum focuses on topics related to Academy research (biodiversity, classification, evolution, adaptations, and aquatic sciences). Examples of activities including using the engineer design process to design wildlife sanctuaries, biomimicry in engineering, and innovative technologies used in environmental and wildlife research. Along with classroom activities, students attended numerous field trips that allowed them to meet with professionals in the industry and see how classroom topics are applied in the workforce. These field trips included visiting a produce farm, community garden, waste recovery facility, coal mine, and more.

This program is a true collaboration of researchers, practitioners, faculty, and students working together to provide high quality, culturally relevant learning experiences. College of Engineering faculty work with WINS staff to incorporate engineering design concepts into a curriculum that is focused on Philadelphia and the lived experiences of the WINS students. WINS students give feedback on lessons and field experiences allowing staff to adjust. The entire project is being evaluated by researchers in the School of Education who are measuring changes to student’s attitudes towards STEM along with mentor/mentee experiences (the other component of the project which is not being discussed in this paper).

**Observations from Program Managers**

During classroom activities and trips, program facilitators observe participant progress in their understanding of the engineering design process and their ability to effectively collaborate with others. The facilitators alternate the placement of students in their groups, allowing them to build rapport not only with friends but with all students. Group activities are broken into several components allowing participants to take on a task that displays their strengths. They are encouraged to share their personal experiences as they relate to the topic, knowing they are working on something that can impact them. One great example of their progress was during a team-building activity on an obstacle course in the Poconos. To find solutions to the challenges, students used components of the engineering design process to complete the challenges without prompting. It was a proud moment of affirmation that students understood how to apply what they learned in class to a real-world situation.

**Collaborative Contributions**

- The WINS Team partnered with Drexel College of Engineering professor Dr. Ian Marcus to modify the natural science curriculum by incorporating the engineering design process as it is used to solve environmental issues and how nature can inspire innovation. We also
created a space where participants apply lived experiences when working through design challenges.

- Scientists from Drexel, ANS, eClose Institute, and SAI Med Pharmaceuticals mentored participants through internships.
- Philadelphia Education Fund and Hillary Blecker Consultants provided resources for mentors working with marginalized youth.
- Drexel School of Education and Research for Action gather pre and post data to evaluate the impacts of the program.

Preliminary findings indicate the following outcomes:

1. EngWINS participants increase their understanding of engineering concepts and design process.
2. EngWINS participants experience increased confidence when presented with engineering design challenges in collaborative group environments.
3. EngWINS participants demonstrate an increased interest and self-efficacy in exploring and developing solutions to environmental justice issues impacting their communities.

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PLAY AND CREATIVITY

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Abstract: Can students learn to be more creative? Creativity may not be a matter of learning but of unlearning. We have in us a natural innate built-in drive designed to push us to learn and experience important principles of creativity, things like; curiosity, discovery, exploration, experimentation, communicating, and socializing. This instinctive drive is called play. Play attributes are like creative attributes but are not sufficiently comprehensive as to be considered synonymous. What can be learned from play and what can be unlearned from our training to be more creative. It is time to push back and provide opportunities for unlearning those things that limit our creativity and relearn those important attributes gained through principles of play.

Keywords: creativity, play, playful, design thinking, design

1. Introduction

A core competency of design is making human connections through need finding and defining, which are important aspects of creative thinking (Getzels, 1975; Runco, 1994). The department of design at Brigham Young University is continuing to try to understand and apply core creativity principles in a structured creativity course and to infuse more creativity opportunities into a variety of other courses. These internal efforts have led to a campus-wide mini course on creativity principles and methodologies.

The questions arise, can you teach creativity, and can students learn to be more creative? Creativity may not be a matter of learning but of unlearning. In 1968, George Land and Beth Jarman (Land & Jarman, 1993,) conducted a longitudinal research study to test the creativity of 1,600 five-year-old children who were enrolled in a Head Start program. The test was the same creativity test he devised for NASA to help select creative engineers and scientists. The assessment worked so well that he decided to try it on children. Land re-tested the same children at 10 years of age and again at 15 years of age. The results were astounding.

Test results among 5-year-olds: 98%
Test results among 10-year-olds: 30%
Test results among 15-year-olds: 12%
Same test given to 280,000 adults: 2%

Land wrote, “What we have concluded is that non-creative behavior is learned.”
Tom Kelley and David Kelley (2013), in his book *Creative Confidence*, shares an interesting insight; he pointed out that there is no word in the Tibetan language for “creativity” or “being creative.” The closest translation is “natural.” In other words, if you want to be more creative, you just have to be more natural.

We have in us a natural instinctive drive designed to push us to learn and experience important principles of creativity, things like curiosity, discovery, exploration, experimentation, communication, and socialization (Elkind, 2007). This instinctive drive is called play. The drive to play freely is a basic, biological drive. Free play is how children learn to make friends, overcome fears, solve their own problems, and generally take control of their lives. The things that children learn through their own initiatives, in free play, cannot be taught in other ways (Gray, 2013). Decades of research has shown that play is crucial to the development of these skills. This is especially true of the purest form of play: the unstructured, self-motivated, imaginative, independent kind, where people initiate their own games and even invent their own rules (Elkind, 2007). Children are intrinsically motivated to play, and they learn at tremendous rates in their formative years (Bowler & Linke, 1997).

It turns out that creativity is not some rare gift to be enjoyed by the lucky few—it is a natural part of human thinking and behavior (Kelley & Kelley, 2013, p. 6). Can we help students unlearn this non-creative behavior they have been taught? Observations have shown that students who are the most creative and who are also most resistant to the pressures to conform are resilient. A creative adult is a child who survived. If creativity is a natural tendency, where does that natural tendency go?

In our society, efforts are made to try and control children’s natural tendencies and inclinations for learning at an early age. They are told it is time to stop playing and start working. It is time to control those physical urges and sit still. It is time for learning a set of rules. It is time to conform to authority, and it is time to stop socializing and work independently.

### 2. History of education

Our public educational system took aspects of its theory from the schools established by the Puritans. The Puritans believed that children were born sinful and needed to be disciplined, that all pleasure was a trick of Satan, that hard work-built character regardless of the outcome, and that suffering was virtuous. Willfulness and the spirit of freedom had to be beaten out of children to make them good Christian workers (Gray, 2013). This educational system was eventually taken over by the state, who believed that the role of the school was to develop patriotism, a pledge of allegiance to the establishment and authority. Their desire was to blend a diverse number of cultures into a unified whole and use education as a defense because we were in competition with other nations. We had to work hard to beat the Soviets. (This is when homework was introduced.) As a part of that defensive strategy, the school system was fashioned in the image of industry to train students in the classroom to function well in the industrial environment, which demanded that students memorize the rules, not question content or authority, do the tasks they were asked to complete as efficiently as possible, and work independently (Robinson, 2010). This is why, as Postman says, “Children enter school as question marks and leave as periods” (1969, p. 53). The priorities of industry have changed, but our educational system has been slow to adapt.

All three of these systems—religion, state, and industry—were educating for a specific end result, and their methods were designed to produce the desired outcome. None of these systems was interested in things like curiosity, discovery, exploration, experimentation, communication, and socialization because there was no perceived need. This system taught non-creative behavior because that was what was important at the time.
This is not to say that these work principles are not important, but there should be a balance of work and play. It is time to push back and provide opportunities for unlearning those things that limit our creativity and relearn those important attributes gained through principles of play.

3. Play and creativity

Play attributes are important for creativity, but they are not sufficiently comprehensive to be considered synonymous. The commonalities described below are aspects that creativity and play have in common.

Literature searches identified numerous connections between several aspects of play and creativity. Here is an amalgamation of defined attributes of play that apply also to creativity. Play is a divergent thinking activity (Johnson, Christie, & Wardle, 2005). Play is a range of intrinsically motivated activities normally associated with pleasure and enjoyment (Garvey, 1990). Play is immersive (Garvey, 1990). Play is ambiguous (Sutton-Smith, 1997). Play is heuristic in nature, in that there are little or no fixed rules, and if there are rules, they are often very fluid. Play is driven by curiosity and discovery, exploration and experimentation, and communication and socialization (Elkind, 2008).

There is a correlation of creativity to these aspects of play. Creativity is a divergent-thinking activity (Guilford, 1968). Creativity is intrinsically motivated—the activity itself is its own reward—whereas work is usually an extrinsically motivated activity. If we can define task engagement for extrinsic reasons such as “work” and task engagements for intrinsic reasons such as “play,” it will be expected that states of highly creative activity will seem like play (Amabile, 1988). Creativity is immersive; Csikszentmihalyi (1997) has studied creativity extensively and describes it as a flow state in the creative process that requires just the right balance of challenge and opportunity. He compares this to play. Creativity is ambiguous; Vernon (1970) seemed to think that a tolerance for ambiguity was the most important trait for successful creative work. Creativity is heuristic in nature; it has no clear process and can be inhibited by rules and norms. Creativity is driven by curiosity, the desire to understand the “why.” Creativity is discovery. James (1907) described it as perceiving in an unhabitual way. Creativity is exploration and experimentation. “The ability to relate and to connect, sometimes in odd yet striking fashion, lies at the very heart of any creative use of the mind” (Seidel, 2015). Koestler (1964) added that creativity “is the ability to make combinations of previously unrelated structures.” Creativity offers opportunities to explore and experiment and to fail with no repercussions. Communication and socialization or collaboration drives creativity because innovation always emerges from a series of sparks—rarely a single flash of insight (Sawyer, 2007).

What emerges from these comparisons is the difference between play and being playful. Play is an activity; playfulness is a mindset. What we are trying to instill in our students is a playful mindset because a playfully light attitude is typical of creative individuals (Csikszentmihalyi, 1996).

In trying to understand creativity, we have tried to understand play—how creativity and play are connected. As an example of these efforts, we turn to a student senior thesis project that focused on play. Outlined here is that student’s research and discovery about play.

4. Senior thesis project on play

4.1. Research and observation

The student began the study by seeking to understand the role and value of play in the lives of children. A literature search on the topic was conducted and reviewed. Interviews with various educators in the School of Family Life at Brigham Young University and elsewhere were conducted. Discussions with parents and
children in regard to play were also completed. In addition, simple observations were conducted to see how children played in playgrounds, homes, and schools. The consensus of the literature, interviews, and discussions indicated that opportunities for free play have diminished over the last few decades (Gray, 2011), and a variety of unfortunate consequences have ensued (Ginsburg, 2007). Free play is a means by which children learn social skills, overcome fears, solve problems, and take control of their lives (Gray, 2013). These positive aspects of a child’s life are curtailed because of lack of freedom to play, and these aspects are taught best through play. Can opportunities for more free play be created in this environment of fear for the safety of children?

4.2. Playthings
The initial approach was to provide a plaything that would enable children to experience unstructured play. The exploration included a variety of game-driven toys. Yet, it quickly became apparent that games add structure to play and therefore reduce the positive traits associated with unstructured play, such as curiosity, discovery, exploration, initiative, responsibility, and creativity.

Several articles share how fundamental the toy block has been through the centuries in helping to promote child-led play (Cartwright, 1988). Small blocks easily put the child in charge, as he or she can have complete control over the toys (Frost, 1989). The focus of the student’s study turned to creating a block that would not be rules-driven like a game but open-ended. Several block varieties were prototyped, including blocks with offset centers of gravity, puzzle-like blocks with interesting combinations, and block accessories (Figure 1).

Upon further investigation, however, it became apparent that the market was saturated with blocks and other similar toys. Homes are already full of a variety of blocks and toys that do spur creativity in children. The insight was in the connection of the playthings and the play environment (Best, 1998).

4.3. Play environment
One possible reason that unstructured play is lacking in the home is that the home itself is not an environment that fosters child-led play. Environmental design addresses this issue and offers a number of applications that guide children to unstructured play more naturally (Frost, 1989).
Unlike small toys such as blocks, environments are harder for children to control. But rather than stifling play, environments allow children to become the plaything. They can run, jump, and climb through the spaces and enjoy the physical sensations associated with physical movement. Environments can also enable “rough and tumble” activity, which is a key element to balanced play (Gray, 2011).

Playgrounds offer a number of environmental solutions, and their history and development show how our understanding of open play has changed. Although children have access to play spaces at schools, parks, and playgrounds, studies show that children are spending increasing amounts of time in the home. Yet, most homes are not able to undergo renovations to add an entire space devoted to play.

4.4. Play tools
The solution needs to be a play tool that allows children to transform whatever environment they are currently in to a space that allows more opportunities for unstructured play. Children already have innate senses of creativity and wonder as they explore the world around them. In the hands of a child, a play tool can combine the strengths of a play accessory and an environment.

The first steps were to research and observe ways that items in the home already offer such a solution. The living-room blanket fort is an excellent example of this type of play. Children are able to turn an ordinary room into a creative environment by collecting couch cushions and blankets and building their own play environment. Unfortunately, blanket forts only provide a temporary environment as the parents eventually need to put the room back into order.

4.5. Solution
An interesting solution emerged while combining some of the more intriguing forms from the earlier block explorations with the understanding of play environments. Oversized blocks promoted open play while also changing the environment. With a large block, a child uses more than his or her hands to play.

While observing the children play, the student noted that one particular block set seemed to be more popular than the others. It was made from two unique block forms that changed the way the blocks could be stacked and assembled. When a variety of sizes were produced, the children began to make walls to hide behind or platforms to use other toys on. Because the angled blocks stacked differently than normal square blocks, the children continued to use them in creative ways long after their initial encounter with them.

When small versions of this block were presented to children, they started by building structures and learning how the blocks worked. Eventually the play turned to more imaginative games, where the children played-acted stories in the miniature block landscape. The boys often began throwing the blocks at the towers they had built, and then they began to build fortresses for themselves.

In order to promote rough-and-tumble play, large versions of the blocks were made with dense foam cores to support the weight of a child. The cores were then covered with padding and soft, durable fabric for better comfort and safety. The fabric also added an element of friction between blocks, allowing children to build arches and tilted towers. The blocks were named “Kilter.”

The Kilter blocks become integrated with the environment by becoming usable pieces of furniture. Block furniture always stays out in a room, allowing the child free access and charge over his or her play. The odd forms force even parents to experiment to understand the opportunities for play rather than telling the child how to use them properly. The blocks are also non-representative to allow the child to use his or her
imagination to put them to use rather than relying on prescribed function. Also, as furniture, the blocks can be integrated into the daily life of a child, whether he or she is sitting to play videogames, reading a book, or talking with others.

4.6. Validation
In this study, the student observed a number of children playing with the Kilter blocks. In most cases, the children began with rough-and-tumble play by balancing on the blocks or stacking them and climbing around them. The next stage became more creative as the children tried to see what structures they could produce with the odd forms. They used teamwork to share the limited number of blocks. Some children even assigned certain blocks to everyone, leaving the remaining ones as communal extras. Eventually, the blocks became the stages for their other toys as they pulled out action figures to play on the blocks.

The blocks were shown at two public venues, where they were warmly received by all the children who happened to see them. At one point, there were more children than blocks, and yet they were all finding ways to play. They began to use the blocks in more ways than any of the adults had imagined, and they enjoyed showing their parents what they could do. Some parents even joined their children by reclining on the block furniture while the children played around them (Figure 2).

![Children playing on Kilter blocks](image)

Fig. 2. Children playing on Kilter blocks

4.7. Conclusion
The term used in the industry for the success of a toy is “play value.” The term is frequently employed in the field of child development for the assessment of toys. When they are fun and engaging, playthings and spaces are said to have play value; those that are quickly discarded or are considered uninteresting do not. In short, objects of play must be compelling and must encourage the child’s involvement in order to have true play value (Newstead, 2004). Based on the positive results from the study, Kilter blocks have play value.

There are several avenues of further exploration. These include making further revisions and refinements to the blocks themselves, seeking a means of production, and exploring other “play tool” concepts.

Ideas for further revisions arose while observing children play with the blocks and overhearing their comments as they played. For example, with a set of eight blocks, a group of children divided them evenly...
and shared the extras while voicing their wish to have more. Perhaps a number of smaller blocks could be included with the set to expand the opportunities for group open play. The student also observed that children liked to stand on the teetering blocks and often fell unexpectedly. By reducing the density of the foam cores so that children would compress the blocks when standing on them, the blocks would be less likely to cause injury.

The interest in the blocks has lead to discussion on making them available to the public. A number of home- and office-furnishing designers and retailers have shown interest in the blocks and have encouraged production. With the simplicity of construction, a number of options are available, including crowdfunding a product launch or seeking a licensing retailer such as IKEA.

Further explorations may still identify other opportunities for unstructured play with children. Adults also benefit from unstructured play and may appreciate a “play tool” as much as children do. After sharing the Kilter blocks with several office designers, the designers explained that similar solutions are becoming popular in the workplace. Kilter blocks address children in the home, but there are many other environments and people that could also benefit from similar solutions.

5. Discussion

The department of design is trying to understand the relationship between creativity and play. Can play be a tool in understanding and continuing to develop creativity course curriculum, content, and delivery methods? Can a playful attitude be developed in students that will help motivate them and encourage them to uncover the power of curiosity and discovery? Can a playful environment increase socialization, cooperation, and collaboration between students? Can a playful approach foster more energy and fulfillment in their work efforts? This research will not have a big impact on the larger educational system or paradigms, but it can have the power to change the department of design and its approach to creativity in classrooms. Department of design can help students across our campus to unlearn some of the non-creative behaviors they have been taught. This is important because creativity is a mindset for our day and can help find innovative solutions to some of the world’s most intractable problems.

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Culturally Responsive Teaching Practices for Asian Art and Culture

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Abstract

This presentation explores the theory and practice of teaching Asian art and culture based on a culturally responsive pedagogical perspective. According to Gay (2018), culturally responsive teaching strategies are critical and worthy pursuits. To effectively teach diverse students in U.S. public schools, various educational research methodologies and practices that are distinct from those employed in multicultural education have been formulated. The topics of culturally responsive teaching (Lee, 2012; Gay, 2002, 2018) and culturally compatible and relevant pedagogy (Andrus, 2001; Aronson & Laughter, 2016; Brown-Jeffy & Cooper, 2011; Sleeter, 2012) have emerged in academic literature. In this presentation, various discourses and teaching practices on culturally responsive Asian art and culture are introduced.

The presenters will also examine some distinctive patterns of cultural appropriations (Han, 2018) often found in Asian art curricula. For example, teaching about Japanese pans and Chinese lanterns would be challenging without concurrently delivering misconceptions about Asian art and culture. Hence, we discuss the concepts and benchmarks of cultural appropriation in K-12 classrooms and pre-service teacher education. The presentation will focus on the following three themes: 1) theory and practice of teaching Asian art and culture through a culturally responsive pedagogical perspective; 2) patterns of cultural appropriation and differentiated ideas; and 3) culturally responsive lesson ideas and tips. Introducing Asian artists
and their artwork through exemplary classroom activities will facilitate meaningful teaching and learning experiences in exploring Asian art and culture.

References


Exploring Contemporary Chinese Artists in K-12 Classrooms

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Abstract

This presentation highlights ideas, methodologies, practices, voices, and styles of teaching about contemporary Chinese art and artists. We carefully chose three different art forms—ceramics, new media, and installation art—because they have significantly influenced the international visual art field for decades. The artists we selected create art by experimenting and exploring the relationship between historical knowledge and contemporary agendas in making art. The teaching and learning episodes underrepresented with insufficient instructional resources about Chinese art and culture might cause misrepresentations of Chinese art within American art classrooms (Shin, et al., 2017), as well as rapidly generate stereotypical notions of Asian art and culture, such as Chinese lanterns or Japanese fans. On the other hand, students will benefit from an inclusive educational experience when art educators encourage students to explore various cultural artifacts that convey historical narratives and principles. The students can deconstruct common stereotypes and reconstruct personal meanings by examining and interpreting artworks from other cultures. Teaching and learning about artists from different cultures can help teachers and students expand their global perspectives and understand international trends (Manifold, et al., 2016; Young, 2011).

Why is teaching contemporary Chinese art especially relevant in the American classroom? As we struggle to address our challenges as a global community, learning about underrepresented art and artists from Asian countries can create tremendous value in art
education classrooms. Noticeable modern Chinese artists have contributed to various international art scenes for decades. Furthermore, contemporary Chinese art has already demonstrated its potential to communicate and engage with global audiences (Chung, 2012; Marshall, 2010). This presentation will introduce six contemporary Chinese artists and their artworks. The deconstruction and reconstruction method in their artmaking process becomes a vital tool for the lesson activities. Describing three lesson segments, the central focus for student learning, the essential question for studio prompt, and guiding questions for class discussion will provided in this presentation to help art teachers develop vibrant learning activities to broaden students’ cultural horizons.

The first segment of the presentation features two ceramic artists: Ming Bai [白明] (1965- ) and Hongyu Tan [譚紅宇] (1971- ). They create ceramic vessels and clay sculptures, exploring historical and artistic connotations through traditional techniques and modern perspectives. The second segment highlights two young media artists in the current Chinese art scene: Xiaoyi Chen [陳蕭伊] (1992- ) and Ying Miao [苗穎] (1985- ). Through their utilization of digital art, video, and photography, they seek to deepen our understanding of the world we now inhabit. Chen & Ying’s artworks encourage us to reflect on our society and culture with a critical and artistic filter. The third segment focuses on two installation artists: Xu Bing [徐冰] (1955- ) and Wenda Gu [古文達] (1955- ). These artists used deconstruction and reconstruction methods to examine and amplify the process of meaning-making, juxtaposing traditional objects and modern spaces together. While conventional Chinese language is prevalent in much contemporary art, the appearance of the Chinese words and texts in Xu’s and Gu’s installation works becomes a considerable aspect of their creative performance, depicting culture, origin, sign, and identity.
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The Role of the Hidden Curriculum in Building the Personality of English Language Young Learners

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Abstract

The current paper aims to identify the role of the hidden curriculum in building the personality of young English language learners in Saudi Arabia. An informal shadow curriculum that exists alongside the official curricula in schools and colleges. The paper provides a theoretical and conceptual framework of the hidden curriculum including the concept, the characteristics, and the sources of the hidden curriculum. The paper also highlights the differences between implicit and hidden curriculum, the importance of the hidden curriculum in the primary stage, how to use hidden curriculum in building the personality of the primary school pupil from three aspects (the cognitive aspect, the behavioral aspect, the skill aspect). This theoretical review identifies some significant implications for pupils, teachers, and parents. Furthermore, one of the main goals of this paper is to discuss the importance of understanding the hidden curriculum and how it can assist school principals, English Language teachers, and parents to understand personal traits of young English language learners. The researcher revealed important results and recommendations regarding hidden curriculum.

Keywords: Hidden Curriculum-Young Learners

Introduction

In light of the tremendous acceleration and successive developments of technology, social media and electronic games, the burdens on the school have increased. What primary school pupils learn at school inevitably becomes not necessarily related to what is presented to them in the courses (the formal curriculum), but rather related to what they acquire in values and behaviors through the (hidden curriculum).

The hidden curriculum can be defined as the indelible message, and it is often a non-verbal message. The person takes this message from an event or experience. The message of the hidden curriculum may be unwritten, as the hidden curriculum can be considered as the transfer of educational experiences that teachers promote through their practices. Which are not necessarily written or intentional commitments (Al-Nouri, 2014).

The curriculum may be implicit or accidental and not intended or direct, as it is the kind that is received by pupils usually in implicit, indirect ways. The hidden curriculum may be positive, and this needs the teacher by example, which is what educators seek, such as ensuring time, hygiene, and others. It may be negative, and the pupil acquires bad habits and behaviors through it, such as smoking and profanity. In the current paper, the researcher deals with the role of the hidden curriculum in building the personality of the primary school pupil. Small (2020) defines the hidden curriculum as an unwritten, informal curriculum, usually unplanned lessons, and values and attitudes that pupils learn in school.

The concept of the hidden curriculum:
Philip Jackson in 1968 was the first to write about the hidden curriculum in his book, Life in Classrooms, to convey the idea that the school plays more roles than transferring knowledge from one generation to the next. As for the concept of the hidden curriculum, it has many names, some educators call it the hidden curriculum, while others call it implicit curriculum or informal curriculum. Actually, there is no agreement among educators on an accurate and unified definition of it, but there is an implicit agreement on the concept of the hidden curriculum.

The hidden curriculum is defined as: “the curriculum consisting of behavior, values, and meanings that are taught to pupils by the teacher or school without planning. It is also known as: “a set of concepts, mental processes, attitudes, values and behaviors that the learner acquires outside the written curriculum in an imbibed and unsupervised manner as a result of the learner’s interaction with his colleagues, teachers and principals in the school and through extra-curricular activities and by observation and example” (Stephen, 2014).

Educators believe that the hidden curriculum represents the values and attitudes that appear in activities, practices, and some aspects of behavior that pupils are exposed to within the school, which are not included in the academic curricula but are influenced by and acquired almost unconsciously. These activities and practices are represented in the direct guidance that pupils receive through teachers and principals or by imitating someone. And this also includes some other direct non-classroom activities, such as audio-visual tapes or focused lectures delivered by instructors from outside the school. Moreover, it could include school outdoor activities in which teachers are a party and pupils are a target, and thus the hidden curriculum may have a farther impact in changing the pupils' attitudes from the academic curriculum itself, the reason for this being the position or place of honor that the teacher deserves, so pupil receives these values and attitudes from him often without accountability, especially when the teacher is very convinced of a certain principle, and an active advocate of what he believes (Kafi, 2009).

**Characteristics of the Hidden Curriculum**

The hidden curriculum has a profound impact on pupils' performance, progress and attitudes. For example, pupils imitate what their teachers do. The effects of the hidden curriculum last longer for the pupil compared to the explicit curriculum:

- The hidden curriculum is made, confirmed and treated by pupils and school staff.
- The hidden curriculum of each school has unique characteristics from other schools.
- Changes in the hidden curriculum are slow and require great effort.
- The hidden curriculum has the nature of construction and destruction (Josh, 2016).

**Hidden Curriculum Sources:**

The sources of the hidden curriculum are identified as follows:

**1-School resources**

A- The teacher: English Language teacher is a main source of the hidden curriculum through its personal, scientific and professional characteristics, and the positive effects it leaves, such as honesty, discipline, and time-keeping, or negative effects on pupils, such as late entry to classes, absence, smoking, or hair styles.
B- The (formal) School Curriculum: The school curriculum in terms of its fulfillment of the different needs of pupils and its relevance to their age, interests and abilities.

C- Teaching methods: Methods in terms of their modernity, keeping up to date with the changes that have occurred in the curricula, stimulating them to think, and being appropriate to the level of pupils, the lecture method, for example, is not suitable for primary school pupils.

D- Teaching aids: Teaching aids in terms of their relevance to the subject and the levels of pupils, as well as the more sensible (in which more than one sense is used), the longer their impact will be on the pupils' memory. Information is easier retrieved when it is stored using a teaching aid.

E- Evaluation: Evaluation in terms of diversity, modern methods have appeared in evaluation called alternative evaluation, not based on tests only, but on projects, completion files, write-off lists, and others.

F- School environment: School environment in terms of the attractiveness of the school and the providing appropriate conditions for pupils' learning.

2-Non-school resources (community):
   It is represented in the social, cultural, economic and political factors and the role of the teacher in spreading those values in the hearts of young people (Al Farah, 2015). Examples include sermons, religious and cultural lectures, football players and other games in terms of their behavior such as haircuts and their lifestyle during their appearance in social media.

Differences between the Formal Curriculum and the Hidden Curriculum
   • There are differences between the formal curriculum and the hidden curriculum, which can be summarized as follows:
   • The formal curriculum is a planned curriculum, which is an intended approach, while the hidden curriculum is not intended.
   • The effect of the hidden curriculum on the pupil is a wider circle and more depth, and the formal is a narrower circle and less depth.
   • The results of the hidden curriculum spread faster than the formal curriculum. The results of the formal curriculum are mostly positive, while the hidden curriculum has positive and negative results.
   • The hidden curriculum is considered a fixed and changing aspect of school education, unlike the formal curriculum, and these aspects lead to a change in the behavior of pupils.
   • Young learners in the informal curriculum learn different types of collective learning, while they learn from the formal curriculum the intended facts and skills that educators pay attention to (Shouq, 2013).

The Importance of the Hidden curriculum in the Primary Stage:
   The hidden curriculum plays an important and main role in the educational process, which may far exceed what the official curriculum plays. The role of the hidden curriculum is manifested not only in what it provides to pupils of additional and enriching experiences in the cognitive
field, but also in what it provides them with multiple educational experiences of a religious and intellectual nature social, ethical and behavioral. The importance of the hidden curriculum in the educational process in the Arab world today is more evident now than ever before. The negative effects of globalization and its various challenges in the intellectual, economic, social, and technical fields, and the wide spread of social media require us to pay great attention to the hidden curriculum in our schools. We ought to employ it in an effective and clear manner, while not neglecting the formal efforts made by the Ministry of Education in the Kingdom of Saudi Arabia for the continuous development of the announced curricula that took into account that the pupil has become in a time that can be described as the obsolescence of the new and the convergence of the distant. This is said in addition to the Ministry’s interest in the hidden curriculum through the establishment of many projects and initiatives that would stand side by side with the official curriculum. Examples of these are Programs of Kindness, Rifq in Arabic (رَفْق) and E’rtqa in Arabic (ارتقا). Therefore, facing these challenges and negative effects of globalization on our children has become a concern for those interested in education. The importance of employing the hidden curriculum is also determined by the fact that it is concerned with the contemporary educational and educational demands of our children, the most prominent of which are, for example; developing their critical and creative thinking, enabling them to understand contemporary technology, and employing it to serve development trends in their societies. One of the means that helps the educator to apply the hidden curriculum in the classroom is to enhance the pupils' motivation to achieve the plans they seek to achieve (Al-Wakeel, 2011).

Alsubaie (2015) revealed that the hidden curriculum is an important curriculum in school because of its strong and effective influence on pupils. While it may be an issue for school staff, especially teachers who are not good at dealing with this type of curriculum in a positive way. Therefore, schools need to inform teachers about its importance and how to deal with it, provide them with required knowledge and skills to apply it, and draw their attention to the positive and negative impacts

**Promoting Hidden Curriculum**

In order to promote the role of the hidden curriculum in the primary stage, the following must be taken into account:

- English Language teacher should be a good example and represents positive values and behaviors.
- The importance of good preparation for English Language teacher, scientifically and culturally, through pre-service teacher preparation programs as well as in-service training courses.
- The importance of school leadership in following up on teachers and identifying their training needs, periodic meetings, workshops and professional communities for teachers.
- The importance of a pupil counseling to observe pupils’ behavior.
- This knowledge confirms the importance of preparing the teacher, who is a good example in behavior, interacting with the educational goals and the educational process.
• The great balance and harmony between curricula, with its objectives, content, activities, and evaluation in one hand and the environment and the needs of society on the other hand.

• School buildings and their equipment should be in an appropriate condition, and that this should be of a similar level between one school and another.

• The positive and friendly interaction between teachers and pupils, and between teachers and parents, to learn about the social and environmental conditions of pupils, and to cooperate in solving problems.

• The interest in values and education on critical thinking skills is more important than in deciding the content.

• Educators and experts differentiate between the stress of the educational administration and the stress of parents on the one hand, and the recognition of the reality of the required educational development.

• To take the opinions of elite educators when planning curricula (Georges, 2014).

How to Use the hidden Curriculum in Building the Personality of the Primary School pupils:

First: the Cognitive Aspect:

This is done through implementing the hidden curriculum within the school framework. We can find the hidden curriculum in what pupils learn from the nature of the relationship between the school principal and teachers, the way teachers deal with pupils, the teachers’ relationship with each other, the arrangement of classes, the type of furniture and its placement in the school, and teachers’ scientific conversations. The cultural, social, and educational time distribution, and the regulations, rules, and instructions that apply to them.

It is possible to identify some aspects that represent the hidden curriculum in the school environment, including:

• The personal behavior of the English Language teacher, and his relationship with the pupils, and also with the school principals and other teachers, the pupil learns from the way the teacher deals with him a lot of behavior patterns. He may learn to respect and appreciate others if the teacher treats him with respect and appreciation, and he may learn to laugh at others and not appreciate them if the teacher treats him with sarcasm and contempt.

• Pupils will not respect time and come late to class if the English Language teacher is not committed to entering the class on time.

• Some English Language teachers insult their principal and this behavior gives the pupils negative attitudes toward teachers and schools. These teachers think that this would enhance the strength of their personalities, but it may be a hidden message to pupils that they do not abide by the laws and do not care about the relationship with colleagues and officials.
• Teachers’ indulgence in pupils not following up on assignments or correction gives a bad impression about their teachers and sends a passive message to pupils.

• Pupils acquire negative values, including disrespecting the opinions of others and interrupting them, which is acquired by the teacher if he interrupts them and does not leave them free to express their opinions or needs. On the other hand, he may learn to listen and respect the opinions of others if the teacher listens to his pupils and give them chances to express their thoughts and opinions. The teacher is like a mirror.

• Unqualified English Language teachers suffer from this weakness and may change pupils attitudes to negative towards them and towards the course, as well as the way the written curricula deal with some issues may be weak or follow one method in the solution, leading to molding the pupil on a specific way and from here the importance of the teacher appears well qualified.

• The school schedule in distributing lessons by placing certain courses at the end of the school day, as well as failure to apply violations and punishment.

• The school building with its mosque, playgrounds, laboratories, library, ventilation, comfortable seats, a suitable size for the classroom and the number of pupils in it, computers, lecture halls and activities.

• The activities that the pupil participates in at school teach him self-confidence, cooperation, love of work, and time management according to the nature of the activity and the role the pupil plays in it.

• The relationship between the pupil and his colleagues, his interaction with them, and what he can learn from them through imitation or influence and persuasion. The pupil may learn from his classmates good and positive habits such as cleanliness, love of learning, honesty and respect for others (Al-Khouli, 2016).

Second, the behavioral aspect:

This is done by using the hidden curriculum within the framework of the family, as the family is the first group in which the child lives and feels belonging to it, and he learns how to deal with others to satisfy his needs. Developing and unifying the community and regulating the behavior of individuals in line with the specific social roles in accordance with the general civilized pattern. Teaching the child good manners, morals, and habits is the responsibility of the parents and not the responsibility of the school alone.

The social interaction in the family, the relationships between its members, and the daily life in which the child learns many behaviors and experiences that the individual may not learn except in the vicinity of his family. (Gahwan, 2012).

The family can influence the child's behavior through the following:

• Parents’ commitment to good example. The pupil acquires good habits and morals, such as honesty and trust, performing prayers and charity through his influence on the parents and the extent of their adherence to the teachings of religion. He may learn through example the opposite, so he learns to lie. Our Islamic religion has spread throughout the world through the good example that he used to have by Muslim merchants.
A child can learn aggressive behavior, anger, violence, and cruelty if the parents treat him with cruelty and persecution.

If the parents coddles their children excessively, this may result in idleness, lack of discipline in behavior and the inability to take responsibility for the children.

Inequality between children and differentiation between them may make the child's personality hateful and selfish.

A child may acquire the habit of smoking if one or both parents smoke.

Neglecting the child and not paying attention to his positive or negative behaviors creates an anxious, hesitant, confused personality (Al-Murtadha, 2013).

**Third: the Skill Aspects:**

This aspect is achieved by a group of peers or colleagues, as the pupil needs to form a group that is often of the same age as his friends and peers and compares himself with them. The pupil with peers enters into new experiences that differ from what appeared within the narrow family boundaries, as the peer community is characterized by expansion. Through imitating and imitating peers, the individual learns a lot of behaviors and acquires many directions, the most important of which are the following:

- Pupil learns by imitating his peers a lot of positive morals and behaviors such as: honesty, honesty and commitment to religion, if he engages in a peer group characterized by these good traits.
- Pupil also acquires bad habits such as cheating, drug abuse, smoking, lying and theft.
- Here comes the role of the family and the school curriculum in teaching children the proper way to choose their friends and to teach them how to discuss their own issues objectively and abstractly, characterized by freedom in expressing opinion and decision-making, and how to follow the right directions and show good morals, and provide them with love and affection, as this reduces the negative influence of the peer group. (Younis, 2010).

- The role of English Language supervisor in guiding the teacher towards observing the hidden curriculum:

  - English Language supervisor, through his observations or through his continuous communication with the teacher, must confirm to the teacher that there are unintended experiences accompanying the formal curriculum that pupils may go through, so he must bear in mind that these experiences, despite being unintended, are important and essential. It deserves all the attention. The teacher must allocate time for unintended experiences (experiences of the hidden curriculum), which are not restricted and not specific.
  - Thus, the tools that the teacher prepares must include data about other things or phenomena that are not discussed in the lesson, but are related to it, and ask pupils to activities to develop those experiences such as research, exploration, investigation, and collaborative work. It is necessary for the educational supervisor to direct the teacher towards taking into account the cognitive experiences of the pupils. Pupils may ask their
teacher in something other than the teacher’s specialty, which makes him in a critical situation. Here the teacher must be encyclopedic as much as possible, at least in relation to the subject of his lesson and the matters that he is expected to inquire about the pupils, from here the idea of team education emerged (Al-Laqani, 2011).

**The Role of the Hidden Curriculum in Developing the Values:**

The hidden curriculum is an image of the common values in society, and this means that the school is not a place for purely academic education, but rather a place for transmitting values to pupils.

Thus, it is an effective and essential element in providing the pupil with different values, both negative and positive, as he presents these values in an implicit and non-explicit manner through the school pupil’s interaction with his peers and the teacher. And in addition to this, it provides other noble values, as it plays a prominent role in providing pupils with a set of skills and positive attitudes that enable them to interact socially and have a positive and negative impact on their psychological health (Rafael, 2012).

The hidden curriculum supports the values and meanings through which individuals continue their whole lives in all economic and social aspects. But the other side of the hidden curriculum is reflected in the pupil’s acquisition of contradictory values, which causes him to have an internal conflict to differ in saying from action through daily situations, and this has been confirmed by many studies in education, where I concluded that the hidden curriculum produces the following personalities for society: riotous, aggressive, and the transcendent, the plaintiff, and the weak personality.

There are many negative values that the pupil can acquire through the hidden curriculum including but not limited to the value of procrastination or postponement, which is a negative value that the pupil acquires from school as a result of his long wait for his role in school. Another disadvantage could be disvaluing time people’s opinion. This is a negative value that the pupil acquires when he is surprised by the daily schedule. Furthermore, there may be the value of confrontation and conflict, which is a negative value that the pupil acquires from placing seats in the classroom (Fayyad, 2010).

It is essential that the English Language teachers should pay attention to the following:

- Building a system of positive values to work on imparting them to his pupils by employing the hidden curriculum.
- Draw teachers’ attention to their words, behaviors and thoughts produce a set of hidden experiences that may affect pupils either positively or negatively (Kafi, 2009).
- Sayer (2019) in his study that entitled “The hidden curriculum of work in English language education” revealed the following result: learning and teaching English is affected by several factors, including social and economic class, and this prepares the pupil with certain types of skills and attitudes that correspond to their class status and reveals the hidden curriculum in early English language teaching.

**The Hidden Curriculum Experiences in Learning and Teaching**
Based on the nature of the hidden curriculum experiences, especially in terms of the inability to predict or plan for them, the teacher needs several requirements to help him/her deal with his pupils within the framework of the experiences of this curriculum, and they are as follows:

- School leadership aware of the nature of the relationship between the formal curriculum and the hidden curriculum.
  - Awareness of teachers and supervisors of the importance of providing sufficient opportunity for pupils to interact with the experiences of the hidden curriculum.
- The availability of different learning resources and the ability of the teacher and pupils to deal with them.
  - Directing classroom and non-classroom activities so that pupils go through many experiences within the framework of the hidden curriculum.
  - The teacher was able to build appropriate assessment tools in order to evaluate the learning outcomes of the accompanying experiences in a timely manner (Al-Nouri, 2014).
- The process of measuring the learning outcomes of any experiences, whether they are the experiences of a formal curriculum or the experiences of a hidden curriculum, is linked to the evaluation process, which must meet all the conditions of scientific evaluation. Since the experiences of the hidden method are not visible or unknown and cannot be predicted with a high degree of truthfulness. The teacher must have sufficient experience and training to be able to build appropriate assessment tools for the hidden curriculum experiences, whether they are tests, cards, interviews, observation, and other tools, and use them at the appropriate time (Fayyad, 2010).

**The Advantages and Risks of the Hidden Curriculum in the Primary Stage:**
The primary school stage may be most significant in pupils learning; particularly English learners, the role of hidden curriculum becomes detrimental. There may diverse positive and negative effects.

First: The advantages of the hidden curriculum:
- Facilitates the work of the educational system and helps to establish the system, and through it develops the attitudes and values advocated by the community.
- Contributes to the achievement of moral education for learners through the good establishment of the community of companions or adults, as good example and unintended observation are the best methods of learning in the hidden curriculum, and hence the importance of the role of the teacher as a good role model for his pupils in all aspects of personality.

Pupils learn many positive behaviors that may not be part of the formal curriculum, such as respecting regulations, respecting time, maintaining public property, and social skills through the hidden curriculum.
The hidden curriculum allows most members of society to benefit from it and to increase adherence to faith, values and principles, especially in light of circumstances that prevent the nation's children from being informed of the official curriculum.

The learner gains social and familiarity by being in school.

The learner gains respect for regulations, laws and instructions, the preservation of public property, how to build relationships with others (Al-Murtadha, 2013).

Second: The Risks of the hidden curriculum:

Killing creativity among learners, for example, unqualified teachers, which leads him to literally transfer the book and teach it to pupils, and this work affect the personalities of pupils, so they do not know how to deal with their teachers.

It generalizes the attitudes and values of the middle class, and does not take into account the low class learners who cannot compete with their rich colleagues in obtaining certain clothes and tools. It may also hinder the role of the official curriculum and thwart its orientations if coordination and integration between them is not achieved at the required level.

Falsifying the awareness of pupils and highlighting the conflict between what is included in the official curriculum, and what the pupil learns or is intended to learn in daily life. For example, a pupil who learns through the official curriculum that smoking is harmful to health and sees a teacher smoking and declares that when he leaves school, has a conflict between what he finds in the official curriculum and the reality that he sees.

Expressing frustrating statements to the pupils. Such a pupil does not understand, is stupid, or is impossible to learn.

The hidden curriculum sometimes identifies the restrictions imposed on the behavior of pupils in the classroom, which may be an obstacle to learning (Al Farah, 2015).

How to Adjust the Hidden Curriculum and Reduce its Negative Effects on the Primary School Pupils:

The problem of directing the hidden curriculum, controlling it, and limiting its negative effects on young people is a task that is not easy for educators. Whatever it may be, the need for continuous supervision and guidance of children is urgent, and attention to their interests, desires and needs. This may be achieved through meaningful and deliberate cooperation and coordination between the school and its local community.

Wrong behaviors, deviant ideas and false information are not learned by the pupil knowingly and knowledgeably from the school, but are often through the hidden curriculum. Whereas the announced official curriculum is subject to planning, and its content is consistent with the higher goals sought by the school, and it is also subject to supervision and follow-up by the teacher, school administration and educational supervision. Therefore, the results achieved by the formal curriculum are guaranteed results that serve the lofty purposes of education. As for the hidden curriculum, if it is far from supervision, follow-up and control, the pupils acquire through it undesirable behaviors, concepts and values, which contribute to the formation of his personality patterns and thus are reflected on his behavior inside and outside the school (Al-Khouli, 2016).
In order for the two formal and hidden curriculum to play their roles, the following precautions and procedures should be taken in consideration:

- Encourage the pupils’ religious values based on piety and adherence to the principles acquiring from the Islamic faith and the etiquette and attitudes it motivates. In addition to deepening the concept of moderation for them to enable them to understand their religion in an integrated and balanced way and to form for them the criterion on the basis of which the pupil controls his behavior and actions and accepts or he rejects the values and ideas he receives through the hidden curriculum.
- Strengthening the will of pupils because the hidden curriculum is open and requires the right choice of everything that is presented to it, and the right choice requires a strong will.
- Prevention is better than cure, and trying to keep pupils away from practices that affect them and lead them to some unwanted behaviors, values or ideas, and this may not be possible in many cases, but if the pupils must be exposed to these situations, then there must be supervision and follow-up from some people whose abilities, morals and integrity are trusted by the school (Younis, 2010).
- Focusing during the hidden curriculum on the higher and advanced levels of thinking, such as analysis, evaluation, and judgment on things, so that the pupil, when exposed to the hidden curriculum, can evaluate and judge things, and then choose in wisdom way instead of focusing on memorization and remembrance, which are lower levels that accustom the pupil to accept things as they are and without critical thinking or conscious study.
- Focusing in the school on self-development skills, character building, enhancing self-confidence, accepting criticism and respecting others. These are the skills that our pupils can be trained on, developing their abilities and discovering themselves so that the pupil is able to deal positively with new situations that he is exposed to.
- Encouraging the spirit of moderation and demonstrating the importance of the right way and not regressing and retreating from it.
- Good selection of leaders in their different positions in all religious, civil and military affairs, and that these selected leaders be among those who are proven to represent the middle class, as indicated by the Holy Qur’an and the Prophet’s Sunnah (Qahwan, 2012).
- It is not allowed to exploit any feature of any kind in the consolidation or dissemination of values that deviate from the moderation defined by the Holy Qur’an and the Sunnah of the Prophet Mohammad, whether on pulpits, in teaching and learning halls, in literary and cultural clubs, in camps and the like, and this also applies to those who try to diminish the status of religion and the authentic culture associated with it. This can certainly is found helpful in the Arab world.
- The official and non-official educational institutions commit themselves to affirming national belonging and achieving national unity, and considering that any kind of treatment that constitutes discrimination is an attack on national unity.
- Working to launch applications and mechanisms for developing scientific thinking skills and creative and critical issues in various formal and informal educational practices in an effort to
strengthen social thinking, get rid of traditional ideas in dialogue, discussion and presentation, and reduce the characteristic of single opinion and authoritarian education (Kafi, 2009).

**Conclusion:**

The researcher reached the following results:

- Teachers, school principals and all school staff must be a good example in compliance with our example, our Prophet Muhammad, peace be upon him.
- The school, with all its teachers and affiliates, has the greatest impact on the pupils more than the home and the community.
- The hidden curriculum plays a major role in the development of group work.
- The hidden curriculum is not isolated from anything in the school, nor from the rest of the curricula types and their classifications with their many aspects.
- One of the priorities on which the hidden curriculum focuses is to help the school so that its purpose is to help the learners, to be active members of society.

Balucanag (2017) concluded that the hidden curriculum helps learners acquire values, attitudes and knowledge more than we imagine compared to the formal curriculum and is considered important in learning languages, including English, because learners acquire skills during exposure to the hidden curriculum. Also, they realize that the values, attitudes and skills they practice are the result of an unintended goal when they are exposed to the hidden curriculum.

**The Recommendations of the Current Paper:**

**In the light of the results, the researcher recommended the following:**

- Studying and understanding the characteristics of the primary stage by all English Language teachers, principals and English Language supervisor in order to be taken into consideration when dealing with them.
- Asking pupils to take their opinions into account and discuss them and to develop their critical thinking.
- Training English Language teachers and all school staff to make them aware of the positive and negative of the hidden curriculum.
- Carrying out workshops and periodic meetings inside the school to identify positive behaviors to enhance them and negative behaviors to treat them.
References


ART + STEAM INTEGRATION: SCIENCE EXPERIMENT ART

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ABSTRACT

STEAM education is a significant challenge for many educators, starting the breakdown of traditionally independent disciplines and bringing new convergent curricula into K-16 classrooms. The National Art Education Association (NAEA, 2022) presents its position on STEAM education that it believes:

- STEAM education values all STEAM disciplines equally.
- STEAM education is implemented through a wide variety of approaches.
- STEAM education encourages creativity and innovation.
- STEAM education acknowledges the rigor found in visual art.

The NAEA argues that students must be proficient in visual thinking and creative problem-solving to be successful in STEAM fields. Today the US government recognizes the role that the arts can play to elevate STEM education. The formal first lady Michele Obama said, “learning through the arts reinforces critical academic skills in reading, language arts, and math, and provides students with the skills to creatively solve problems” (Chang & Lee, 2019, p. 43). By integrating arts in STEM fields, lessons are more interesting and meaningful both to teachers and students and plenty of opportunities for students to enhance the global 21st-century skills.
A growing number of advocates argue that the arts can provide opportunities for students to develop the global 21st-century skills – critical thinking, problem-solving, communication, collaboration, and creativity – that will be needed by every student in real life to survive successfully in increasingly complex media and the technologically driven world (Partnership for 21st Century Skills, 2015). Many mathematicians, scientists, and engineers also believe that the arts have the ability 1) to draw curiosity; 2) observe and express accurately; 3) perceive an object differently; 4) express emotions and construct meaning personally; and 5) work with others or alone effectively (Sousa & Pilecki, 2013). Renaissance artists Leonardo da Vinci and Michelangelo Buonarroti are good examples to show no boundaries between the arts and STEM because they are artists, inventors, engineers, and scientists. In other words, the artists’ geniuses are the product of STEAM education, not just art education. STEAM education aims to foster the true innovation that comes with combining the mind of a scientist or technologist with that of an artist or designer.

This presentation will share the learning experience from the Art Museum’s workshop, called “Fostering STEAM: Professional Development in Art + STEAM Integration.” We believe the arts can open new ways of teaching, learning, and thinking in STEAM education so art educators should have to determine the effectiveness of STEAM convergence arts education in the field of art education. Many of the research findings show that arts education should not only be for those students who want to be artists because the arts 1) develop cognitive growth; 2) improve long-term retention of content; 3) introduce novelty – something different and unusual activities; 4) reduce stress; and 5) advance social growth (Sousa & Pilecki, 2013). Simply, learning the arts can also have on learning other subjects, such as STEM. Thus, if teachers are aware of how arts and STEM learning intersect and support each other, they can use STEM
concepts to enhance learning in the arts and/or integrate arts-related skills/activities in STEM lessons.

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Fostering a Critical Mindset in Leadership Studies  
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Abstract

It can be argued that leadership development knowledge produced in textbooks and other forms of media, does not contain neutral value free knowledge but rather perspectives formed at different times through political, economic, and social negotiations, struggles, and compromises. Studies have shown that deeply held beliefs and worldviews are reproduced in leadership curriculum. Conventional leadership theories and practices may be accepted as truths. Giacalone and Promislo (2019) refer to this as the “Menace of Misinformation” in management education. Considering what might be wrong with established ideas and beliefs, including our own requires a critical mindset.

Critical thinking, critical reflection, and critical hope as three practices that aid educators and students in developing a critical way of thinking. Engaging in these critical perspectives involves questioning how we see the world, revealing social issues and inequities, and engaging in work for social change. A critical mindset is a ‘critical’ yet ‘hopeful’ disposition that allows us to empathetically critique underlying perspectives, biases, and assumptions in social life that keep us from fully understanding the complex world we live in.

In this session, I introduce a learning activity that stimulates participants critical thinking, critical reflection, and critical hope. The aim of the class exercise is to contemplate critical hope. This activity begins with viewing the United Nations Global Broadcast ‘Nations United: Urgent Solutions to Urgent Times’ (https://www.youtube.com/watch?v=xVWHuJOMaEk) followed by a
discussion on today’s context of recurring crisis’s, coronavirus, geopolitical tensions, climate changes, social inequities and more. Definitions and examples of critical hope are provided, distinguishing between weaker and stronger senses of critical hope.

Participants then individually reflect on their own self-narratives of hope. Questions that guide their reflection include, what are you hoping for and how do you express hope? Participants are asked to consider their weaker and stronger forms of critical hope. Personal narratives of hope are then discussed in small groups. Questions that guide the small group discussion include, how do you experience critical hope, what values or emotions are eroding your critical hope, what values or emotions are building your critical hope and how can you nurture critical hope in yourself and others? The session concludes with a class discussion on participants experiences of critical hope.

Sources


An Individualized Mentored Course to Supplement a Graduate Scientific Communications Course

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Abstract
TPSS 654 Communications in the Sciences is a required graduate course in the Tropical Plant & Soil Sciences (TPSS) Department. It covers oral and written communication formats including scientific journal article, thesis/dissertation proposal, scientific poster, layperson talk, and three-minute thesis talk. It has been taught in person over the years, but was taught online (virtually) in the fall semester, 2021. With 18 students, I found it difficult to give adequate feedback and critique on each student’s eight assignments. To meet this challenge, I developed a new course which emphasized one-to-one mentoring and instruction with each student.

TPSS 711 Special Topics is a graduate course covering “Specialized topics from various areas of plant and soil research such as experimental techniques, growth regulation, morphogenesis, genetics and breeding, culture and nutrition of tropical crops”. In consultation with the instructor, each student decided on several individual projects they wanted to work on during the semester. The student indicated what specific feedback they were looking for. I provided assistance with each project.

The objective was to develop a new course TPSS 711 Special Topics “Scientific Communications” which enabled individual instruction and mentoring of students on their own personal projects.

I. Introduction
TPSS 654 Communications in the Sciences is a required graduate course in the Tropical Plant & Soil Sciences (TPSS) Department (TPSS 654, 2023). It covers oral and written communication formats including scientific journal article, thesis/dissertation proposal, scientific poster, layperson talk, and three-minute thesis talk (Figure 1). The course has a two-hour lecture/discussion session once a week. I used the flipped classroom approach with small group discussions.

It has been taught in person over the years, but was taught online (virtually) in the fall semester, 2021 (Figure 2). The Fall 2021 class had three PhD, 13 MS, and two unclassified students, one of which was an extension agent (Figure 3). Majors included 14 TPSS and two Entomology students. Six students were new students.
With 18 students, I found it difficult to give adequate feedback and critique on each student’s eight assignments. As a result, in Fall 2022, I developed a TPSS 711 course in which I mentored each student individually on two or three projects during the semester.

TPSS 711 *Special Topics* is a graduate course “Specialized topics from various areas of plant and soil research such as experimental techniques, growth regulation, morphogenesis, genetics and breeding, culture and nutrition of tropical crops. A-F only. Pre: consent.” (TPSS 711, 2023).

**Objective.** The objective of this paper is to describe a newly developed course TPSS 711 *Special Topics* “Scientific Communications” which enabled individual instruction and mentoring of students on their own personal projects.

### II. Procedure

In Fall 2021, TPSS 711 was a hands-on practicum course on scientific communications. It involved individualized personal instruction and mentoring from the instructor. Each student met and worked individually with the instructor on several of their own projects of their choice (Figure 4). TPSS 711 was an advanced course beyond TPSS 654 *Communications in the Sciences*, but TPSS 654 was not a prerequisite for the course. Course format was in-person or virtual.

**Course Objectives:** By the end of the course, students should:

1. Be able to critically evaluate their written and/or oral projects.
2. Be aware of audience psychology and addressing the needs and expectations of audiences.
3. Further their skills in writing, presenting, and evaluating different forms of scientific communication.

This course used a variety of teaching techniques. Primarily, it was individual meetings with the instructor to discuss personal projects, goals for each project, problems encountered, and possible solutions. This was a **Bring Your Own Device (BYOD)** course so students brought their laptop, tablet, and/or smartphone to the meetings with the instructor. There were readings from handouts, articles, videos, and websites to explain and provide additional information regarding the students’ projects and the discussions with the instructor.

In consultation with the instructor, each student decided on several individual projects they wanted to work on during the semester. Each student indicated what specific feedback they were looking for. The instructor provided individualized assistance with each project.

### III. Results

**Instructor’s Perspective.** Having this course be TBA (to be announced) regarding meeting dates and times allowed tailoring the course for each student’s needs. Mutually decided meeting times
gave more flexibility for the instructor and student. Frequency of meetings depended on the instructor’s and student’s personal schedule, the project being worked on, and if the project had a due date. For example, if the project was due that semester or was a longer-term project with a future due date. One-to-one meetings enabled more detailed personal instruction and sharing of personal experiences that was not possible in the larger TPSS 654 online course with 18 students. Students were more motivated when working on their own personal projects that they were highly interested in.

*Student’s Perspective.* As a graduate student in the sciences, the importance of how to present and communicate one’s research is of the upmost importance. These skills are not always taught in higher education which makes a course that discusses these topics necessary for developing a career as a researcher. Furthermore, it can be difficult to find enough one-to-one time with professors and advisors to discuss progress and ask questions about current projects. This course would allow for these one-to-one consultations while also gaining the knowledge and skills that are necessary to be successful in graduate school and as a researcher in the sciences.

**IV. Conclusion**

*Instructor’s Perspective.* I found TPSS 711 provided a great opportunity for personalized instruction and sharing. It allowed me to share the many finer points and insights I have learned over years through studying and personal experiences with scientific communications. With the success of TPSS 711, I am offering the course in the Spring 2023 semester and have five students registered for the course. I plan to offer TPSS 711 every semester from now on.

*Student’s Perspective.* I believe this course will give me the time I need to discuss questions, concerns, and goals of my research. I see it as a valuable experience for graduate students looking to develop their skills as scientist and researchers.

**V. Literature Cited**


VI. Figures

**Figure 1.** In TPSS 654 in Fall 2021, Dr. Kauahi Perez was a guest speaker on scientific conferences including attendance, abstract, networking, and business cards.

**Figure 2.** Mason Russo, PhD student in the PEPS (Plant and Environmental Protection Sciences) Department attending TPSS 654 via Zoom.
Figure 3. A TPSS 654 student, Melelani Oshiro, an extension agent on the Big Island, provided valuable insights and tips through peer teaching.

Figure 4. John Steinhorst and I meeting virtually to discuss his TPSS 711 projects.
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Learning Menus and Student Choice

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Abstract

The burden of effectively meeting the wide range of educational, physical, and social-emotional needs of students while providing them access to a meaningful education has been placed upon classroom teachers and local education agencies. The purpose of this literature review study was aimed at measuring the effectiveness and social validity of learning menus as a student-centered strategy used within any educational setting. Although sources found primarily focused upon students with autism, the effectiveness of learning menus as a Universal Design for Learning (UDL) strategy was examined to determine whether it was socially valid within the context of a Multi-Tiered Support System (MTSS) intervention. A thematic analysis approach was taken when reviewing the educational sources found. A keyword analysis was completed using word clouds as a visual representation of main ideas within research articles. Repeating concepts were charted and compared to hypotheses proposed within this study.

Results indicated that learning menus are socially valid when used during teaching or interventions. Further recommendations for local education agencies is to utilize learning menus as a method of increasing opportunities for student choice and academic independence. Learning menus can increase special education code compliance while providing an appropriate and meaningful education to all students, especially students with unique learning needs.

Keywords: learning menus, choice boards, differentiated instruction, Universal Design for Learning (UDL), Multi-Tiered Support System (MTSS)
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Chapter I: Introduction

Learning menus and other Universal Design for Learning (UDL) strategies are effective for academic and social-emotional development when working with students with special needs because they are built upon student preferences and strengths. UDL allows all students academic access. Education is a dynamic continuum and pedagogy is continuously improving due to educational research. During a Keynote Speaker Address at the Remote K12: The Connected Teacher Summit, Dr. Mae Jemison explained that she believes all students deserve an excellent education regardless of the school they attend (2021); I completely agree. My transformation into an Education Specialist has taught me it is my duty to advocate for educational paradigm shifts that create meaningful opportunities for all learners.

UDL is a theory borrowed from architectural principles focused on designing spaces easily accessible by all people regardless of personal abilities and limitations (National Disability Authority, 2012). Architect Ronald L. Mace coined ‘universal design’ as a term referring to universal features added to as many homes as possible to increase a person’s ability to live independently for a longer period of time (Center for Accessible Society, 2021). Originally created to allow people to live independently wherever they wanted, now it is used to help students have access to a Free and Appropriate Education (FAPE) in the Least Restrictive Environment (LRE) as possible.

The increasing prevalence of students with autism and other unique learning needs is the reason why UDL practices must be implemented. By 2018, an occurrence at a ratio of 1 in 37 boys and 1 in 151 girls were diagnosed with an autism spectrum disorder (ASD) according to the Center for Disease Control and Prevention (AutismSpeaks.org, 2019). The National Autism Center reported students with autism also experience other health factors that impact their ability
to focus while learning (2019). Educators get more “bang for their buck” while implementing UDL strategies because a greater number of students benefit from the resources rather than other isolated practices exclusive to students with IEPs or 504 Plans.

**Purpose of the Study**

The purpose of this literature review study was two-fold: first, to evaluate the impact of learning menus on students’ overall academic achievement and social-emotional development, and second, to examine the social validity when used with students with unique learning needs. Learning menus, or choice boards, are graphic organizers that allow students to choose from differentiated activities to learn about a particular concept. Activities are organized with an “Intro, Through, and Beyond” teaching model listed under the categories of a menu, such as Appetizer, Main Entree, and Dessert. Using learning menus is a new approach to teaching and is not program-specific.

A current problem in special education is a lack of research identifying the most effective strategies for scaffolding grade-level, standards-based instructional materials to meet students’ specific learning needs, while simultaneously working at their present academic, social, and emotional levels. Research has been conducted on isolated strategies. However, finding a way to streamline the implementation process for teachers is essential for the long-term success of students with unique learning needs, as well as to prevent teacher-burn-out.

The National Autism Center established the following 11 “treatment strategies” as most effective: “the Antecedent Package, the Behavioral Package, Comprehensive Behavioral Treatment for Young Children, Joint Attention Intervention, Modeling, Naturalistic Teaching Strategies, Peer Training Package, Pivotal Response Treatment, Schedules, Self-management, and Story-based Intervention Package” (2007). When used in conjunction with one another,
students’ academic growth has been proven to be greater than when used in isolation. Learning Menus help students with autism have an easier time transferring skills across settings if activities are based upon their own preferences or by making their own choices. Students’ needs are changing and education must adapt to help students continue to be successful.

**Research Questions**

The specific research questions this literature review study focused upon were a) To what extent do learning menus impact academic achievement for students? And b) To what extent do learning menus have social validity, or the acceptability of and satisfaction with the intervention, as measured by increased student engagement and self-efficacy?

One hypothesis to the first question is that research will illustrate an increase in academic achievements as measured by assessments and assignments. Results will establish a connection between implementation of differentiated instruction and greater access to grade level curriculum. Just because a student is reading at a certain grade level does not necessarily mean they have the same instructional comprehension level. When given appropriate supports, such as auditory and visual aids, students can perform at a higher level.

Another hypothesis is that learning menus allow for naturally embedded practice opportunities by providing an organizational structure to learning will allow students to build upon foundational skills. Choice produces a positive students’ response toward learning thus creating higher levels of focus and attention and directly influencing the rate of task completion. When students are more focused during instruction, they are able to retain information longer resulting in a more meaningful learning experience. Students who enjoy learning and see personal value in gaining knowledge become lifelong learners.
Lastly, learning menus will prove to have high social validity because curriculum and instruction is centered around students’ strengths, preferences, and abilities. When learning menus are used as part of a proactive approach to classroom and behavioral management, students develop core values such as compassion and appreciating one another as contributing team members. Another aspect of the hypothesis depends upon establishing the correlation between environment and actions within the classroom. Students who feel they belong will be motivated to participate more and will have an overall sense of enjoyment while learning. As classrooms move towards more of a collaborative model, reducing the visible identifiers of differences between students will also help build self-esteem for students with special needs.

**Importance of the Study**

Finding the most systematic and effective methods to implement in the classroom is imperative if teachers are expected to meet the wide range of student needs, even as class sizes continue to increase. When district level supports make it easier for teachers to implement new methods and strategies, the teachers will more than likely actually implement and maintain the strategies long-term. Learning menus can build a positive school culture if aligned to district- and school-wide community service projects as part of Positive Behavior Interventions and Supports (PBIS) programs. Literature Review Studies focusing on Learning Menus and UDL practices are influential when considering changes to current special education programs, such as expansion of the placement continuum to incorporate Inclusive Classrooms following a co-teaching model.

Offering more educational settings will ensure each student has an appropriate placement. Completed tasks from menus can be used as data collection samples when assessing present levels and can represent multiple opportunities for measuring growth. Over time, school districts
will see an increase in the rate of IEP goal achievement if menus consistently embed specific goals and skills. Eventually leading to a corresponding drop in due process case filings and expenses paid.

Learning menus can be utilized in any content subject, at any grade level, during rotations and collaborative small groups. Building menus for students with autism to work on academic and social skills simultaneously will expedite their development. Practicing taking turns and other communication skills can be done in a positive and structured environment. Offering Peer-Assisted Learning Strategies (PALS) strategically within centers adds additional benefits from observing peer models and listening to academic language in context. Students with autism and other unique learning needs are capable of achieving their potential if educators continue to be innovative.

**Definition of Terms**

**Individuals with Disabilities Education Improvement Act (IDEA or IDEIA) of 2004 (PL 108-446)** governs the provisions of special education services for students with disabilities.

**Free and Appropriate Education (FAPE)** includes special education and related services that are ‘provided at public expense, under public supervision and direction, and without charge’ (34 C.F.R. 300.17) and are ‘provided in conformity with an individualized education program’ (34 C.F.R. 300.17).

**Least Restrictive Environment (LRE)** requires that each public agency must ensure that ‘to the maximum extent appropriate, children with disabilities, including children in public or private institutions or other care facilities are educated with children who are non-disabled’ (34 C.F.R. 300.114); and ‘special classes, separate schooling, or other removal of children with disabilities from the regular educational environment occurs only if the nature or severity of the disability is
such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily’ (34 C.F.R. 300.114).

**Individualized Education Program (IEP)** is a written statement for each child with a disability that is developed, reviewed, and revised in an annual meeting. Components must include child’s present levels, a statement of measurable annual goals, and a statement of related services and supplementary aids, and a description of how the child will participate with typically developing children, and must adhere to the entirety of 34 C.F.R. 300.320.

**Multi-tiered Support Systems (MTSS) or Response to Interventions (RTI)** is a multi-tiered approach to interventions designed to identify and support students with learning disabilities or those at risk. There are at least three levels - universal instruction, targeted, small-group intervention, and individualized, intensive intervention (John, B., 2016).

**Positive Behavior Interventions and Supports (PBIS)** is a multi-tiered system of behavioral interventions in which a universal system of positive recognition for appropriate behavior is established for all students, secondary interventions are designed for those students who need more than the universal system provides, and tertiary interventions are put into place for the small percentage of students who do no respond to either Tier 1 or Tier 2 interventions and are in need of a highly individualized program that can include a case study evaluation to determine whether the student needs special education services.

**Local Control and Accountability Plan (LCAP)** is a tool for local educational agencies (LEAs) to set goals, plan actions, and leverage resources to meet those goals to improve student outcomes.

**Universal Design for Learning (UDL)** is a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn.
**Learning Menu, or Choice Board**, is a differentiation strategy that can be used for whole class assignments and projects as well as individuals. It allows students to make decisions about how they will meet the assignment requirements. By differentiating within the lessons themselves and offering built-in choices, students take a more active part in the process of learning.

**Differentiation** refers to a wide variety of teaching techniques and lesson adaptations that educators use to instruct a diverse group of students, with diverse learning needs, in the same course, classroom, or learning environment.

**Inclusion, or Inclusive Teaching** is an explicit intellectual and affective inclusion of all students into all fields and disciplines, through course content, assessment, and/or pedagogy (Brown University, 2021).

**Summary**

Essentially, students’ education is not based upon what the school can provide; rather it is based upon appropriately meeting individual student needs. As the law requires teachers and districts to implement interventions, supplementary aids, and other services to support students with unique learning needs and at risk students, then educators have an obligation to do it. Using UDL strategies, such as Learning Menus, make it easier for everyone to be in compliance with the law while providing an educational experience that is meaningful for every student. Giving students more control over their education by allowing them to make choices will cause them to become actively engaged with the content. Modifying the classroom environment to support autonomous learning also enhances student achievement. Using learning menus and UDL is not simply about implementing strategies, it really is about changing the pedagogical approach to teaching.
Chapter II: Review of the Literature

Importance of a Literature Review

Different resources containing pertinent information about educational regulations, policies, current practices, and suggested evidence-based approaches were examined to determine if learning menus were effective instructional tools due to the fact that they promote student choice and autonomous learning. Learning menus are a new way of teaching as classrooms adopt student-centered learning models and project-based instructional and assessment methods. Credential programs are starting to teach Universal Design for Learning (UDL), a new pedagogical approach towards lesson planning that meets all learning needs. UDL is a Tier One intervention and must be given to all students under educational law.

Social validity is important to consider on a general level when deciding district policies and site-specific interventions. A concentration on social emotional development of students creates an environment where students are at ease allowing them to be able to focus and learn more. Incorporating a Trauma-Informed Approach to teaching is also important when supporting students beyond academic needs. When relationships and trust are formed, a cycle of positive reinforcement and belonging leads to higher academic achievement. As positive improvement continues to show in the results, consistency and the duration of time for implementation of evidence-based practices also leads to an increase in achievement over time.

Educational Rights For All Students

Educational laws have always guided policy, regulation, and funding decisions on all levels. Federal and state funds have flowed to school districts as part of the Local Control and Accountability Plan (LCAP) for the provision of appropriate support and services for students, especially interventions necessary for those who are struggling or those who have Individual
Educational Plans (IEPs). Similar to how the American Disabilities Act (ADA) protects people with disabilities’ general rights, the Individuals with Disabilities Education Act (IDEA) 2004 protects the educational rights of students with learning disabilities (20 USC Ch. 33).

Qualification for Special Education services and accommodations can use assessment data collected from Multi-Tiered Support Systems (MTSS) using UDL evidence-based strategies and programs as Tier One Supports. Response to Interventions (RTIs) are highly encouraged to guarantee high-quality instruction and universal screening of students. RTIs significantly reduce the number of inappropriate referrals to special education because needs are addressed at increasing levels of intensity during interventions (Stuart & Rinaldi, 2009, pp. 52-57).

In accordance with IDEA 2004, the Council for Teaching Exceptional Children (CEC) developed the Collaborative Instructional Planning and Intervention Framework that should be used when implementing tiered intervention systems. The framework incorporated instructional planning, data collection of measurable goals, and data analysis by the multidisciplinary teams to evaluate intervention effectiveness. After interventions have been implemented, teams analyze the data to decide when to fade out the additional support (Knackendoffel, A., Dettmer, P., & Thurston, L.P., 2018; Pierangelo, R.A., & Giuliani, G., 2017). If the student is not responding to the intervention, more intensive and personalized support will be provided at a higher tier. As circumstances may change, having a tiered support system in place allows for fluidity in movement and an expedited response.

Special Education Case Law has previously ruled that school districts must be compliant with all aspects of IDEA 2004 regardless of what current programs exist within the district, and they must provide what is needed based upon the student's individual needs when accessing curriculum. Chief Justice Roberts noted the uniqueness of special education when he delivered
his opinion regarding the U. S. Supreme Court ruling in Endrew F., v. Douglas County School District (2017). He pointed out that special education by statutory definition of a Free and Appropriate Education (FAPE) is instruction with the specific purpose of meeting students’ unique needs as they interact with the general education curriculum (§1414 et seq.). Special education as recognized by the US Supreme Court means each IEP must consider the individual’s present levels, strengths, and preferences when the team considers the appropriateness of annual measurable goals and progress, services, adaptations to the general education curriculum, and educational environment placement.

Typical-developing peers and students with unique learning needs benefit from sharing a classroom environment and working together during collaborative class time activities. In his March 2, 1992 decision, Judge David E. Levi identified four factors to consider when determining whether placement in the general education classroom is appropriate for a child with a disability:

(1) the educational benefits available in the regular classroom; (2) the non-academic benefits of interaction between a student with disabilities and those without disabilities; (3) the impact of the student with disabilities on the teacher and other children in the regular classroom; and (4) the cost of supplementary aids and services required for mainstreaming the student. Applying these factors, Judge Levi affirmed that the general education classroom was the appropriate placement for Rachel. He highlighted the social benefit of inclusion, noting that the proposed special education program ‘would mark Rachel as an outsider,’ and gave great weight to the testimony of Rachel’s general education teachers who said she was a ‘full member of the second grade class’ (Sacramento City Unified Sch. Dist. Bd. of Educ. v. Rachel H., 1992).
Within an Inclusive Classroom, compassion, equality, and togetherness become values taught to every student everyday and these same values can be enriched by school-wide Positive Behavior Interventions and Support (PBIS) units and project-based learning within the school community (PBIS.org, 2021; Turnbull, A., Turnbull, R., Wehmeyer, M. L., & Shogren, K.A., 2015). Working collaboratively with all types of peers, students learn how to work together and problem solve using everyone’s input and strengths. Classroom teamwork scenarios are realistic representations of futuristic workplace projects they will have to complete later in life.

Students with disabilities may be struggling with certain areas, but they can still be valuable team members that contribute using their strengths and abilities. In the book, *Ten Things Every Child with Autism Wishes You Knew*, Ellen Notbolm (2013) lists ways people should interpret behaviors and provides suggestions as to how to approach a person with autism. She encourages people to view autism as a different ability rather than a disability; looking past what may be seen as limitations and see strengths. People with autism may not be good at eye contact or conversation, but they don’t lie, cheat at games, or pass judgment on other people? (Notbolm, E., 2013). Participation in inclusive learning environments throughout their educational years causes students to grow up to be more compassionate adults. Creating an inclusive mindset as a school-wide cultural norm will begin to transform society for the long term (Abawi, L., & Oliver, M, 2013).

Learning menus can be used as a universal technique so students with disabilities can complete activities similar to their typical developing peers; thus, helping them develop a sense of belonging. Activities can be arranged by section or each activity can be given a point value and students have to reach a specific total amount to be done with their work (Ducey, M., & Key, S., 2009, pp. 15-19). Including everyone while keeping identifiers of academic performance
levels hidden from others is important as students get older. They want to participate and do not want to be held to content that is at their present level and visibly evident to their peers. Choice boards and learning menus are incredibly powerful because students are given more flexibility and are offered choices between topics that are personally meaningful. However, successful implementation requires a lot of advanced teacher preparation (Ducey, et al., p. 17). Students can work on activities individually at their own level and will be able to participate during whole-class discussions and benefit from shared insights and knowledge. Students must understand that not everyone in the classroom does the same thing at the same time, but everyone gets what they need. (Rakow, 2007, pp. 10-12).

School-wide and district-wide pedagogical implementation of differentiated strategies, such as learning menus, will support teachers as they step out of their comfort zones and engage in new ways of teaching through differentiation. One study published in *Educational Planning* (2021) looked at the correlation between school-wide instructional techniques and actual use of differentiation by teachers in the classroom in the state of Maryland. Results based upon teachers’ responses to a survey showed a lower rate of strategies implemented in reality compared to their desire to use it. The findings also revealed teachers who use differentiated instruction do so out of personal choice and not because of a mandate or directive by administration (Hersi, A.A. & Bal, I.A., 2021, pp. 55-71). Providing professional development that only gives time to inform teachers about these strategies is not enough to make the necessary changes in education to achieve the student growth results educators desire.

In order to transform their classrooms, teachers need to be supported by administration. School schedules should allow for adequate preparation time as differentiation requires more upfront planning on the teacher’s part compared to planning non-differentiated instructional
materials. Professional development should provide time for collaboration among teachers to divide the workload and make each section manageable. Learning Menus can be divided when planning so not all the work has to be done by one teacher. Teachers should also share learning menus and associated activities to ease the workload for all of the teachers.

Teachers’ personal perceptions of differentiated instruction and the correlation between planning time given to teachers greatly impact the reality in the classroom. Teachers that were given more pre-planning time were more inclined to use differentiated strategies on a consistent basis and felt that they were successful by using these strategies. Time must be given in order to implement differentiated strategies with fidelity and it acknowledges the reality that these strategies impose more frontloading of planning on the teachers’ part. If teachers were not given the time specifically to plan implementation of differentiated instruction, then there was a decrease in teachers using these strategies and a corresponding sense of not succeeding when attempting to implement it due to the lack of prep time allowed. Administrative leadership can support teachers by allotting planning time necessary for implementing differentiated strategies.

Inclusive education is a growing global trend. Research conducted in an inclusive classroom in Nigeria revealed pre-assessments were used at a higher frequency because a lot of preparation is not needed (Onyishi, C., Sefotho, M. M., 2020, pp. 136-150). Only 20% of participants used differentiated instruction. Strategies such as varied instructional materials, curriculum compacting, learning centers, flexible grouping, tiered assignments, and individualized teaching were used at a very low rate or not at all (Onyishi, C., et al., p. 145). Internationally, the same evidence-based differentiated practices are the center of education. Streamlining the preparation process and making it so differentiated instructional strategies are
naturally embedded within the curriculum rather than seen as an additional burden on the teacher will inevitably increase the use of these strategies.

Research conducted across different continents has proven that students learn best when given differentiated instructional methods of learning. Continued growth and optimal learning can be accomplished when instruction strategically incorporates differentiated strategies, backward design, and well-planned assessment process (Davis, T., and Autin, N., 2020, pp. 55-70). When teachers changed the way they approached teaching within their classroom, then the students also changed their perspective towards learning -- creating a cycle of ongoing transformation and growth.

**Creating positive and safe learning environments**

Modifying the classroom environment to be more conducive to the learning needs of students with autism and other learning disabilities is extremely important and can greatly impact academic success (Kuo, N., 2016). The National Autism Center estimates lifetime costs as high as $3.2 million per individual diagnosed with Autism Spectrum Disorder (ASD). Providing effective evidence-based treatments is the only way to reduce these costs long term (National Autism Center, 2007). Making learning fun makes it easier for kids to retain knowledge. A study completed in Norway found that activities where students could tell jokes and laugh were more engaging to them, and when assessed the areas of greatest growth (Søbstad, F., & Lillemyr, O. F., 2010, pp, 71-83). Designing learning centers that allow choices based upon personal interests will increase engagement, especially at centers that are not led by a professional.

Students complete a higher quality of work if they are given options or allowed to choose how they want to complete the assignment. Offering choices during tasks that are not preferred, such as writing for most students, can act as an intrinsic motivator for the student. If the student
is interested in the topic, then that student will want to complete the task. Allowing students to make their own decisions also gives them ownership over their learning (Pryle, M., 2020). The higher the level of engagement while completing assignments, the more likely information will be retained at a greater rate and for long-term.

Systematic, explicit, and multiple instructional strategies during each of the different developmental phases is extremely important for students with autism (Akçin, N., 2013; Hall, L.J., 2017; Sen, A., Burns, S., & Miller, D., 2009). Direct learning and guided practice with smaller chunks of content were found to be more effective than whole class activity completion (Robinson, S. B., 2018). Using instructional organizational strategies, such as Learning Menus, allows for a strategic break in content for smaller chunks of content. Following a UDL plan template naturally incorporates differentiated instruction because it suggests multiple methods to deliver content in addition to the various ways students express what they learned (Thousand, Villa, & Nevin, 2015, p. 46).

Providing a repeated and structured method of activities creates an environment with anticipated routines resulting in increased focus for students with autism or other attention struggles (Vaughn, S.R., & Bos, C.S., 2014). Learning Menus help them learn how to navigate the educational experience thereby making it more effective. An environment centered around multiple teaching approaches is proactive because students are given different avenues to take when making sense of their learning and then be able to show what they understand by developing projects (Finley, 2014).

Learning menus used during guided centers allows teachers to focus instruction on the individual needs of their students, while working within a small group. Research shows learning centers or stations guided by a teacher or paraprofessional have the greatest effect on learning
how to read and language development because students focus on one aspect of reading at each station (American Institute of Research, 2020; Maxwell, C., & White, J., 2017; Robinson, S. B., 2018; Suprabha, K., & Subramonian, G., 2014). Hearing teachers first think through an activity using Think-Alouds and modeling positive self-talk is beneficial because the teacher can model the correct language in appropriate context. When language can be simultaneously practiced orally and in writing at a higher frequency rate, interaction with one another occurs in a familiar manner. Lastly, academic growth occurred more in teacher-led centers where students participated in small group discussion with both peers and the teacher (Miller, S., 2017).

Interestingly, a clear correlation between speaking, listening, reading, and writing skills was found to exist when language development was examined. Subsequently, parent-child dialogue while reading increased the child’s textual language and vocabulary (Boyle, S., McNaughton, D, & Chapin, S. E., 2019, pp. 205-214). Practicing using language one way had a positive impact on the other areas of language development. Another article published by The CATESOL Journal noted the impacts of experience and prior knowledge had on overall understanding. Students who had a larger working vocabulary and more experiences were able to comprehend a greater amount of the texts read compared to those with limited language abilities (Maunsell, M., 2019, pp. 1-12).

The Progress in International Reading Literacy Study (PIRLS) is an international comparative assessment conducted annually by the Institute of Educational Sciences (IES). Annual measurement of different strategies is necessary in the various areas in relation to the assessment scores and in-school supports available to those that may be utilized after-school or at home. Most development occurred when families practiced the same strategies at home used in the classroom during additional practice at home. Educators must move beyond a
“one-size-fits-all” classroom and teaching method. Working as a team with families and consistent communication also make it possible for the parents to repeat academic strategies to reinforce concepts and provide repetition, both of which are essential when students with autism are learning something new.

Another study by Nanyang Technological University published in the *International Journal of Special Education* focused on different processes and parts to reading comprehension. Students must have an understanding of letter recognition, sound recognition, ability to define individual words, and then understand the word in context in a sentence or extended writing. Their research focused upon the fact that multiple processing steps have to occur for students to be able to understand a passage independently or read aloud to them (Elangovan, S., & Chia, N. K. H., 2013). Students with autism usually read quickly and ignore the natural and purposeful pauses in language. One way to help develop comprehension is to teach them strategies to slow down and read each word accordingly. Suggested strategies were using concrete poems, graphic cues, graphic organizers/mind maps, and working with a topic of interests.

Rhythm was suggested as a teaching method because it used sound and repetitive movement to understand the flow of language. If students could identify a rhythm to speech, then they would be able to imitate the beat and have a more natural flow when speaking or reading (Olaussen, B.S., 2016). Sensory needs were also satisfied; removing barriers to learning and personal distractions allowing students to be more engaged and focused during instructional time.

A study conducted looked at the effectiveness of two strategies used when teaching students with autism how to read sight words. The two strategies deliberately used words, pictures, and prompting to help them learn to read sight words. Using sight words can also help
students become familiar with letter-sound correspondence. Although constant time-delay and stimulus-fading are both good strategies, a correlation between self-efficacy and the effectiveness of the constant time-delay strategy was found. Students relied on the initial prompting when using a stimulus fading, whereas they were able to retain the sight words at a faster rate when the constant time-delay was used because it provided an appropriate processing time. Another benefit was it encouraged cognitive thought before providing support; yet, prevented frustration levels from rising because support could be expected after a set time frame.

One benefit to stimulus-fading was it used a visual picture with the word and the picture would fade away with only the word left. Visual aids faded out at the same rate as prompts faded out, causing students to rely on their own abilities. Both strategies required 100% sustained mastery of words at a lower tier before moving on to the next set of words. Results concluded the same procedure should be used throughout each level as students progress because they have a faster rate of increase on the latter sets due to procedure familiarity (Akçin, N., 2013, pp. 85-106).

Another source found in the *Journal of Educational Issues* focused on the use of Applied Behavior Analysis (ABA) strategies when teaching reading comprehension skills to children with autism. ABA uses intense intervention sessions utilizing discrete trial training where students practice and work on a concept until achieving mastery at that level and then advance through scaffolded activities. Mastery at each level must be reached before moving onto the next level of learning. There is also a focus on immediate feedback and reteaching. The repetition of the activities allow the students to master the activity and demonstrate growth as related to the number of trials required to attain mastery for each concept. Research suggests these same
strategies should be used with Tier Two and Tier Three intervention levels (MacLeon, K. S, Hawken, L. S., O’Neill, R. E., & Bundock, K., 2016, 331-351).

Learning Menus can be used as a visual checklist and can be aligned with a positive incentive program. Positive Incentive programs develop self-efficacy, and increase motivation, overall engagement, and success. Customized themed token boards will increase student motivation to complete the necessary activities at each center. Time-on-task nearly doubles if they are held accountable for self-monitoring (Ainsman, L., & Mayer, G. R., 2017; Cosgrave, G., 2013; Dodge, D., 2017; Legge, D. B., DeBar, R. M., & Alber-Morgan, S. R., 2010; Mulholland, R., & Cepello, M., 2006; Sran, S., & Borrero, J., 2010; Watson Institute, 2021).

Learning Menus create a positive learning experience for students thereby increasing self-efficacy. Using a Trauma-Informed Approach when working with students with emotional or behavioral needs enables these students to be successful in a range of educational settings (Ablon, J.S., 2014; Adams, J., 2014; Cambridge University Press España, 2016; George Lucas Educational Foundation, 2013; National Child Traumatic Stress Network (NCTSN), 2020).

Benefit from individualized instructional strategies that allow choices have been substantiated by research findings (American Institute of Research, 2020; Maxwell, C., & White, J., 2017; Robinson, 2018; Suprabha, K., & Subramonian, G., 2014; Wlodkowski, R.J., & Ginsberg, M. B., 1995). Personal attitudes towards reading and the different tasks given at each learning center influenced success rate. If students felt they could be successful at a given challenge, they would attempt and strive for success despite the difficulty faced. When students felt they could be successful at a given challenge, they would attempt and strive for success despite the difficulty faced.

Another benefit noted was an increase in positive communication and encouragement
between peers when all of them were engaged in goal setting activities. Learning menus can be organizational tools to teach growth mindset and mindfulness. Growth mindset is about believing a person can improve at a specific task based upon effort, strategies used to accomplish goals, and help from others (Dweck, 2016, p. 7). Educators will see an overall decrease in maladaptive behaviors as students develop growth mindsets and internalize mindfulness techniques.

A study by Dina Boccuzzi Legge, Ruth M. DeBar & Sheila R. Alber-Morgan that was published in the *Journal of Behavior Assessment in Children* (2010) focused on self-monitoring and students recording their own data of time-on-task at centers. Helping students be able to monitor themselves and gauge how much time they will need to complete a task was found to be extremely important for behavior modification to happen. Using timers was a great way to keep students on task and helped them focus. An additional benefit from using timers was students ignored distractions simply by being engaged in the activity, knowing how to manage time, or “self-pacing”. The data collected illustrated how much time is spent on-task.

Learning Menus, or Choice Boards, are not grade specific and can be used throughout all school years, including college courses. One study specifically looked at choice boards as a means of product differentiation and concluded having a pre-and post-conference with each student was helpful when creating goals and selecting appropriate tasks. Another benefit was that teachers gave more direct and timely feedback (Danley, A., & Williams, C., 2020, pp. 83-104). Best teaching practices all center on the philosophy that personalized learning is more meaningful throughout a person’s life.

**Technology as an Educational Tool**

Learning Menus can include Computer-Assisted Instruction (CAI) at an independent
learning level. Technology provides access to audio and visual supports, writing tools, and organizational tools; most of which is embedded within learning programs (Ennis-Cole, D., 2011, pp 52-61; Fan, T., 2012). Research conducted by the Faculty of Creative Multimedia found the use of color is very effective because students with autism decode color before language. When red, green, and yellow colors were used, students were noticeably more attentive. Blue, dark yellow, and green had a positive effect on motivating students (Omar, S., & Biden, A., 2015, pp. 989-996). Images and text simultaneously presented is better than presenting texts by itself.

Use of pictures increased background knowledge for learners when a new concept was introduced, resulting with the development of connections prior to engaging with text. Students used technology to access the material and were able to show growth in reading comprehension. The use of technology allowed for a reduction of other distractions such as outside noise or disengagement due to lack of interests. Technology also allowed for easier record keeping for data analysis.

Research sponsored by the Korn Learning Assessment and Social Skills (KLASS) Center and published in the Journal of Behavioral Education brought up the point that technology allows for more consistency when measuring data (Yaw, J. S., Skinner, C., Parkhurst, J., Taylor, C. M., Booher, J., & Chambers, K., 2011, pp. 44-54). Implementation with fidelity may vary among different people, but computer programs always implement the lesson/intervention with fidelity. Another point that was discussed was the maintenance of a skill can also be easily monitored using technology. If the program detects any drop or struggle, it will automatically modify the activity to clarify, reteach, or review a concept. The computer program is more
efficient than the teacher doing it because of time constraints and other classroom responsibilities placed upon the teacher. Longer wait times can be consistently given using technology.

An article titled, “A New Model for Teaching High Frequency Words” examined how decoding words may not lead to comprehension or understanding of the meaning (Farrell, L., Hunter, M., & Osenga, T, 2019). The best results came from repeated readings of a story or text and pre-technology discussions between peers. Students would read the story together multiple times and then participate in a collaborative discussion guided by the use of a graphic organizer, and then they would complete the computer activity. Allowing the use of technology to individualize them as they move throughout different levels of understanding will individually deepen their knowledge base.

Technological features were also analyzed for effectiveness. Use of a touch screen allowed more convenience and more options when communicating. Students who struggled with writing because of difficulty holding a pencil could answer questions without being impeded by their physical disabilities. Using an iPad is recommended as an assistive technology device and writing it into IEPs as a necessary provision. IPads, tablets, and other devices provide easier access to the curriculum (Tipton, J.S., Blancher, J.B., & Eisenhower, A.S., 2017, pp. 171-180). Another benefit offered is the variety within a single device, and cost less than other devices that are only used for a single function. Students should then have fewer devices they need to learn how to use, transport, etc.

All students benefit from being provided with a 1-to-1 mobile device, such as a Chromebook, iPad, or tablet. Research shows engagement increased when using 1:1 mobile devices when completing extended enrichment or intervention activities. Using technology as part of the learning process was found to also be a motivator, especially when particular content
can only be accessed that way (Firipis, A., Chandrasekaran, S., and Joordens, M., 2020, pp. 219-240). Students are willing to work and want to work when they find intrinsic motivation. The way information and tasks are presented has a large impact on their overall perspective towards that information and task (Armstrong, T.K., Hughes, M.T., 2012). If educators personalized the delivery methods and ways in which students were able to demonstrate their abilities, then engagement and overall achievement increased.

Teachers need to find more up to date approaches rather than continuing to uphold a linear curriculum design culture. 1:1 device use is becoming more common and classrooms are extended onto digital platforms with a wide array of collaborative tools and resources for students; now they need to learn how to use them effectively for learning (Firipis, A., et al., p. 219-240). Students are expected to grow up to become global citizens, so educators must open doors with technology and teach them how to navigate digital spaces safely and responsibly.

**Summary of Literature Review**

Technology, setting goals and reflecting upon progress, and differentiated instruction are key if a person is going to successfully learn (*American Institute of Research*, 2020). Learning Menus, or Choice Boards, allow for all of this to occur using one structured graphic organizer. Sequencing of learning follows a logical order that students can follow and when learning makes sense to them, they are more likely to be engaged and view what they are learning as valuable information. Instead of looking at educational practices as tools in isolation, consolidation of learning will help students see it as interconnected. Gaps in learning dissipate when it is a comprehensive experience for all learners.

Teachers are the vessels of change within their classrooms. UDL and differentiated instruction requires more frontloading and preparation work; however, the benefits of students
developing intrinsic motivation and increased academic independence is well worth it. Repeating the process causes it to become more streamlined over time as students become familiar with learning menu formats and task activities. Building different learning experiences into choice boards may be the only way some students receive the support they need or exposure to knowledge they would otherwise not receive. If students are to be global learners, then teachers must teach them how to learn and function that way.
Chapter III: Methodology

Introduction

Taking a solution-oriented approach, this literature review study aimed to accomplish three objectives. First, it aimed to describe the characteristics and benefits of learning menus as a student-centered, UDL strategy. Secondly, a thematic analysis of the research aimed to gain a better understanding of the impact implementation of learning menus, as well as other UDL strategies, had on student progress and self-efficacy. Lastly, establish a cause-and-effect relationship between the implementation of learning menus and the increased ability for teachers to comply with special education laws and regulations.

Mixed methods of qualitative and quantitative data collection were conducted while gathering research. Criteria for an article to be included in the thematic analysis were determining the relevance to the research question based upon topic and publication date, geographical location, and implementation across educational years from preschool to college. Charts, word clouds, and venn diagrams were used as visual representations during quantitative data analysis.

Databases Used

ERIC (Education Research Information Center) database and Google Scholar were searched using keywords: Learning menus, choice boards, Universal Design for Learning (UDL), differentiation, students with disabilities, and evidence-based practices. A search of peer-reviewed articles and educational journals by non-profit organizations such as the Council for Exceptional Children were reviewed. U.S. Department of Education research studies were also examined during the collection of sources.
Resources demonstrating the best ways to implement learning menus and student choice effectively during small group interventions and whole-class instruction were included. Search concepts were expanded to include MTSS research because educational case law requires the use of UDL and PBIS as Tier One interventions. Concluding UDL was a common theme within new educational philosophies, further examination of various agencies providing professional development modules, such as the IRIS Modules created by Vanderbilt University or CAST.org as part of the Massachusetts Department of Education, was conducted. These sources were reviewed seeking recommended evidence-based practices for instructional implementation. Related reference lists and bibliographies were also reviewed to find additional credible sources.

What Works Clearinghouse (WWC) website by the Institute of Educational Sciences (IES) under the U.S. Department of Education was also reviewed. A search for “Choice Boards” found two articles relating to choice boards and student options during distance learning as a reaction to Covid-19. Another keyword search using “Learning Menus Planning Strategy” was conducted and found another article addressing how to support students with learning disabilities.

Textbooks were explored seeking to find the suggested instructional strategies that would result in an increase in achievement growth, especially when working with students with unique learning needs. They were included because there was value in examining the texts teachers utilize within credential programs to ensure they are taught the most up-to-date information in the field. Special education credential course textbooks were evaluated based upon their focus on the legal process of special education or their focus on instructional strategies. Resources or other references found within the textbooks were also investigated when considering sources. All resources were examined for similarities and differences.
Understanding the Variables

Special Education was the biggest variable to consider when conducting this review of educational research because it is unique by definition and functional purpose. One consideration was the wide range of strategies, techniques, task-approaches, and physical supports required when teaching students with special needs. The variations within Special Education programs acted as additional variables to consider. Demographics, funding, and overall district philosophies also impacted educational studies. Sources that had shared commonalities were included to ensure the validity of the comparisons made through data analysis. Generalized topics were researched instead of specific isolated circumstances.

States have the ability to make their own educational laws and policies in addition to the federal codes and regulation that must be followed. Another area that had to be addressed when reviewing case law was the various interpretations or practices based upon the federal codes and regulation. Cases that were included had rulings based upon federal law, which acted as a controlled factor or criterion.

Process of Selecting Literature

An ERIC database search was conducted using the phrase “Learning Menus” and yielded four relevant titles from a result list of thirty-five full-text available. The year in which the research was conducted was considered when reviewing sources and the article was eliminated if it was outdated. Articles and search results published prior to 2010 were excluded when evaluating current educational practices. Search results were sorted by reading the abstracts of each text to see if it was relevant to the research questions. If the abstracts were pertinent, then the full-text was reviewed, noting information that was important. Some of the titles were eliminated because they focused on technical programming or one particular computer-based
program. Other titles were eliminated because they discussed nutritional menus and this study does not refer to a literal food menu but only mimics its structure as an organizational tool.

Another ERIC database search was conducted using the keywords “Choice Boards” and yielded a total of sixty-two titles published within the last five years. Again, abstracts were read to see if the topic was relevant. Some articles were not relevant because they specifically related to school board decisions or school choice waiver programs. This keyword/phrase search was not very successful as it only yielded one article that was directly related to instructional strategies.

The third ERIC database search using the keywords “Differentiated Instruction” yielded 136 full text articles published within the last five years. In an effort to be as current as possible, a refined search with a filter to include only those published since January 2020 gave a new results list containing forty-two sources. Out of the total initial titles on the search findings, nine were initially found to be relevant. Upon further review, one more was eliminated because it focused on the global effects of distance learning but did not address the successful strategies implemented or why certain educational programs were able to still yield academic success despite the pandemic.

“Choice in Learning: Differentiating Instruction in the College Classroom” appeared on both search results lists when the “Learning Menus” and “Differentiating Instruction” searches were conducted. Articles related to higher education were included because individualized differentiated strategies must be used throughout all years of education and successful strategies do not stop when students graduate high school. International studies were reviewed and considered; however, most were not comparable in practices to the United States education system to be included. Research that focused on particular computer-based programs, such as
Achieve 3000, were also excluded because the success of learning menus is not contingent on purchasing or owning rights to a particular program. They stand alone as an organizational lesson planning tool able to incorporate these programs as available or applicable to particular students’ learning needs.

A review of Special Education Case Law was also completed using Wrightslaw.org. After using the abstracts presented and court decision summaries to eliminate cases that were not relevant, two recent case law was found that established that a district must provide students with an IEP or 504 Plan an educational benefit that is reasonably calculated to ensure appropriate progress. The court ruling in the Sacramento City Unified School District Board v. Rachel H. (1994) special education case established the requirement that the IEP process must provide an educational experience that is both appropriate and meaningful. All necessary supports, services, and accommodations to assist with appropriate development and measurable progress data collection must be explicitly outlined in the IEP. Research considered compliance with legal mandates when reviewing sources.

**Analysis of Data**

Qualitative methods included an analysis of language and diction used, as well as an analysis of the images, charts, and associated figures presented. Studies from multiple places were examined and compared based upon similar practices and effective ways to teach students with special needs. Using different geographical locations also provided evidence with implementation with various population demographics and resource availability that was analyzed for effectiveness and social validity. Collected sources specifically referencing best practices or Applied Behavioral Assessments (ABA) when working with students with autism
were compared to differentiated instructional practices to demonstrate overlapping techniques and approaches towards student development.

Quantitative analysis was then conducted based upon the results obtained from the thematic data analysis. Creation of word clouds with associated charts were created by copying and pasting the full text into WordArt.com, a free online program. The program also generated an associated chart that ranked the repetition of words as they appeared within articles as part of the word cloud production process. Eight articles were chosen based upon priority of content as it related to the research questions and objectives. Larger texts and books were not considered for the word cloud analysis because they would have been too large for the technology programs. After each word cloud was created, the next step taken was compiling a list of all words that appeared within the Top Ten of each list on the chart associated with each word cloud. Duplicate words or concepts were excluded and the next word was then included. For example, “DI” and “differentiation” were counted as one concept rather than appearing twice on the list. Any word that occurred only once was eliminated from the compiled list. The frequency of occurrence on clouds as a Top Ten word was tallied for statistical purposes of determining which words or concepts were the mode, median, and mean.

A word cloud was created by importing the title of all of the sources listed in the reference section. The results were compared to the selected sample to ensure accurate representation of data for thematic analysis. Over 70% were shared keywords as illustrated by a corresponding Venn Diagram. Comparative data findings were corroborated with qualitative thematic analysis findings as a triangulation of results to support the hypotheses that learning menus are effective as originally proposed. Similarities were examined to see how wide-spread practices were when differentiated instruction was implemented.
Limitations and Ethical Issues

Some limitations to the data collection methods used were the low rates of research conducted in classrooms resulting in most of the included research being theory based. Without action research studies being conducted, there was limited empirical data regarding effectiveness of specific strategies for specific content knowledge or skills. As a result, search topics had to be based upon more generalized topics rather than specific.

When conducting any research that involves humans, ethical considerations that may impact the study procedures or result findings must be noted. Individual kids are different regardless of genetic abilities or learning needs. Experiences and interactions influence a child’s development and perceptions towards present-day situations. Students respond differently to interventions and instructional strategies because they have different backgrounds and family involvement.
Chapter IV: Findings

During the research phase, a compilation and examination of secondary data sources determined learning menus were valuable instructional tools because students are given opportunities to choose based upon personal preferences and strengths. The specific research aimed to determine the extent to which learning menus impacted academic achievement for students as well as measure its social validity during interventions. Research was also found on how learning menus could be implemented within small groups or as a whole class when supporting students with special needs in an inclusive educational setting.

After a thematic analysis of related educational research was completed, many common themes were discovered that were in line with the hypotheses of this literature review study. Most of the research centered around the benefits of student-centered interventions and individual preferences as a motivator and behavior management strategy. Results illustrated that learning menus and other Universal Design for Learning (UDL) strategies were beneficial on multiple levels from educational stakeholders down to the students themselves. Results also indicated federal education code requires local educational agencies to use tiered support and intervention programs as part of the data collection process necessary when assessing a student’s eligibility to receive special education services.

Overall Findings

UDL lesson planning was definitely the most widely referenced pedagogy that incorporated evidence-based strategies such as learning menus or other means of offering student choice during task completion. UDL lessons were found to be effective when a proactive trauma-informed approach was taken towards teaching that eliminated barriers to learning and increased achievement for everyone. Districts in Northern California, such as Humboldt,
Richmond, Santa Cruz, Aptos and San Francisco, provided traumatic-stress training to help teachers recognize that students’ explosive outbursts or self-injurious behavior could be the result of repeated exposure to violence, abuse and neglect (Adams, J., 2013). Addressing the root of trauma and providing necessary support and therapies impacted all areas of academic performance. Educational strategies implemented from a holistic view of children increased academic and social emotional development and illustrated high levels of social validity as measured by increased self-efficacy.

UDL was emphasized when considering instructional strategies that provided students more opportunities to give their opinions and use their “voice” throughout activities. Research suggested offering choices as to when, how, and the method they want to use to engage with learning content. Choice boards were listed under Instructional Supports Planning Strategies for Best Practices for Remote Learning by the Institute of Educational Sciences (IES). Learning menus were found to be used at all levels of education, including higher education college classes. Multiple articles reported professors utilized them as a means of structuring more opportunities for student expression into the course.

Bloom’s Taxonomy Principles and Multiple-Intelligence Theory practices used in tandem with learning preference frameworks were found to be informative when planning differentiated products and assessments so that students had choices regarding how they achieved the expectations for the unit (Thousand, J.S., Villa, R.A., Nevin, A.I, 2015, p 108). Further analysis revealed that learning menus were effective as measured by naturally embedding the following five out of the top nine research-based strategies suggested to increase student achievement: Reinforcing effort; assigning homework and practice at appropriate level of difficulty; using
Thematic analysis findings also concluded that learning menus allowed for more Culturally Responsive Practices to be implemented into the curriculum to ensure the content was meaningful to all students from all backgrounds. One article found focused on “A Framework for Culturally Responsive Teaching” (1995) concluded four motivational conditions constantly influenced and interacted with one another. “Without establishing inclusion (small groups to discuss experiences) and developing attitude (students choosing a relevant research), the enhancement of meaning (research teams devising hypotheses) may not have occurred with equal ease and energy; and the self-assessment to engender competence (what students learned from their perspective) may have had a dismal outcome” (Wlodkowski, R.J., & Ginsberg, M.B., pp. 17-21).

Use of UDL strategies have expanded the continuum of placement in the Least Restrictive Environment (LRE) and opened opportunities for inclusive education. Additionally, as noted by educational research and rulings from Supreme Court Justices and other special education case law, inclusive classrooms have also shown an overall increase in students who do not require special education services. Doing everything possible to make it a positive environment is important because students with IEPs can not be removed from the educational setting or disciplined due to a behavior related to the student’s qualifying disability. Using similar strategies suggested by Applied Behavior Analysis when making modifications to the instructional content, classroom schedule, classroom rules, classroom arrangement, and peer interactions were noted as most effective (Vaughn, S., Bos, C.S., 2015, p. 28). Use learning
menus provided a strategic and streamlined method to deliver curriculum that ensured all stakeholders acted in compliance with IEP requirements.

**Benefits**

Research gathered concluded that learning menus can be used as an organizational method of providing differentiated instruction as a whole class and within small groups. They can be used as a visual checklist for students while simultaneously providing a positive incentive program. Results implied learning menus created a positive learning experience for students thereby increasing self-efficacy and improvement in overall performance and abilities.

As a menu of different task options, research suggested teachers include Computer Assisted Instruction (CAI) to provide support at an independent performance level. Another menu option could be check-ins with a teacher or participation within a guided instruction small group. Results indicated that when these were built into the daily schedule, students were given more teacher feedback and reteaching opportunities. Research also revealed students and teachers developed closer relationships that enhanced the learning experience.

**Examples in Field**

Qualitative data collected was used for a thematic analysis that revealed key ideas and concepts throughout educational research were in line with hypothesized ideas. Word clouds served as visual representations that illustrated common central themes and approaches aligned with factors considered essential for student success. UDL checklists and learning menus were found to have overlapping evidence and was commonly suggested as a best practice. When instructional strategies were reviewed through a support circle lense, research revealed UDL interventions allowed all stakeholders to benefit and be an active part of MTSS teams.
Below is an example of one of the word clouds created from importing the full text from eight selected articles and the associated ranking of words by greatest amount of appearance within the text. The one included was chosen because it was visually the most similar to the one created using the reference titles. Please refer to the appendix section for the other word clouds not included in this section. Collectively, the word clouds visibly represented the fact that students must be at the center of all planning if expected to be successful. Teachers play an important role as the knowledge holders and differentiated instruction planners. Most importantly, research revealed that teachers’ roles have shifted to facilitators or guides while students take ownership of their learning. The size and how close to center the word appeared in the cloud were compared to qualitative findings to see if they corroborated.

The following word cloud was created using the titles included in the reference section of this study. Word clouds and the corresponding frequency rank charts were used as visual representations when comparing themes from a selected small sample to the overall study findings. The main difference between the two word clouds is the word Autism appearing as one key word from the titles listed in the Reference section; whereas teacher was a key concept in the small sampling. The overall sample focused on students with Autism as a main theme as
evidenced by the word being located in the center of the word cloud and larger than other words. The sample focused more on strategies and the impact a teacher has in the classroom when differentiated instruction is implemented; resulting in the word teacher being closer to the center than other recurring concepts.

The following chart illustrates the tallied results of words that appear on the top ten word list on multiple word clouds. The words that appeared at a greater frequency correlated with the same keywords and concepts as originally thought to be the foundation of effective educational practices. Evidence clearly determined these words or concepts were the true factors educators should consider because they have the greatest impact on student learning.
Statistical analysis of the data, such as calculation of mean, median, and mode, were calculated using the selected sample of titles as quantitative evidence. The maximum range was found to be “Student” and “Learn” due to these words appearing on 8 out of 8, or 100% of the top ten list of word lists from the word clouds created. “Teacher” appeared on 88%, and “Instruction” appeared on 75%. “Differentiation” and “Classroom” were closest to the mean calculated at 4.36 because both appeared on 4 out of 8, or 50% of the top ten word charts. These words also represent the median. Two was the numerical mode and the minimum, or lowest number in the range or data set. “Active”, “Knowledge”, “Different” and “School” each appeared twice. These subfactors need to be considered when evaluating educational research because they present variables and limitations that may skew results and findings.

The following Venn Diagram compared the top ten ranked words to the reference titles word cloud top ten ranked words. The results illustrated the overlapping similarities and 70% of keywords appeared on both top ten ranked word lists. The selected eight titles chosen for the thematic analysis sample were determined to be an accurate representation of the themes found throughout the seventy-five total sources included. 100% of these ideas can be incorporated
when using a learning menu as an instructional tool. A triangulation of results comparing qualitative and quantitative findings concluded that the hypothesis that learning menus yield increased academic results when used with students with unique learning needs is supported by current educational research. The same holds true for the second hypothesis that learning menus are socially valid when implemented during tiered interventions.

70% of the Reference Title Word Cloud overlapped with the Selected Samples Word Cloud.
Chapter V: Discussion

Overview of Study

The purpose of this literature review study was to evaluate the current research supporting the effectiveness of instructional activities that included student choice. Findings from data analysis demonstrated learning menus, or choice boards, were effective on multiple levels when considering intervention implementation and when used as a Universal Design for Learning planning strategy. Learning menus were beneficial because they gave students clear directions and explicit expectations when completing a task. Option choices could be adapted to meet individual needs or personalized based upon interests and strengths.

Additional benefits found were learning menus promoted educational autonomy as well as created positive learning environments conducive to learning for all students, including those with special learning needs. Finally, research displayed a correlation between implementation of best practices to meet individual needs and to be in compliance with legal mandates that have established the necessity of those same best practices during tiered support interventions to ensure appropriate educational access has been provided to every student regardless of abilities.

Summary of Findings

Findings categorized learning menus as effective student-centered instructional strategies that created a more active and engaging learning atmosphere. In addition, students who struggled with behavior had increased motivation and showed an overall improvement as measured by a higher frequency of active participation during whole group instructional time and small group intervention settings. Overall, students with unique learning needs showed greater results in academic and IEP goal achievement when teachers and other service providers utilized learning menus or other choice opportunities.
Learning menus should not be viewed as a replacement strategy; rather, they should be welcomed as complementary to current educational practices. Student benefits ranged from increased time-on-task to higher academic achievement. Universal Design for Learning (UDL) offered multimodal learning opportunities and appropriate assessment methods that adequately measured student progress.

The results appeared to show that current credential programs and professional development organizations for educators incorporated student choice and personalized learning as foundational components of a proactive classroom and behavior management plan. Teaching philosophies were important to note because teachers’ personal perspectives towards differentiated instruction and UDL directly impacted the delivery of instructional content to students. Multiple studies corroborated the idea that teachers implemented differentiated instructional strategies at a higher rate of fidelity when supported and funded by district and administrative leadership. Findings showed student achievement increased when professional development was provided district-wide with collaboration time among colleagues. Another result was an overall increased teacher satisfaction in the workplace, which also influenced students’ engagement and achievement.

Initially as a search to find evidence that learning menus were in and of themselves an effective evidence-based strategy, the scope quickly expanded to include legal aspects of education. Research examined from the lenses of a Circle of Support (Dickinson Independent School District, 2016) seeking benefits at every level for all participants and stakeholders revealed a legal mandate for the implementation of these strategies rather than them simply being a recommended or optional best practice strategy. Students have a legal right to receive an appropriate and meaningful education and LEAs could possibly receive severe consequences if
found to have violated their educational rights. The results indicated that when implemented, learning menus were effective on multiple levels of intervention.

Most effective approaches to implement to achieve academic growth were offering opportunities for choice and tasks based upon individual preferences and strengths. Providing time to practice multiple skills also built connections to learning. Results also indicated a wider range of student benefits than originally anticipated, such as social-emotional and behavioral improvements.

Implications

There are a few key aspects that must be taken into consideration when implementing evidence based research practices during instruction, such as learning menus. First, learning menus are aligned with current suggestions of best practices used in education. Second, adaptations to the structure of the learning environment and instructional practices must occur as the range of student needs continues to rapidly grow. Lastly, incorporating learning menus and differentiated instructional strategies do not have to be perceived as an added burden on teachers in order for stakeholders to accurately implement IEPs for multiple students while remaining in compliance with educational codes and regulations.

Learning menus are evidence-based and have been found to develop organizational skills by promoting independent decision making through choices and personal preferences. During a TedX event, Dr. Ablon suggested teaching students skills of flexibility, frustration tolerance, and problem-solving based upon research in neurosciences (Ablon, J.S., 2014). Skills need to be taught to the student and opportunities to practice skills are needed for social and behavioral development similar to academic skill development.
Self-awareness; self-management; social awareness; relationship skills; and responsible decision making were listed as “The Five Keys to Social and Emotional Learning Success” (Edutopia video, 2013). Research demonstrated social-emotional learning centered students’ minds and bodies and reduced their emotional tension so they could be open to new content and material. Studies found academic outcomes increased exponentially when students were cared for, nurtured, and loved. Predictable classroom structures reduced the likelihood of problem behavior from occurring, and increased the likelihood of effective learning (Yell, M.L., Meadows, N., Drasgow, E., & Shriner, J.G, 2013, p. 227). Educators get much more out of them when social-emotional needs are first addressed and implemented as an academic intervention (Edutopia video, 2013).

Common features of Cognitive Behavioral Interventions (CBI) such as Cognitive Strategy Instruction: strategy steps, modeling, self-regulation, verbalization, and reflective thinking (Vaughn, S., & Bos., C.S., 2015, p. 37) were the same areas of focus treatment when implementing the Self-Regulated and Strategy Development (SRSD) Model during interventions (IRIS Center, 2021). Students with autism benefit from indirect modeling and visual support when working with others by observing to see how they approached a task. All of these strategies establish a higher level of self-efficacy which then proves the interventions were socially valid.

Physical structure of the classroom can mimic the menu and create a functional flow within the classroom. Sensory needs can be met by different item options that naturally embedded movement and cues for transitions, accompanied by visual timers to assist students with autism who require prompts for anticipated transitions. These strategies were echoed in the “SOS: Teaching Students How to Be Independent Learners/Thinkers Module” by the IRIS
Center working with Vanderbilt University. All of the above findings supported the original hypothesis that learning menus increased opportunities for student choice thereby resulting in increased academic success.

Using learning menus when writing Behavior Intervention Plans (BIPs) were found to be vital when measuring effectiveness of tier two and three interventions. Addressing the skills necessary to monitor and regulate behavior and providing appropriate motivational tools were suggested to be the focus when writing intervention plans. When students were provided with appropriate coping skills, maladaptive behaviors decreased (Pierangelo, R., & Guiliani, G.A., 2017, p. 162).

Teachers have the ability to make a significant impact by changing their own pedagogical perspectives and practices. Changing one’s approach to lesson planning also changes the types of strategies implemented. Students benefited from teachers who focused on how each strategy or activity connected to the learning objectives and the most effective methods of content delivery. Research suggested teachers reflect upon personal interactions and improve word choice and approach to evoke different behaviors rather than trigger maladaptive behaviors. Being cognizant of one’s tone of voice, facial expressions, body language, use of strategic questions, and appropriate response wait time can directly impact the experience (EdSource.org, 2014; ).

Creating a safe and trusting environment for students to feel a sense of belonging, with particular importance for educators working with students with emotional or behavioral disorders, is essential for academic and psychological development. Mary Wagner, a longtime researcher of students with emotional disabilities and a principal scientist at SRI International, determined emotional and behavioral disorders are about a “mismatch between the kid and the
school.” She recommended adults first change the environment around children who have a behavioral disorder, then have expectations that their behavior will change as a result (EdSource, 2014). These beliefs correspond with the results from the thematic analysis. Individual value was given to each student when learning menus and options for tasks based upon personal preferences were implemented in different areas of instruction and assessment.

**Recommendations**

The first recommendation proposed as a problem-solution to current overwhelming instructional requirements is to implement learning menus when working with students with special needs. Options can be centered on a particular academic topic or standard, and also allow practice opportunities for social-emotional development by strategically planning the lesson and preparing the environment. If teachers use the same template or format for the learning menu in different content areas over time, then students will become more familiar with it eventually leading to more engagement with the material. Using the same formats for assignments are highly recommended when working with students with autism because they are able to connect the tasks with the visual format of the graphic organizer. Repetition during practice opportunities using the same instructional formats help students with autism internalize information and be able to connect to the learning later.

UDL strategies serve a vital role as tier one MTSS screening for all students by providing an effective delivery of content, collecting data frequently to measure growth, and determining when to increase intensity during MTSS interventions. Visual and auditory support used during instructional time enhances comprehension and focus for all students. Providing graphic organizers to all students teaches them how to structure their own thinking and how to approach task completion. When teachers begin to use these strategies consistently, the data collected can
identify students continuing to struggle with the content. This may prompt multidisciplinary teams to conduct further assessments to determine if these students need to receive Tier Two or Tier Three interventions.

Another recommendation for school districts and administrative leadership is to provide common planning time among colleagues to ensure student needs are met and decisions are made as an interdisciplinary team. Teachers are given content specific programs, instructional curriculum materials, and teaching tools without having the time to learn how to properly use them or implement them effectively. Having an initial professional development training when a program is first purchased is not enough for teachers to truly be able to deliver that content to the students. Sometimes the solution is not purchasing another program, which is what a lot of districts are currently doing. By reorganizing planning time so teams can effectively use resources currently available may increase implementation fidelity and will eventually lead to an increase in academic achievement. Providing common planning time shares the workload among the team and also allows them to build a cooperative working relationship together. Planning together also keeps consistency during instruction so data collected is valid.

The next recommendation proposed as a response to findings is to use learning menus within all educational settings from an inclusive to a self-contained classroom. Classrooms are already shifting to a more student-centered collaborative model by using rotation stations. Following a co-teaching model is highly suggested as research shows significantly greater results in classrooms following it. Rotation stations or learning centers support students with autism by designating a time and place for specific learning. This helps their brain categorize the content while learning and allows for easier recall and overall content or specific skill mastery. Incorporating flexible seating during rotation centers optimizes a learning space for students with
autism decreasing distractions and increasing overall focus and engagement. Dividing the learning objective and assigning a specific skill or task to different centers isolates content assessment. Data analysis can then determine which strategies work for certain students. Teachers will work in a more timely manner to address areas of need as they can be identified at a more expedited rate and intervention can be given earlier.

One last recommendation is that learning menus should be implemented in the classroom and at home simultaneously as an additional means of offering common language and structure when families are supporting their child at home. Easier communication between families and school expedites the rate of development from practicing skills across multiple settings. Parents and family participation and contribution as an IEP team member is important to ensure all of the student’s rights are provided and protected by the school and all service providers on the team. More positive experiences for families would make it easier for them to address difficult topics or highly emotional areas regarding their child. Building trust and working relationships throughout the school year would also lead to less due process cases because the team would be able to work more efficiently and collaboratively before contentious situations arise.

**Limitations**

Learning menus, or choice boards, have not been around as an instructional strategy long enough to have substantial amounts of research regarding their implementation. The same holds true for inclusive education. Generalized topics such as differentiation and universal design for learning were the overall focus.

There is also a lack of teachers conducting action research projects within their own classrooms. There appears to be an absence of a clear protocol teachers should follow when attempting to obtain district approval to conduct their own educational research. Originally this
study was intended to be an Action Research Study using students from my self-contained classroom as participants. However, due to time constraints related to the logistics of obtaining approval at the district level, compounded by COVID-19 impacts on schools, such as closures, distance learning models, and limited ability to interact with students in a face-to-face manner of teaching and learning, a Literature Review Study was completed instead.

As educators incorporate evidence-based practices into their instructional planning, learning menus will become more commonly practiced among teachers. Currently, actual implementation of strategies vary depending on the resources available to the staff and students, professional development for staff, and fidelity with all programs implemented. Continued changes in approaches to teaching will also lead to development of more effective treatments and interventions.

**Future Research**

I would like to conduct the action research study I originally intended to complete but could not do so. The data I could gain from it would be beneficial because it would specifically focus on students with autism. If more teachers conduct research in their own classrooms, education would evolve at a faster rate and best practices like learning menus would quickly catch on as a trend.

Future research could be conducted regarding the impact of using learning menus within an inclusive classroom following a co-teaching model. Possibly taking it one step further, research studies could compare the IEP goal achievement rate of students placed in an inclusive classroom compared to students placed in self-contained classrooms. Empirical evidence could be collected that illustrate a correlation between social-emotional development and UDL
strategies, such as learning menus, in either or both of the above learning settings. This could have dramatic effects on the education of males with autism.

Placement in a more restrictive learning environment limits students’ abilities to access grade level curriculum. Unfortunately, there is a high prevalence of males with autism being placed in self-contained classrooms. Limitations on having meaningful interactions with their general education peers may influence their ability to develop age appropriate social skills. Continued research is the only way educational policy and actual practices will be innovative and broaden the range of programs offered.

Any educator that wishes to start implementing differentiated instruction or UDL strategies such as learning menus should first reflect upon their current philosophies and compare existing practices to reveal areas where new practices could be implemented without creating a drastic change in the routine. An important part is reflecting upon the needs of the students on the current roster. Doing so will ensure their needs are met when planning instructional materials. The key is to take ‘baby steps’ and start small when changing classroom procedures or techniques. Implementation should not be a complete overhaul of current practices but rather a smooth transition.

Next, research suggested district leadership provide appropriate professional development and time to practice skills learned during that time. If necessary, administrators and leadership could consider revising master schedules and school calendars to be more conducive to ongoing collaboration among colleagues. Professional Learning Community (PLC) planning time should be built into the master weekly bell schedule to ensure planning is given within contract time. Lessons can tie to school-wide PBIS community-based learning projects. Weekly minimum days can be built into the student calendar to allow for Early out Friday or Late Start
Wednesdays. Common time can be used for lesson planning or other MTSS team tasks, such as Data Reflection Sessions (DRS).

Educators should seek individual professional development separate from what is provided by the district. After attending different professional development sessions, these educators could then share with their colleagues during collaborative planning time. Best practices shared at conferences from different locations exposes teachers to a wide variety of techniques being implemented with different learning styles. Branching out from their usual professional circles will ensure practices are evidenced-based and data-driven rather than simply teacher opinion. When multiple regions within the same state have shared practices and funding needs, state funding may make an effort to support by aligning funds to support these common shared philosophies.

**Final thoughts**

Education is ready to change and needs to change. If educators continue to teach with antiquated methods then students will not develop the 21st century skills they need. Students with unique learning needs will continue to experience more of a divide between them and their peers. Learning menus can combat the growing gap leaving students with special needs far behind their typically-developing peers by providing a variety of formats. There are endless possibilities of activities that can be offered as “menu options” depending on the subject matter, performance levels, and individual interests and strengths.

Learning menus do not stop teachers from doing what they are already doing; rather, it complements current practices within a positive and structured classroom. Learning menus streamline a teacher's planning workload and make it easier for students to understand what is expected of them. Embedding necessary accommodations, modifications, and incentives into the
learning menu also allows students to be successful while working at individual performance levels. Making students the center of all instructional decisions will ultimately make them more successful as they grow up. Giving students power to choose their own individual pathways while learning will lead them to become independent, global thinkers.
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Appendix

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Table 7.2  Top Nine Research-Based Strategies for Increasing Student Achievement

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<td>2. Summarizing and note-taking</td>
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<tr>
<td>3. Reinforcing effort</td>
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<td>4. Assigning homework and practice at appropriate level of difficulty</td>
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<tr>
<td>5. Using nonlinguistic representations, graphic organizers</td>
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<tr>
<td>6. Establishing cooperative group learning</td>
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<td>7. Setting objectives and providing feedback</td>
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<tr>
<td>8. Generating and testing hypotheses</td>
<td></td>
</tr>
<tr>
<td>9. Providing cues, questions, and advanced organizers</td>
<td></td>
</tr>
</tbody>
</table>

TEACHING FOCUSING ON TABLES, EQUATIONS, AND GRAPHS OF LINEAR FUNCTIONS INCORPORATING THE KNOWLEDGE-BASED JIGSAW METHOD

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Abstract
In this study, we made a three-hour lesson in the area of linear functions for junior high school students and investigated which of tables, equations, or graphs is the best starting point for learning linear functions. We divided students who learn linear functions for the first time into three groups, each starting with tables, equations, or graphs, using the knowledge-constructive jigsaw method for practice, and we compared the three groups in terms of performance and behavior. Tests were conducted before and after the expert activities, and there were no significant differences in performance. However, worksheet evaluations showed that the group that started with tables tended to engage in more spontaneous problem-solving activities than the group that started with equations and graphs.

1. Introduction
Hereafter, the problem of instructional procedure refers to the problem of deciding whether tables, equations, or graphs are the best starting point for teaching linear functions, in this paper.

According to data from the National Institute for Educational Policy Research’s "National Survey of Academic Performance and Learning," the percentage of correct answers to questions in the function area is lower than the percentage of correct answers for other areas of mathematics subjects, as a result of a large-scale survey conducted among Japanese junior high school students.[1][2][3][4][5][6][7][8][9] (see Table 1.)
The National Assessment of Academic Progress is a survey conducted by the Ministry of Education, Culture, Sports, Science, and Technology (MEXT) which is the Japanese government ministry for education. The survey covers all sixth-
grade students in elementary school and all third-grade students in junior high school throughout Japan. The purpose of this survey is "To grasp and analyze the academic achievement and learning status of students nationwide from the viewpoint of equal opportunity and the maintenance and improvement of the level of compulsory education, to verify the results and challenges of educational measures, and to improve these measures. The results will be used to improve the educational guidance for students in schools and to improve their learning conditions. Through this survey, we will establish a continuous cycle of verification and improvement of education." [19]

The survey was conducted by MEXT. After every survey, MEXT grasps and analyzes the academic achievement and learning status of students nationwide and verifies the results and issues of educational measures. It then publishes points for improving instruction based on these findings.

In response to the low scores in the function area, the National Institute for Educational Policy Research (NIER) points out that the key to improving instruction is "To understand the change and correspondence between two quantities and relate them to each other using tables, equations, and graphs." [2][4][5][6] This remark was made repeatedly in the years in which the percentage of correct answers in the function area was the lowest compared to other areas. This key point is denoted as (X) below.

The same content as (X) is described in the Teaching Guidelines of Study for Junior High School Mathematics presented by MEXT (p. 51). In the section on cultivating qualities and abilities in the Teaching Guidelines, it states: "a. To discover the characteristics of changes and correspondence between two quantities that can be regarded as a function, and to consider and express them by tables, equations, and graphs." [10] In the section on teaching functions in the second grade (p.53), it is mentioned: "To understand linear functions by interrelating their tables, equations, and graphs." [10] In the second grade of Junior high school in Japan, students study "linear functions".

Therefore, we focused the content of this study on "linear functions."

The following studies with classroom practices are examples of how to improve instruction related to the content of this (X).

Sasaki [14] created a teaching method that incorporates mathematical activities such as "observation, manipulation, and experimentation" and implemented it with junior high school students. The unit on linear functions is divided into six sections: "Definition of a function," "Definition of a linear function," "Rate of change of a linear function," "Graphs and variation of a linear function," "Finding the expressions of a linear function," and "Finding linear functions from concrete events." Sasaki incorporated some mathematical activities in the introductory phase of the first four sections and at the end of the last section. These mathematical activities include activities to find and solve problems from phenomena in everyday life and society, activities to find and solve problems from mathematical phenomena, and activities to explain and communicate using mathematical expressions. For example, Sasaki conducted a mathematical activity using incense sticks. He prepared incense sticks 10 cm long. When the incense is lit, the length of the incense will shorten to 9.5 cm after 1 minute, 9 cm after 2 minutes, and so on.

The students observe the phenomenon and record the elapsed time and the length of the incense. The data for those two quantities will be represented using tables, equations, and graphs. The interrelationships and characteristics of those tables,
equations, and graphs are discussed in groups and presented in a poster. This is an example of Sasaki’s teaching practice.

In this study, Sasaki states

“The students were able to integrate (tables, equations, and graphs) by experiencing observation, manipulation, and experimentation in the terminal phase (at the end of the last unit) and representing them in tables, equations, or graphs. This was effective in helping the students understand the representation of two quantities that change with each other in tables, equations, and graphs.” [14]

(Brackets in parentheses are additions by the authors.)

As the other study case, Shimoda [15] conducted the following research.
First, he investigated the types of errors and incorrect ideas and procedures for problems that require interrelating tables, equations, or graphs. He categorized the errors found in the survey, developed an instructional method to take advantage of these errors, and implemented the method in his classes. The results showed that his method was effective in solving equations from tables of linear functions.

As exemplified by the two previous studies mentioned above, the majority of other studies and practices also aim to improve teaching methods in the area of function.
However, these previous studies did not describe the instructional procedures.
In the following, we discuss instructional procedures.

From the viewpoint of the history of mathematics, we consider which is the best expression to start learning.
First, let us mention the number tables. It is known that “number tables” existed in Babylonian mathematics from 2000 BC to 300 BC.[17] The contents of ancient Babylonian mathematics were gradually revealed by Neugebauer and others.[24][25] Nakamura[17] expresses the Babylonian mathematical number tables as follows.
“I was surprised to see that a table (Plimpton 322) was created for $1+\tan^2 \theta = \sec^2 \theta$ with 15 right triangles of various angles (with interior angles varying by about 1°).” (See Figure 1.)

**Figure 1. Plimpton 322** [18]

Ptolemy (c. 150 B.C.) is also credited with creating trigonometric-like tables, which he included in his book “Almagest.” Regiomontanus (1436-1476) is said to have used it as a reference to create a kind of exact sine tables.[12],[13]
On the other hand, graphs and equations appeared much later. Descartes established the foundations of coordinate geometry in "LA Geometry" (1637). This gave birth to the modern concept of Cartesian coordinates. By introducing this concept, figures are represented by equations. For Descartes, expressions represent curves. Thus, the unification of curves and equations allowed for the modern representation of expressions by graphs. Since then, the interrelationship of graphs, equations, and tables has become essential to the understanding of functional concepts.[12][13] 

From this historical background, it can be inferred that tables are primitive and easy to understand tools, whereas equations using coordinates and graphs are sophisticated tools and difficult for beginners.

Second, from the viewpoint of the textbooks that are in use today, we consider which is the best expression, again. Textbooks actually used in elementary education in Japan begin by discussing linear functions (proportion) using tables. After that, students derive equations based on the tables. Then, graphs are created based on the equations. The students are guided through the process of tables → equations → graphs.[20][21] From this point of view, the inference can be made that it is better to start learning function area by using tables in junior high school as well.

Finally, we can say the following from the viewpoint of linear functions used in everyday life. When analyzing experimental data in science or geographic data in social studies, the first step in most cases is to represent the data in tables. Then, based on the tables, graphs are drawn. Finally, the data are examined to determine equations. This is the same starting point as the sequence found in the Japanese textbooks for elementary school students. In other words, the sequence is tables → graphs → equations.

The above three perspectives suggest that the concept of number tables is a representation that is more easily perceived than graphs or equations. Therefore, it is natural to guess that it is preferable to teach from tables rather than equations in the instructional procedure.

However, most of the textbooks used in secondary education in Japan currently teach linear functions in the following order.[22][23]

1. Introduce the equations \( y = ax + b \).
2. Find the corresponding tables and graphs from those equations.

Hence, it can be hypothesized that this sequence of instruction is one of the factors contributing to the low average percentage of correct answers in the area of linear functions.

In accordance with this hypothesis, this study will examine which of the following representations is the best place to start learning in the area of functions: tables, equations, or graphs.
2. Research Objectives and Methods
This practice will examine which of “tables,” “equations,” or “graphs” is most effective for students to learn first in the area of functions.
We conducted a practice incorporating the knowledge-constructive jigsaw method. The knowledge-constructive jigsaw method is a method consisting of the following five components.\[16\]

1. Each student solves a given problem.
2. The students are divided into several groups, and each group is asked to tackle the problem using a different method.
   This is called “expert activity.”
3. One student from each group is selected to form a new group. Then, explain to the students in the other groups what was discussed in the expert activity. This is called “jigsaw activity.”
4. The whole group exchanges opinions. This is called “Cross talk.”
5. Finally, the students summarize their opinions and solve the problem again.

There are three reasons to use the knowledge-constructive jigsaw method for this study. (See Figure 2.)

**Figure 2. Reasons for adopting the knowledge-constructive jigsaw method**

1. Students can do the activities by themselves without depending on teachers’ guidance. It means that differences in teachers’ instructional content can avoid affecting the results.
2. A series of activities are conducted: pre-test, expert activities, and post-test. The scores of the post-test are compared with the scores of the pre-test. By comparing the scores, it is possible to identify the group whose scores rose the most. This allows us to verify which “tables,” “equations,” or “graphs” is most effective to use at the beginning.
3. The activities in expert activities are evaluated on the worksheet, too. This allows us to verify which is the most effective to learn first, in terms other than correct or incorrect exam answers.
The practice is described in detail in the following.

The practice was conducted at a junior high school in Japan and targeted junior high school students who were learning linear functions for the first time. And the students were divided into three groups: Group a which constructs equations and graphs from tables, Group b which constructs tables and graphs from equations, and Group c which constructs tables and equations from graphs.

The instructional plan for this practice consists of three 50-minute classes.

- First, a pre-test (“1st test”) is conducted before the first class.
- In the first class, expert activities, 2nd test, 3rd test are conducted. In this class, students consider the problem corresponding to \( y = ax \).
- In the second class, the expert activity, the 4th test, and the jigsaw activity are conducted. In this class, students consider the problem corresponding to \( y = ax + b \).
- In the third and final class, cross talk, 5th test are conducted. The details are described below. (See Figure 3.)

**Figure 3. The instructional plan**

Here, we describe the expert activities. The type of problems is as follows. Problems in which equations and graphs are derived from tables are called Type A. Similarly, problems in which “equations \( \rightarrow \) tables/graphs” are derived are called Type B. Problems in which “graphs \( \rightarrow \) tables/equations” are called Type C. The group that aims to be able to explain how to solve A-type problems is called Group a. Groups b and c are named in the same way. Here, the activities were conducted to enable them to explain how to solve the corresponding problems. In the expert activity in the second class, each group was asked to examine the question, “What is the point to solve the problem?”

In the expert activity, students were asked to summarize their groups’ unified view of what they would focus on to solve the problem.

Next, we describe the test performed.

Before and after the expert activities, examinations were carried out so that everyone tried to solve all types of problems (A, B, and C). A total of five tests were given, with the 1st and 2nd tests on linear functions (proportion), and the 3rd, 4th, and 5th tests on linear functions. 1st and 2nd tests consist of the same questions. 3rd and 4th tests consist of the same questions, too. The students in Group a were compared in terms of
their scores on type B and type C problems on the pre- and post- expert activities test. Similar comparisons were made for students in Groups b and c.

From this comparison, if we were able to identify the group with the highest increase in scores, we would be able to determine whether it is more effective to start with “tables,” equations,” or “graphs.”

Next, we explain jigsaw activities and cross talk.

In a jigsaw activity, one person from each expert group is selected to form a group of three. These groups are called jigsaw group. In the jigsaw activity, a student from Group a explains how to solve a Type A problem and the point of the solution to students from Groups b and c. Students from Groups b and c are also involved in the same way.

In Cross talk, each jigsaw group is first assigned a problem.
They then explain to the whole class how to solve the problem they are assigned and the points to focus on when solving the problem. This is done to help students learn how to solve the problem.
These are the details of the instructional plan. In the next section, we discuss the results of actual classroom practice.

3. Analysis and Results
The practice was conducted in June 2022 (17 to 22 days, excluding Saturdays and Sundays). The target students were second-year junior high school students who were learning linear functions for the first time. The number of students who attended the practice was 16 (male: 11, female: 5). The results of the practice are as follows.

Each test is worth 2 points. The tables are marked with a “T,” the equations are marked with an “E,” and the graphs are marked with a “G.” The average scores of (A1)~(C2) for the 1st test and the 2nd test are shown in Table 2 below. (See Table 2.) The average scores for (A1) ~ (C2) in the 3rd and 4th tests are shown in Table 3 below. (See Table 3.)

Table 2. Average scores per problem for the 1st test and the 2nd test

<table>
<thead>
<tr>
<th>1st test Pre-test</th>
<th>pre(A1)</th>
<th>pre(A2)</th>
<th>pre(B1)</th>
<th>pre(B2)</th>
<th>pre(C1)</th>
<th>pre(C2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>b</td>
<td>0.571</td>
<td>0.571</td>
<td>0</td>
<td>0.286</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>c</td>
<td>0.286</td>
<td>0.286</td>
<td>0</td>
<td>0.143</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2nd test Post-test</th>
<th>post(A1)</th>
<th>post(A2)</th>
<th>post(B1)</th>
<th>post(B2)</th>
<th>post(C1)</th>
<th>post(C2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>1.5</td>
<td>1</td>
<td>0.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>b</td>
<td>0.857</td>
<td>1.429</td>
<td>1.429</td>
<td>0.571</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>c</td>
<td>0.400</td>
<td>0.400</td>
<td>0.800</td>
<td>0.400</td>
<td>0.400</td>
<td>0.400</td>
</tr>
</tbody>
</table>
Table 3. Average scores per problem for the 3rd test and the 4th test

<table>
<thead>
<tr>
<th>3rd test</th>
<th>pre(A1) T→E</th>
<th>pre(A2) T→G</th>
<th>pre(B1) E→T</th>
<th>pre(B2) E→G</th>
<th>pre(C1) G→T</th>
<th>pre(C2) G→E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.25</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>b</td>
<td>0.4</td>
<td>0.4</td>
<td>0.6</td>
<td>0.2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>c</td>
<td>0</td>
<td>0.6</td>
<td>0</td>
<td>0</td>
<td>0.4</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4th test</th>
<th>post(A1) T→E</th>
<th>post(A2) T→G</th>
<th>post(B1) E→T</th>
<th>post(B2) E→G</th>
<th>post(C1) G→T</th>
<th>post(C2) G→E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>b</td>
<td>0.2</td>
<td>1</td>
<td>1</td>
<td>1.2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>c</td>
<td>0.400</td>
<td>0.600</td>
<td>0.200</td>
<td>0.000</td>
<td>0.400</td>
<td>0.000</td>
</tr>
</tbody>
</table>

We conducted the following tests to clarify whether there is a significant difference in the mean score per question between the 1st and the 2nd test. The test method was the Wilcoxon test with correspondence. This same method was also used in the comparison of the 3rd and 4th tests.

The results are presented in Table 4 below. (See Table 4.)

Table 4. The result of the Wilcoxon test

<table>
<thead>
<tr>
<th>1st→2nd</th>
<th>(A1) T→E</th>
<th>(A2) T→G</th>
<th>(B1) E→T</th>
<th>(B2) E→G</th>
<th>(C1) G→T</th>
<th>(C2) G→E</th>
</tr>
</thead>
<tbody>
<tr>
<td>a (Tables→)</td>
<td>0.250</td>
<td>0.500</td>
<td>0.250</td>
<td>1.000</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>b (Algebraic expressions→)</td>
<td>0.250</td>
<td>0.250</td>
<td>0.250</td>
<td>0.500</td>
<td>1.000</td>
<td>NA</td>
</tr>
<tr>
<td>c (Graphs→)</td>
<td>1.000</td>
<td>NA</td>
<td>0.500</td>
<td>1.000</td>
<td>NA</td>
<td>1.000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a (Tables→)</td>
<td>0.500</td>
<td>0.500</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>b (Algebraic expressions→)</td>
<td>1.000</td>
<td>0.500</td>
<td>0.500</td>
<td>0.250</td>
<td>NA</td>
<td>0.500</td>
</tr>
<tr>
<td>c (Graphs→)</td>
<td>1.000</td>
<td>1.000</td>
<td>NA</td>
<td>1.000</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

As shown in Table 4, the results of this practice did not show a significant difference when analyzed at the 5% level. Therefore, statistical analysis did not obtain a significant difference in the test scores. The cause is considered to be that the sample size was smaller than expected, and students are unfamiliar with the knowledge-constructive jigsaw method.

It may also be too much to expect that students will be able to solve problems in areas they have not studied on their own in a short period of time (one or two hours).

Second, we analyzed the worksheets used in the study and found the following.

The worksheets used in the expert activities were analyzed in terms of the following five elements: “Does the student write the answers?”, “Does the student write the points of focus when solving the problem?”, “Are the answers written by the student correct?”, “Is the point of focus written by the student correct?” and “Is the student calculating?”.
In particular, we focused on the “Does the student write the points of focus when solving the problem?” Because the other elements were not significant difference by statistical analysis. The results were as follows. (See Table 5.)

Blank spaces were provided in the worksheet to fill in the points that were focused on when solving the problems. Table 5 shows the percentage of those blanks that were filled in. As a result, Group a was 75%, Group b was 14%, and Group c was 10%.

Thus, we can understand the percentage of Group a has more than Groups b and c. To verify whether the three groups are significant differences, we performed the following Kruskal–Wallis test using SAS.

First, the Kruskal–Wallis test was used to analyze whether there were significant differences among the three groups (Group a, Group b, Group c). The results of this analysis are shown in Figure 4 below. (See Figure 4.)

**Figure 4. Difference among three groups by Kruskal–Wallis test (Group a, Group b, Group c)**

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Sum of Scores</th>
<th>Expected Under H0</th>
<th>Std Dev Under H0</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>192.0</td>
<td>132.0</td>
<td>17.902964</td>
<td>24.000000</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>200.0</td>
<td>231.0</td>
<td>20.510422</td>
<td>14.285714</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>136.0</td>
<td>165.0</td>
<td>19.163978</td>
<td>13.600000</td>
</tr>
</tbody>
</table>

Average scores were used for ties.

**Table 5. Worksheet of jigsaw activities**

<table>
<thead>
<tr>
<th>Group</th>
<th>Percentage of writing points (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group a</td>
<td>75</td>
</tr>
<tr>
<td>Group b</td>
<td>14</td>
</tr>
<tr>
<td>Group c</td>
<td>10</td>
</tr>
</tbody>
</table>
As Figure 4 shows, the Kruskal–Wallis test was used to analyze the results at the 5% level. The results show that the p-value is 0.0032. This means that there is a significant difference. Thus, it means that there is a significant difference in the expert activities of the three groups: Tables, Equations, and Graphs.

Next, we tested whether only Group a was significantly different from Groups b and c. First, we divided them into “Group a” and “Group b and Group c.” The result is shown in Figure 5 below. (See Figure 5.)

**Figure 5. The difference among three groups by Kruskal–Wallis test (Group a, Group b, and Group c)**
As shown in Figure 5, the p-value of the Kruskal-Wallis test is 0.0008, indicating that there is a significant difference. Thus, from Figures 4 and 5, Group a was significantly more likely to write down the key points for solving the problems, indicating that learning to start from tables is more likely to be a mathematical activity than starting from equations or graphs. Group a students tend to engage in more spontaneous problem-solving activities than Groups b and c students.

4. Conclusions
Therefore, from the results and discussion in the previous section, the following can be said.

- From the view of learning effectiveness, it remains unclear which of “Tables,” “Equations,” or “Graphs” is most effective at the beginning of the study. This is the conclusion of the fact that no significant difference was detected in the test scores. However, the problem would be simply that the sample size is too small, which leads to this conclusion.

- Tables are more likely to engage in spontaneous problem-solving activities than those in equations and graphs. This is the conclusion drawn from the comparison of student activities read from the worksheet.

Based on these conclusions, there are two prospects for the future. The first is to practice with junior high school students in many schools to increase the sample size and to increase our precision about where to start with tables, equations, or graphs.

Second, once the initial method of expressions is determined in A: Tables → Equations and Graphs, B: Equations → Tables and Graphs, or C: Graphs → Tables and Equation, we would like to focus on creating teaching materials based on the results.
REFERENCE


[18] Plimpton 322:(Quoted from https://commons.wikimedia.org/wiki/File:Plimpton_322.jpg)


Amplifying Youth Voice in Developing Culturally Relevant SEL Models; The Intersection of Culturally Responsive Teaching (CRT) and Social Emotional Learning (SEL)

1. Social-Emotional Education
2. Presentation format: Roundtable; Student Paper & Proposals for Future Research
3. A discussion about the lack of culturally relevant Social Emotional Learning (SEL) models made available for students from historically marginalized populations (racial, cultural, socioeconomic), and the impact this has on perpetuating the opportunity gap (in academics, social, and psychological areas) that disproportionately afflicts these students. This future research and paper will aim to centralize and amplify youth voice (YPAR) in developing relevant out-of-school-time (OST) programs by embedding culturally relevant teaching (CRT) components into SEL.
4. Paper author(s):
   1. Hannah Alice Andry
   2. Doctoral Candidate; Learning, Leadership, and Community EdD Program
   3. Plymouth State University, NH
   4. handry@plymouth.edu

Abstract:

Despite the emphasis in recent years on the importance of social and emotional learning for students, there is a dearth of culturally responsive social emotional learning (SEL) opportunities for youth from diverse cultural, religious backgrounds, and socioeconomic situations (Schlund et al., 2022), a phenomenon that is at odds with SEL's founding aims (J. Comer, 1968). This contributes to the ever pervasive opportunity gap that afflicts students from historically marginalized populations. Presently defined by The Collaborative for Academic, Social and Emotional Learning (CASEL), SEL is the process through which “all individuals acquire and apply the knowledge, skills, and attitudes to develop healthy identities, manage emotions and achieve personal and collective goals, feel and show empathy for others, establish and maintain supportive relationships, and make responsible and caring decisions” (2020). Culturally responsive teaching (CRT) defined by Geneva Gay (2010) as “using the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning encounters more relevant to and effective for [students]” (p. 31). Gloria Ladson-Billings (2009) maintains that CRT is “a pedagogy that empowers students intellectually, socially,
emotionally, and politically [because it uses] cultural referents to impart knowledge, skills, and attitudes” (p. 20). Culturally relevant SEL programming lies within my immediate sphere of influence as a non-profit youth program director in Greater Boston. In my role, I work to develop and deliver SEL and social justice programming to a diverse racial, religious, and socioeconomic student population. Although I am close in proximity to this problem, this issue goes beyond my specialty and connects to other local and national conversations around socio political issues involving equity, inclusion, and representation. There is a gap that lies within some current popular SEL models that reflect only American, heteronormative standards for social and emotional development, which occurs naturally and differently for all students. The recommended action post-research will focus on shifting the responsibility from students having to adapt to inequitable expectations and systems, to the oppressive society and systemic barriers that some students are exposed to, and furthermore, invite youth into their learning through youth participatory action research (YPAR) (Edirmanasinghe, et. al, 2022; Cammarota & Fine, 2010; Ozer, et al., 2021). This research will be approached through a postmodernist Social Justice theory lens and utilize qualitative YPAR research methodology.
Supporting Academic Integrity: A Balanced Approach

HICE 2023 Roundtable

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For this roundtable discussion, we proposed to inform attendees about our recommendations for a balanced approach to supporting academic integrity and request their feedback and ideas for improving academic integrity in higher education. Our research involved surveys with 228 students and 73 instructors at our Canadian online university, asking about issues related to academic integrity and misconduct. The research revealed three areas of concern: policy and procedures, compliance and commitment, and resources. In addition, we found three roles responsible for implementing solutions: university administrators, instructors, and students.

Our findings based on our research and the research literature suggest that clarity in policy and procedures needs to be improved. This includes clarity about reporting procedure, range of consequences, and evidence needed for reporting cases.

From our survey, we found that greater compliance and commitment were needed throughout the university. Participants requested that administrators take cases more seriously and that everyone (administrators, instructors, students, and others) needed to emphasize and communicate the importance of academic integrity. A further request was for instructors to be compliant with policy and to model academic behaviour. We found evidence for these recommendations in the literature as well.

A third key issue that arose with our research and review of the literature was the need for more resources. Resources are important for compensation for pursuing alleged cases of misconduct, education and training, and effective course design. Resources, as well as compliance and commitment, are essential for enacting effective policy. A balance is needed to support a culture of academic integrity.

Our research participants provided a number of recommendations and strategies for improving academic integrity, both for our particular university and for educational institutions in general. We distributed handouts listing these to the attendees at our roundtables. However, there were a few suggestions from our research participants that we were not able to verify in the study. There seemed to be insufficient research for making recommendations relating to these matters. We invited our attendees to discuss these remaining issues at the roundtables. They were also asked whether our findings resonated with them and their institutions. Overall, we found that they did.

Issues that remain from our research about supporting academic integrity:
Use of Honour Codes.
There is some evidence that honour codes or pledges can help increase academic integrity.

- Have attendees used honour codes at their institutions to prevent cheating?
  o How well did that work?
  o Would it work in different contexts (e.g., different countries)?
  o Is it sufficient to remind students about integrity or do they need to go further and actually pledge to uphold it?

  Roundtable attendees discussed the history and origins of honour codes, whether they could be presented in such a way as to avoid a moral tone, and whether they were more likely to be successful in certain contexts. An attendee mentioned that signing an honour pledge was more successful than talking to students about cheating, using lockdown browsers, or using text-matching software in misconduct prevention. [However, a check of the source of this information (Shu et al., 2012) after the conference revealed that, ironically, this research team was accused of using fraudulent data (Berenbaum, 2021).] Roundtable attendees agreed that there was not a lot of research on this in Canada to help decide the issue.

Is “cheating” mostly a moral matter?

- Do attendees think that most students who “get caught” cheating are making a moral choice to do so?
  o What approach does your institution take – punitive, educational, or restorative justice?
  o Which of these should be encouraged?

  Although this question was not asked specifically, roundtable attendees tended to talk about integrity as being something students needed to understand better. Difficulty with time management was also raised as a factor.

Should text-matching software be used to “catch” students?

- What about using it to teach students?
- What are the dangers of giving students access?

  We did not have the time to discuss this question. However, in passing attendees mentioned they used text-matching software as a learning activity.

Is it a good idea to inform students about essay mill websites?

- How much detail should be given?
- Could this backfire?

  We did not have time to discuss this question. It remains a topic for future discussion.

References


Change in Teacher’s Knowledge and Attitude After Dyslexia Simulation Professional Development

Topic: Special Education

Authors:
Joseph Genovesi, Junior at Hopewell Valley Central High School, josephgenovesi@hvrsd.org

Sponsor: Vicky Pilitsis, PhD, Director of Curriculum & Instruction Hopewell Valley Regional School District, vickypilitsis@hvrsd.org
Change in Teacher’s Knowledge and Attitude After Dyslexia Simulation Professional Development

This abstract will discuss a survey completed in 2017 on teachers’ knowledge and attitudes on dyslexia and a follow-up survey on teachers in the same district on knowledge and attitudes on dyslexia after a one-day training session (dyslexia simulation) and discuss with students who have dyslexia.

**Background:** According to Yale’s Center for Dyslexia and Creativity (2017), dyslexia is very common. It affects 20 percent of the population and about 80–90 percent of all students with learning disabilities have dyslexia. Dyslexia is caused by a neurological difference in the brain connectivity of people with dyslexia as compared to typical reading people (Yale Center, 2017).

What is Dyslexia

“Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge.” (IDA, 2002).

This definition was adopted by the International Dyslexia Association (IDA) in 2002 and many state education codes, including New Jersey, where my school district is located, have adopted this definition. Dyslexia is also sometimes called an invisible disability because it doesn’t have outward visible signs (Shaywitz, 2003). This can lead teachers to believe many of the stereotypes about people with dyslexia. Some of the most hurtful are people with dyslexia:

1. are stupid
2. can’t read
3. are lazy, they just need to try harder
4. can be cured
5. always have other learning disabilities

Researchers Lee and Smith (2001) stated “There appears to be a high correlation between the extent to which a teacher articulates a belief in making a difference, and rejects deficit models of students and their families, with the quality of their pedagogies” (p. 37). So teachers who believe in the misconceptions of dyslexia are less likely to have high expectations of students with dyslexia and more likely not to support them or their IEPs (individual education plans).

In 2017, I conducted a research project to discover which of the common misconceptions of dyslexia teachers believed the most. The results from the 2017 survey of teachers in the district were as follows:
Teachers in K-5th grade: There were 10 teachers who answered the survey
Top four misconceptions:

- Dyslexia is a difference not a disability
- Girls aren’t equally likely to be dyslexic as boys
- You can fix dyslexia there is a cure
- Reading text is the best way to learn

![Graph of Most Common Misconceptions for Teachers Grades K-5th](image1)

**Figure 1: Graph of Most Common Misconceptions for Teachers Grades K-5th**

Teachers at TMS in 6th-8th grade: There were 39 teachers in that answered the survey.

The top four common misconceptions were:

- Girls aren’t equally likely to be dyslexic as boys was the most common misconception. 87% of teachers either answered wrong or were not sure.
- Dyslexia is a difference not a disability was the next most common misconception. 74% of teachers either answered wrong or were not sure.
- You can fix dyslexia there is a cure was the next most common misconception. 47% of teachers either answered wrong or were not sure.
- Reading text is the best way to learn was the next most common misconception. 36% of teachers either answered wrong or were not sure.

![Graph of Most Common Misconceptions for Teachers Grades 6-8](image2)

**Figure 2: Graph of Most Common Misconceptions for Teachers Grades 6th-8th**
Teachers in 9th - 12th grade: There were 23 teachers that answered the survey.

The top four common misconceptions were:
- Dyslexia is a difference not a disability
- Girls aren’t equally likely to be dyslexic as boys
- You can fix dyslexia there is a cure
- Using non text ways to learn is just a crutch. Students must learn how to read text to be able to keep up with their peers.

![Figure 2: Graph of Most Common Misconceptions for Teachers Grades 9th-12th](image)

2022 Study: In October of 2022 the Hopewell Valley School district conducted a one-day professional development for teachers. The teachers received a Misconceptions of Dyslexia Survey before the professional development day and then received a post survey after the professional development. The post survey repeated the top 15 misconceptions and had an open ended question on how they may have changed their teaching methods after the professional development to see what impact a one-day dyslexia simulation and discussion with students can have on teachers. The results of these surveys is presented below.

The Purpose of the Study: The purpose of this research was to investigate the impact of a half day Dyslexia Simulation Training on teachers' knowledge, attitudes and beliefs about dyslexia.

RQ1: What are the most common misconceptions around dyslexia in the school district?

RQ2: What impact did a half day Dyslexia Simulation Training have on teachers' misconceptions about dyslexia?
**Results:** The results from this research study matched the results from my previous study in 2017 in that the top 3 misconceptions from 2017 were still in the top 11* held misconception by teachers in the pre-PD survey. These were:

- Girls aren’t equally likely to be dyslexic as boys.
- You can fix dyslexia there is a cure.
- Visual Reading is the best way to learn

The fourth highest “Dyslexia is a difference not a disability” was discarded because teachers felt this question was confusing.

The post-PD survey showed that the half day training significantly changed 5 of the top 11 misconceptions that teachers hold about dyslexia. There was a moderate but not statically significant change in another misconception. 4 misconceptions had only a slight change and 1 misconception didn’t change at all.

![Graph: Misconceptions Held by Teachers about Dyslexia]

* The 10th and 11th most common misconceptions were tied so both were included in the results.

**Discussion:** Changes in Teacher Misconceptions

The following misconceptions dropped significantly indicating that teachers have a better understanding that:

- Poor readers can be of average or above average intelligence.
- Dyslexia is a chronic condition that cannot be fixed.
- Dyslexia is hereditary.
- The label of dyslexia can help a student know that they are not lazy.

**Other Important Findings to Note:**

- Teachers may hold unconscious biases around poor reading. In the pre-survey when teachers were asked if students with dyslexia have below average intelligence or if they are not as intelligent 89% and 96% disagreed. But as the graph indicates only 40% pre-survey indicated that poor readers can be average or above average intelligence and even after training only 67% agreed. Dyslexia is characterized by the inability to read fluently and most people with dyslexia are poor readers.
- Of the 119 statements about student supports only one teacher wrote about supporting the student’s emotional well-being.
- There are studies about the emotional and social impacts of dyslexia on students. As a person with dyslexia, I know the importance of training teachers and parents so that the negative impact of early academic failures can be mitigated.
✓ “I have never had a student in my class with dyslexia” from a 20+ year teacher.

Why knowing about these misconceptions is important:
Many of these work together to make learning and school harder for students with dyslexia. If you are a teacher who believes that dyslexia is a difference not a disability you are less likely to embrace a student’s accommodations. This is especially true if you think dyslexia can be fixed or that the student is just using their accommodations as a crutch. Teachers who believe this often view students as lazy. “If they just worked harder, they wouldn’t need extra time or audio books.” This also leads teachers to believe students with dyslexia are not as intelligent as other students.

The truth is that having dyslexia makes the school day and homework exhausting. The student with dyslexia always must be concentrating 150% to just keep up with the class. Homework can take 2-4 times as long to complete and as the student gets more tired the symptoms of dyslexia get worse, until it is impossible to even try to do work.

Literature Cited


**Acknowledgements:** I would like to thank Dr. Toni May from Drexel University for helping me with the statistics for this study. I would also like to thank Dr. Vicky Pilitsis for helping me get the survey out to teachers and all of the teachers who filled out the surveys.
Title:
Westward Expansion through the Lens of Indigenous Populations: A Place-Based Teacher Professional Development and Collection of K-12 Lessons to Teach History Through the Lens of Those Whose Stories Aren’t Told in Textbooks

Topic:
Teacher Education

Description:
A US Department of Education Grant Program funded a GeoCivics Professional Development (PD) for teachers of language learners to increase knowledge, skills, and confidence in working with English learners while teaching history, geography, and government in their K-12 classrooms. The first year of the grant looked at history through the lens of those whose stories aren’t told in traditional classroom curriculum. As part of the PD, teacher participants developed 3-5 lessons to bring their knowledge back to their schools; one lesson including a civics action project to bridge classroom instruction to community needs - empowering our next generation of leaders. This workshop will include teacher’s stories from the PD and the exploration of these freely-accessible lessons.

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The GeoCivics project is in its first year of a 3-year grant program. The GeoCivics Project will support culturally and linguistically diverse students in both Arizona and across the U.S. by developing a systemic plan to design and implement professional development (PD), digital resources, and GeoCivics lesson plans based on evidence-based strategies to further educate, support and empower K-12 teachers. This will provide an all-inclusive learning experience for students to develop social studies knowledge, academic vocabulary, and literacy skills using evidenced-based approaches to teaching diverse and underserved student populations. To do this, ASU leveraged strong partnerships with local school districts that have large EL
populations. Using the Arizona Geographic Alliance (AZGA) model that provides effective PD that also supports teachers in creating standards-based lessons for diverse learners while strengthening teacher leadership skills, GeoCivics partnered with teachers from underrepresented populations to participate and develop, collaborate, and create knowledge in the areas of American history, geography, civics, government through online modules and lessons that will be freely accessible to all teachers. Following the PD, these teacher leaders shared their knowledge and skills by conducting a PD for colleagues to further support effective practices across their districts and the state. Informed by Barnett (2014), Gamoran (2012), August (2009), Vaughn, (2009), Wenner (2015), Shulman (2013), Echevarria (2010), Bandura (1999), and Yosso (2005), this study evaluated teachers through assessing GeoCivics content knowledge, skills in teaching English learners’ content, confidence in teaching culturally and linguistically diverse students both content and language in tandem to increase social sciences and English literacy skills. In doing so, the GeoCivics project:

- Developed & provided online and face-to-face PD in GeoCivics through the first-year topic: Westward Expansion through the Lens of Indigenous Populations to 15 teacher Leaders from diverse geographic, grade levels, teaching experience, and cultural backgrounds.
- Developed 30 GeoCivics lessons that support culturally and linguistically diverse students in the areas of American History, Geography, and Civics connected with the first-year focus topic
- Guided teachers in the development of civic action projects that connect with American history, geography, civics, and government that are currently being implemented in K-12 classrooms across the country
- Supported underrepresented teacher leaders with self-study to improve teaching and learning
- Created online PD to reach teachers across the state and nation in GeoCivics instruction that are now freely accessible to all K-12 teachers at [https://www.teachgeocivics.com/](https://www.teachgeocivics.com/)
- Utilized technology to develop free online PD and evidence-based lessons

The teachers developed their lessons, piloted them in their classrooms, and are currently publishing their lessons to the GeoCivics page as well as to the Arizona Geographic Alliance website. These lessons focus on:

<table>
<thead>
<tr>
<th>Grades K-12</th>
<th>Implementing Land Acknowledgements to Learn About Original Indigenous Lands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades K-3</td>
<td>Life after Bosque Redondo / Treaty / Boarding schools</td>
</tr>
<tr>
<td>Grade 2</td>
<td>Exploring Indigenous People / Stories brought to Life / Indigenous Now and Then</td>
</tr>
<tr>
<td>Grade 3</td>
<td>Arizona Indigenous culture</td>
</tr>
<tr>
<td>Grade 4</td>
<td>Water is Life</td>
</tr>
<tr>
<td>Grades 4 - 8</td>
<td>Telling Our Stories: Building Community through Community Cultural Wealth</td>
</tr>
<tr>
<td>Grades 4-8</td>
<td>Beyond the Cherokee: Learn History Like You Have Never Heard Before - The Ketowah People</td>
</tr>
<tr>
<td>Grades 6 - 8</td>
<td>Westward Expansion, and impact on the Seminole Indians in Florida</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Middle school</td>
<td>Trail of Tears</td>
</tr>
<tr>
<td>High school</td>
<td>Indigenous sacred places, the Long Walk, and land acknowledgements for the CAP.</td>
</tr>
<tr>
<td>High school</td>
<td>Indigenous Traditional Foods and The Three Sisters</td>
</tr>
<tr>
<td>Grades 11/12</td>
<td>Founding Documents and Westward Expansion.</td>
</tr>
<tr>
<td>Grade 12</td>
<td>Acknowledgement of the Taínos as an Indigenous Tribe by the Federal Government</td>
</tr>
</tbody>
</table>

As a result of the GeoCivics experience, there were significant gains in knowledge, skills, and self-efficacy in teaching American History, Geography, and Civics to English learners in the K-12 classroom. These teachers reflected on the impact the PD had on their teaching with one teacher describing the resources and pedagogical skills gained that have greatly supported their teaching, another teacher discussing the shift in teaching through an inquiry lens, and yet another discussing how they have gained confidence in teaching civic education and engaging students within their community. One hundred percent of the teachers reported that they researched all three goals in increasing content knowledge and skills in teaching Social Studies, increasing pedagogical knowledge in teaching English learners, and increased civic engagement practices in their classroom.

In addition, these teachers increased teacher leadership skills through increased confidence in sharing knowledge with colleagues, gaining confidence in presenting to local school boards and at conferences, and engaging in collaboration efforts to share resources to improve instruction for all students within their community. Overall, these teachers have stressed the important of place-based professional development and the impact it makes in teacher knowledge, pedagogical skills in the classroom, and impact on student interest and learning from the teachers who have first-hand experience and primary and secondary documents and resources to teach the content. One teacher mentioned that this was the best PD they had ever experienced and truly helped them grow as a teacher and teacher leader and the impact it is having on student successes in the classroom.

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Vaughn, S., Martinez, L.R., Linan-Thompson, S., Reutebuch, C. K., Carlson, C. D., & Francis, D. J. (2009). Enhancing social studies vocabulary and comprehension for seventh-grade

Title:
Supporting English Learners through Teacher Professional Development: Successes, Challenges, and Lessons Learned from Key Grant Personnel of a US Department of Education National Professional Development Grant Program

Topic:
STEM Education, Teacher Education

Description:
A US Department of Education National Professional Development (PD) Grant Program funded a STEMSS PD for teachers of language learners to increase knowledge, skills, and confidence in working with English learners in their K-12 classrooms. A partnership between the grant and the Arizona Geographic Alliance guided the PD format and teacher leadership development. This session will share the successes, challenges, and lessons learned as a result of this 5-year project.

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The Arizona Geographic Alliance (AZGA) has trained educators in geography education for more than 25 years. As part of the successful program that initially partnered Arizona State University with National Geographic to foster geography education, leadership development became an integral part of the success and longevity of the program. As teachers became more involved after the initial training, they were provided opportunities to lead projects and mentor new teachers. The STEMSS program leveraged this professional development method to grow a cadre of STEMSS (STEM + Social Studies with an emphasis of integrating geography across the curriculum) teachers while making an effort to engage teachers from diverse backgrounds and those who work with linguistically diverse student populations.

As part of the teacher professional development, 10 STEMSS online modules (https://www.teachstemss.com/) and more than 50 lessons have been developed and are freely accessible on the AZGA website (http://geoalliance.asu.edu/lessons/geomath). In addition, these teachers have assisted in training additional cohorts of teachers that are bringing STEMSS education that supports academic vocabulary development back into their schools and sharing the strategies with their colleagues. Several teachers have received awards for leadership and effective teaching practices and others have moved on to leadership roles within the education community. Still others have gone back to school to work on Masters and Doctorate degrees to make a further impact on policy and curriculum that reaches diverse student populations. In total, more than pre-service teachers, 120 in-service teachers, and 50 para-professionals have increased knowledge, skills, and self-efficacy in supporting English learners in the classroom. These teachers and grant staff have conducted more than 100 conference sessions to disseminate the STEMSS lessons and EL strategies and, as part of the family-engagement events incorporated into the PD and participant requirements, more than 300 families and community members have engaged in STEMSS activities that embed EL strategies to support language acquisition through STEMSS content.

This five-year US Department of Education National Professional Development Program STEMSS had three goals: (1) To improve instruction for English learners, (2) To increase teacher’s knowledge, skills, and self-efficacy in teaching English learners, and (3) To support EL Families and Community through Family Engagement Events. All three goals, based on Yosso’s Community Cultural Wealth (2005) Framework and Stanford’s Six Principles for EL Instruction (Stanford, 2013) were to ensure that emergent bilinguals have equitable and successful school experiences with support both in school and at home. Supporting teachers to engage in culturally sustaining practices that honor students’ families’ knowledge and experiences will support emergent bilinguals in their educational journeys. Grant funding can help support these important goals. However, writing a funded grant proposal is only the first step after needs have been identified and innovative projects have been designed. Once funded, various challenges exist in ensuring the intent of the project is carried out while meeting the needs of the target population. Navigating both the grant verbiage and higher institution’s interpretations of the intent inspire initial conversations. These conversations were then followed with hiring processes and implementing grant logistics to effectively run the grant.
Once the actual work began in meeting grant goals and objectives, many other challenges became apparent. For this grant, using the assessment tool was cumbersome and not effective in gathering the data we had planned on collecting to support the goals. This issue guided a literature review and eventually the development of our own vocabulary assessment tool that needed to be vetted and piloted. We also encountered staff changes and needs for rehires. Recruiting is always a challenge and the processes initially implemented had to be modified when Covid hit, delivery of professional development had to be moved online, and timelines had to become more fluid and flexible. Key Grant Personnel shared successes, challenges, and lessons learned by sharing a synthesis of research findings and identifying several key elements in conducting a grant program such as the importance of ensuring that grant staff have similar goals and beliefs about additive language programming. Key partnerships, such as the Arizona Geographic Alliance and local school districts, were critical to helping us grow a cadre of teacher leaders who work with language learners and who disseminate lessons and resources. These partnerships brought many added benefits but also lessons learned on how to bridge two entities’ goals and missions to their work. Furthermore, navigating challenges such as Covid school closures, changing modalities, and connecting with school communities that impact project successes are documented below.

Beyond the successes of the grant and meeting grant and funder’s goals, the 120 teachers and 50 pre-service teachers who participated impact more than 600 students annually. These teachers have shared their experiences and new knowledge with more than 500 educators who have access to the freely accessible EL resources, PD, and lessons. Several articles, white papers, policy briefs, and conference proceedings disseminate grant resources and successes. The research has included opportunities to engage with teachers as co-researchers and co-authors through a research-intensive and practitioner focused research project. And, the revisit of grant goals and objectives and working with a consortium of educators, parents, faculty, and key stakeholders, have helped keep the “North Star” focus on English learners and improving instruction for ELs in K-12 classrooms across the United States. Partners, such as the Arizona Geographic Alliance, have provided membership lists, resource libraries, and content-focus professional development to ensure teachers have the knowledge and skills to teach content and language in tandem. These partnerships helped grow an outreach to EL communities and teachers. Finally, US Department of Education funding and Arizona State University personnel have successfully supported the grant project to ensure these outcomes were possible.

Lesson’s learned as a result of the grant project as a whole, challenges such as Covid, staffing changes, ensuring partners and staff are aligned to the project ‘North Star’, and teacher workload post-Covid include a list that will support future project planning. These include:

- Assume a grant proposal will get funded and prepare for it
- Ensure plenty of staff are budgeted to conduct grant activities and staff requirements/disposition/skills align to the ‘North Star’ of the project
- Build in a planning year if possible
- Develop and support ongoing and open lines of communication
- Conduct regular and frequent meetings for reflection and planning
Focus on the ‘North Star’ of the project in all decision making

Look for varied avenues to disseminate and provide dedicated time to focus on research dissemination, writing, and publishing

References


Mrs. C teaches second grade in a small city in central Maine. Well over half of the students in her district qualify for free and reduced-priced lunches (56% when the study began). Over the past several years, she transformed her mathematics teaching and her students’ learning by coupling the use of screencasting apps to record and hear students’ voices with apps that help students visually think about and model mathematics concepts. Allowing students to create screencasts, or videos of their work and thinking, has benefited all her students, “but especially kids that aren’t comfortable writing or reading” (quotes are from an interview of Mrs. C, October 19, 2019). She also believes that open model apps (e.g. the Number Frames and the Number Line app, which are free on the Math Learning Center’s website
https://www.mathlearningcenter.org/resources/apps) allow her students to better visualize numbers. She knows that her students “have a lot of math understanding, but they can’t get it out in [written] words.” She believes integrating both these tools into her math teaching helps her give all of her students “a voice, and [that] regardless of their literacy ability, it shouldn’t impact [their] math ability to share what [they] know.” When asked about the changes she observed in her classroom, Ms. C explained,

Seeing the growth that kids had [made] by explaining their thinking, and the more opportunities they had to use those open apps and to use visuals as an explaining tool …, it just seemed to open their minds more to math and have more of a growth mindset about the ways to solve problems instead of coming in and saying, ‘I’m not a math person.’
When you’re a second grader and you already think you’re not a math person, that’s sad. You shouldn’t think you’re not an anything person when you are seven; you’re an everything person!

Mrs. C participated in a multi-year research and professional development project focused on investigating how one-to-one mobile devices, tablets, leverage mathematical learning in K–2 classrooms. The study brought together education researchers, university faculty, administrators, and teachers as co-investigators in a collaborative project. Participants worked together to identify how the use of a screencasting app, such as Explain Everything™ or ShowMe™, can improve students’ mathematical learning. Screencasting apps provide students with an interactive whiteboard platform. They enable students to video-record their writing and audio-record their voice as they work. Additionally, students can import photographs and videos into their projects.Saved screencasts can then be projected and played for an entire class to observe and discuss. In this paper, we describe findings from the project focused on ways using technology provided more students more access to learning mathematics in early elementary school (K-2) mathematics classrooms. Before jumping into the study, we first provide a brief overview of relevant literature on mobile technology and then summarize equity literature that help frame our findings.

Mobile Technology and Student Learning

Some research (e.g., Hall, 2015) suggests that using handheld mobile technology in early grades classrooms promotes isolated learning that prohibits social interaction and limits hands-on learning. Although many math applications available on mobile digital technology focus on drill and practice of procedures, research indicates that interactive digital technologies can improve the teaching and learning of mathematics in the early grades (e.g., Attard & Curry, 2012; Ginsburg, Jamalian, & Creighan, 2013; Goodwin & Highfield, 2013; Soto, 2015; Soto &
Ambrose, 2014; Soto & Hargis, 2014). Mobile digital technologies can provide students with unique learning opportunities. Using recording tools available on these devices, students can document their problem-solving approaches and share their thinking with others (Attard, 2013; Larsen & McCormick, 2020; Larsen, McCormick, Buffington, & Louie, 2018). Moreover, video and screencast recordings allow students to review, reflect on, share, and critique their own as well as others’ written work and “can help support effective teaching practices that promote problem solving and deeper learning of elementary mathematics” (Thomas, 2017, p. 493). The ease with which students can record and share their recordings affords them access to other children’s problem solving methods and opportunities to reflect on their own and others’ explanations and even find and correct these mistakes (Hattie & Timperley, 2007; Soto, 2015; Soto & Hargis, 2014). The act of creating video recordings of their work can engage students and enable them to view themselves as creators of worthwhile mathematical ideas (Yelland & Kilderry, 2010). Recordings of students’ mathematical thinking can also provide students and teachers with evidence of learning and be a source of motivation and encouragement (Blair, 2013; Sedig & Liang, 2006; Soto & Ambrose, 2014). Moreover, audio-visual recording capabilities can be especially advantageous for young children who are better able to express their thoughts verbally rather than through writing.

Providing Access for All in Elementary Mathematics

In Principles to Action (2014), the National Council of Teachers of Mathematics (NCTM) presents a “unified vision of what is needed to realize the potential of educating all students... Most important, it describes the actions required to ensure that all students learn to become mathematical thinkers” (p. vii). In the document, NCTM outlines six essential guiding principles “that must exist for all students to learn” (p.vii) and eight practices that provide a
research-based framework of “high-leverage practices and essential teaching skills necessary to promote deep learning of mathematics” (p. 9). The first principle, Teaching and Learning, states, “An excellent mathematics program requires effective teaching that engages students in meaningful learning through individual and collaborative experiences that promote their ability to make sense of mathematical ideas and reason mathematically” (p. 5). Another principle, the Tools and Technology Principle, requires “that an excellent mathematics program integrates the use of mathematical tools and technology as essential resources to help students learn and make sense of mathematical ideas, reason mathematically, and communicate their mathematical thinking” (p. 5). A third underlying principle is Access and Equity, which we use to help frame our findings.

The Access and Equity Principle “requires that all students have access to a high-quality mathematics curriculum, effective teaching and learning, high expectations, and the support and resources needed to maximize their learning potential” (NCTM, 2014, p. 5). Beliefs and practices that empower all students to participate meaningfully in learning mathematics provide the foundation for access and equity (NCTM, 2014). One such belief is that “All students are capable of making sense of and persevering in solving challenging mathematics problems and should be expected to do so” (NCTM, 2014, p. 64). Students, regardless of gender, ethnicity, and socioeconomic status, need the support, confidence, and opportunities to reach high levels of mathematical success. NCTM includes students’ dispositions and persistence in mathematics as essential elements to equity and access in mathematics classrooms. The authors note the lack of self-confidence that many students develop leads them to view mathematics as something beyond their grasp that they can never hope to understand. These students see mathematics as being within the reach of only a few exceptional students. However, students and teachers should
all believe that all students can participate and achieve in mathematics, and “all deserve support to achieve at the highest levels” (NCTM, 2014, p. 63). All students and teachers need a growth mindset toward learning mathematics that emphasizes mathematics teaching and learning as processes that cultivate mathematical abilities, stresses success and learning as a reflection of effort and not intelligence alone, and promotes the belief that all students can participate and achieve in mathematics (NCTM, 2014). Moreover, classroom environments that foster “a sense of community that allows students to express their mathematical ideas—together with norms that expect students to communicate their mathematical thinking to their peers and teacher, both orally and in writing, using the language of mathematics—positively affect participation and engagement among all students” (NCTM, 2014, p.66).

In their chapter “Providing Access to Equitable Mathematics Learning,” Wager, Pietz, and Klehr (2017) synthesize the research behind the Access and Equity Principle. They identify dispositions and practices “necessary to achieve equitable mathematics teaching: (a) believing that all students are capable and having high expectations of them; (b) valuing student thinking and engagement in practices that support student agency and identity; and (c) identifying possible interventions to achieve the goal of equitable access” (p. 99). They state that equitable mathematics teaching requires the belief that all students can and should participate in rich, rigorous mathematics. They also note pedagogical practices and instructional choices that support students’ mathematical identity and agency, which include positioning students as capable, listening closely to learn about students’ mathematical thinking, and engaging in practices that help all students to voice their mathematical thinking. Equitable mathematics teachers engage “practices that empower all students to have agency in their learning and develop their identity” (Wager, Pietz, and Klehr, 2017, p. 102). Additionally, Wager, Pietz, and
Klehr (2017) note that given the opportunity, students who participate in mathematical practices that support agency and equal status, such as constructing equitable participation norms that position all students as capable, can transform how they view themselves as mathematical thinkers, how they view mathematics, and how and what mathematics they learn. Classrooms that provide equitable access to learning must be structured so that all students participate, share their ideas, questions other students’ ideas, and respond to their teacher’s questions. Classrooms that establish equitable participation norms and support students’ agency develop a community where students know they can make and learn from mistakes and provide space for classroom discussions that build confidence and enable students to cultivate strong mathematical identities. Equitable teaching positions all students “as capable and confident” (Wager, Pietz, and Klehr, 2017, p. 103).

Bieda and Staples (2020) support the notation of justification as an equity practice. Requiring students to justify their thinking provides students with equitable access to mathematics, develops their agency, and promotes their engagement in learning. They claim, “These two aspects—access and agency—link the mathematical practice of justification to teaching that aims at achieving more equitable outcomes” (p. 103). They define access as “each student in a class having opportunities to engage in rigorous mathematics and to learn mathematics that is meaningful” and agency as students developing “a sense that they can do mathematics and create mathematical ideas; each student sees mathematics as a tool to use” (p. 104). Teachers’ justification moves can create opportunities to access fundamental mathematical ideas and highlight students’ capacities as thinkers and doers of mathematics (Bieda and Staples, 2020).
Adding to the literature focusing on equity, Boaler (2016), as part of a four-year study, found that “reasoning had a particular role to play in the promotion of equity, as it helped reduce the gap between students who understood and students who were struggling” (p. 86). Boaler (2016) added that others way to promote equity are to provide high-level content to all students, change perceptions of who can achieve in mathematics, and teach students in ways that encourage them to think more deeply about the subject. She also found that visual representations “play a critical role in opening access to understanding for all students” (Boaler, 2016, p. 185). She reported, “When I ask students to visualize and draw ideas, I always find higher level of engagement and opportunities to understand the mathematical ideas that are not present without the visuals (Boaler, 2016, p. 185).

The Project

In the spring of 2014, the authors, both faculty at nearby public universities, began this project with approximately 30 ASD School District kindergarten to second-grade teachers and administrators and members of the Education Development Center (EDC), an educational non-profit research and professional development organization. We collaborated to learn how mobile digital technology combined with best practices in teaching mathematics could improve K-2 students’ mathematics learning. ASD has a population of 3,600 students. To improve both mathematics and literacy in early elementary classrooms, the district launched a one-to-one tablet initiative in 2011. Following this, the literacy scores improved, but students’ mathematics scores remained disappointingly low. When the project began in the district, students most often used iPads individually. They wore headphones and interacted with devices only by tapping their screens. By the end of the study, participating classrooms looked and sounded very different. We observed students solving high-level tasks on their own and with their peers, recording their
strategies and reasoning using screencasting apps, sharing their screencasts with their peers, thoughtfully providing feedback on each other’s work, and then revising their screencasts. Learning went from rote and isolated on the tablets to rich, meaningful, and collaborative.

The project was part of the Research + Practice (R+P) Collaboratory, which promotes a collaborative partnership approach between researchers and practitioners to help bridge the gap between research and practice in STEM education. Each month throughout two school years and for several days each summer, we participated in professional learning community (PLC) meetings. During the meetings, the professional development focused on the technology and supported the teachers’ pedagogical content knowledge. Building on the work of other projects (e.g. Attard, 2013), we knew that to harness the potential of mobile digital technology and for teachers to embed the research-based practices with technology into their teaching, the participating teachers needed professional development that supported both their pedagogical math content knowledge and the integration of technology into their teaching. We also knew that they needed sustained professional dialogue to reflect on and develop these new practices (Attard 2013). In the fall 2014, we began with a “toe-in-the-water” phase when teachers explored mathematics, research-based teaching practices, and technology tools (e.g. screencasting tools and open apps), trying some of the practices and tools with their students. During each meeting, teachers shared and reflected on the practices they tried often by showing a screencast of their students’ work. Moreover, one of the authors or researchers from the EDC collaborated with each teacher and visited, videotaped, and discussed classroom lessons for monthly classroom embedded coaching cycles, which included a pre-lesson planning session, a video-recorded observation, and a post-lesson debrief.
Methodology

Design-Based Implementation Research

Equal positioning of researchers, administrators, and teachers played a critical role in the methodological approach. We considered everyone as a co-investigator. As such, we collaboratively identified needs to address, designed possible solutions, tested these solutions, and planned for the sustainability and scale of the reform strategies that emerged (Penuel, Fishman, Haugan Cheng, & Sabelli, 2011). The project adopted a Design-Based Implementation Research (DBIR) approach to co-develop and investigate technology-supported strategies that have the potential to improve mathematics learning. DBIR centers around the following set of guidelines: i) the development of theories and learning environments are interconnected, ii) research and implementation take place in ongoing iterative cycles, iii) generated theories must be applicable to practitioners and other designers, iv) research occurs in real environments, and v) the data collected highlights both enacted work and outcomes (Design-Based Research Collective, 2003). These tenets aligned well with our collaborative philosophical approach to the study.

Data Collection

During the study’s first year, 8 teachers and 9 building and district-level administrators participated in the collaborative work. In the second year, 5 teachers and 4 building administrators from the first cohort continued the work and 9 new teachers and 1 new administrator joined. Before each visit, teachers completed a strategy planning form, and after the lesson, they submitted a reflection form. At monthly PLCs, teachers shared their use of the strategy from the preceding iterative cycle. All members of the collaborative used a sharing protocol to discuss and reflect on the implementation and outcomes. During this time, teachers
Members of the study, therefore, participated in two forms of professional learning each month: one embedded coaching cycle and one joint PLC. Researchers conducted multiple rounds of interviews with members of the collaborative, including administrators, teachers, math coaches, and other researchers, and all participants completed surveys monthly throughout the two years of the project. The data collected and topics discussed informed the design choices during the iterative cycle process. When originally coding the data, researchers generated a list of themes that they presented to the collaborative. Teachers and administrators then reviewed the list, provided feedback, and identified new themes. One of the codes that emerged in our early rounds of coding was “equity.” The following themes were included under the broad theme of equity: expected participation, expected audience, expected feedback, opportunity to revise, opportunity to see multiple strategies, choice in problem and tools, supports (i.e. sentence starters, checklists) available, high expectations, and wait time.

During the 2019 – 2020 academic year, we returned to the cite of the original study to conduct follow-up observations and interviews related to the duration of impact and scalability of the project. We collected observation and interview data from two teacher-leaders (including Mrs. C.), who we identified in the first iteration of the project. When coding their interview transcripts, we noticed that themes of equity and opportunities to learn mathematics appeared again. With this in mind, we returned to our original data set and reexamined the data we originally coded as “opportunities to learn.” In the finding that follow, we share how that data suggests that the use of screencasting apps helped teachers develop more equitable mathematical teaching practices for their students.
Findings

We believe that the greatest finding from our overall study is the way that the use of technology in mathematics classrooms provided more equitable learning experiences for the children involved in the study. Our findings suggest that using the screencasting tool in mathematics classrooms has the potential to support equitable learning for all students in the mathematics class. Our data indicated that the technology helped support requirements that NCTM declared necessary for equity (Wager, Pietz, and Klehr, 2017, p. 99): (a) equitable beliefs and expectations, (b) instructional choices that provide equitable access to learning (e.g. building on students mathematical thinking and building on the Standards for Mathematical Practice (CCSS, 2010)), and (c) pedagogical practices that support students’ mathematical agency and identity (e.g. positioning students as capable).

Equitable beliefs and expectations

For some of the teachers, the opportunity to hear all of their students’ mathematical thinking positively changed their perceptions of their students and increased their expectations of their students. Many students in this project come from low-income households, and participating schools experienced chronic underachievement in mathematics. One way that teachers’ beliefs changed relates to their estimation of students’ mathematical abilities. For example, a second-grade teacher, Mrs. S. reported, “I watched children from other schools explain their thinking and assumed they were just ‘smarter’ than the kids I work with. Now my students are those ‘smart’ kids because they can explain and show their thinking!” (Email, May, 20, 2015). Kindergarten teacher, Mrs. T, provided another example of a teacher positively changing their beliefs about a student’s capabilities in her interview (2/3/2016). She stated,

I have [a student] that just [makes] video after video […] His are just right on and he’s picking up and using tools that I haven’t even
taught yet. And he’s using them correctly and it’s just a lot of really neat stuff from that kid that I did not expect.

The ability to hear all of their students’ voices helped the teachers to understand their students in new ways and supported their development of more asset-based beliefs, including having a growth mindset.

*Instructional Choices that Provide Equitable Access to Learning*

The project provided participating teachers with rich opportunities to examine their own practice and the practice of other participating teaching. The teachers progressed from understanding their own experiences working on mathematics together to exploring new technologies and pedagogical practices and then to understanding their students’ reasoning about the mathematics. They worked toward making students’ ideas and needs, which became much more visible to them because of the screencasts, the center of the classroom. The digital technology and recordings provided a powerful vehicle for the students to use and the teachers to hear all of their voices. Mrs. K, a second-grade teacher, stated in an interview,

> I didn’t always get to listen to how every student was listening and sharing their thinking. [Now,] I can look at those students who I know are struggling and take time to review their recording later, and then I can meet with them again. So, it’s a nice snapshot of how students are doing with a particular problem at that moment (February 2, 2016).

The technology provided teachers the ability to hear and see students’ thinking and methods of solving problems much more than traditional paper and pencil work, and this helped teachers see the importance of supporting their students’ discourse. The teachers discovered that when students engage in mathematical communication, they make connections for themselves and their peers. A kindergarten teacher reported “In the past, I’d never really thought about how important it is to have [students] explain what they’re doing, what they’re thinking. So it has
been huge for me; it’s really been an eye-opener, and a changer, in how I teach my kids” (Interview, February 25, 2016).

The opportunity to hear their students’ thinking not only helped increase the value that multiple teachers placed on discourse, but it helped them to realize the value of productive struggle and wait time. The teachers also discovered they could not stop a students’ prerecorded solution to prompt student thinking as they would during an in-time explanation and that students often self-corrected in the middle of the video.

The data suggests that participating teachers changed their instruction in other ways associated with more equitable mathematics teaching. Some teachers reported that this project spurred them to restructure their pedagogy by focusing more of their lessons around hearing, sharing, and discussing students’ strategies and ways of thinking. Teachers conveyed that observing students’ screencasts helped them plan instruction to better meet their students’ needs and not just follow the district-wide curriculum. Mrs. M, who had students share their screencasts with peers stated, “The opportunity to observe students self-correct their thinking as they talk out a problem with a peer gives us lots of information. It gives us a window into their thinking and helps us plan next steps for instruction and explorations for students” (Email, April 11, 2015). To provide their students with better opportunities to share their reasoning, participating teachers implemented more high-level, open tasks that allowed for multiple entry points, strategies, and solutions. These types of problems promoted richer mathematical explanations that students then captured on their screencasting apps. The focus of lessons appeared to change from centering on “getting through” the district-wide curriculum to centering more on engaging students’ thinking and on solving and discussing tasks that promote reasoning and sense making.
Teachers also made more strategic use of the technology in their planning. To support their students’ communication with the screencasting apps, the teachers identified, created, and shared a variety of tools with one another. These include the use of sentence starters and sentence frames to support students’ reasoning and ability to justify their thinking and solution, checklists that they co-constructed with their students with indicators that contribute to a strong video, co-constructed classroom norms for productive discussions, and anchor charts about quality explanations.

In addition, teachers provided their students with more autonomy over which tools to use to solve problems and represent their thinking (e.g. representing their thinking on a virtual number line or ten frame, using manipulatives, or just drawing symbols or a picture). Including the open apps and with them the ease of multiple ways to visually represent numbers provided more students more access to the mathematics. As other researchers have found, visual representations played a significant role in opening access and increasing higher levels of engagement to understanding for all students (Boaler, 2016). Giving students choice about which representations they can use to help solve the problem helped them develop their own way of thinking about problems, and not just following a method from the book or teacher.

In a typical math class, only a few students may have the opportunity to present their ideas each day. In classrooms using screencasting apps, every student can record and explain his or her reasoning. In essence, all students create, and often revise, a presentation of their mathematical ideas each time they use screencasting tool, even if the student does share the presentation with another student or with the entire class. Reflecting on this in an interview, Mrs. K stated that the screencasting tool “forces everyone to engage in that problem and everyone to talk” (February 2, 2016). She further commented in her log about this fact stating, “creating the
videos requires ALL students to think” (January 23, 2016) and then during their whole class discussions, students begin to make connections and “light bulbs” go on.

Principal Mr. D also shared ways in which using the screencasting app supported more equitable learning in the classroom in his interview (February 9, 2016),

We may come up with the same answer, we may all have taken a different route to get there, and I think that being able to capture these things honors that process of we all think differently, and so what students are sharing out in the classroom [is] OK.

Mrs. B an English language learner teacher reported in an interview (January 26, 2016),

Sometimes they don't have the language and the ability to write down what they're thinking. But if they can use this recording tool and an app, they can show it and can talk about what they've done a little bit more easily than if it was pencil/paper.

Promoting Students’ Mathematical Agency and Identity
Teaching students in ways that provided them with more access to learning also prompted them to possess more positive mathematical identities and empowered them to have more agency as learners and doers of mathematics. For example, Mrs. C reported on the benefits of using screencasting apps with open apps (interview, October 10, 2019). She explained that children no longer have to “write a big paragraph” trying to explain to her how they know the answer’s right. They can now visually show her a picture of ten frame for example and couple that with a brief verbal explanation. She claimed, “For all kids it’s been super helpful, but especially kids that aren’t comfortable writing or reading. They have a lot of math understanding, but they can’t get it out in words.” Learning from other childrens’ screencasts in whole class discussions also helped children see “this is what we are looking for, this is the why.” She also stated, “I think it has been really helpful just to give all of them a voice and regardless of their literacy ability, it shouldn’t impact your math ability to share what you know.”

The use of the technology appears to have helped empower all children’s voices and provide access to those who are often marginalized in a typical mathematics classroom. As part of the study, we observed children who receive intervention supports, children with autism, and a student who was selectively mute record their voices using the screencasting tool and share their video-recordings with their classmates. In this manner, students who may be commonly marginalized in a classroom or who may not have opportunities to share their ideas publicly participated more fully in mathematics lessons. School administrator, Mrs. D. reported in her interview (March 11, 2016), “In a classroom where this is happening all of the students are equal participants. And all of the students’ ideas are equally valued.” This emerging evidence suggests that screencasting tools may provide a platform for a wider range of learners to communicate their ideas and have their voices heard in math class.
In her recent interview (October 10, 2019), Mrs. C reported on how using the technology has changed her students’ learning, “I think it has been really helpful just to give all of them a voice.” She later reported that students who were considered “lower-level” are now “equally as successful as anybody else.” When asked why she believes those students experienced more success in her classroom than previously, she said, “They don’t have to write anything. I think they know a lot more about math than they thought they did because they weren’t fast responders or loud responders.” She then explained how not being fast or loud has taught them they cannot be as successful as others at school learning. She noted that requiring everyone to make a video requires that everyone be doers of mathematics, that it gives them a more equal voice. She reported that in their mind,

School is hard for me, and school is not hard for you, so you’re going to answer everything and that’s how they perceive school… They are the sitters and they (the others) are the doers. And you can’t do that when you have to make your own video. You can’t just be a sitter because nothing is going to be on there. Some tried to avoid it at first, because they just are nervous, but you have to do something. And, some of those videos...a lot of those videos are just as good. They’re all good. I mean they all have different explanations and they’re very good at using the visual piece, which was huge.

In the same interview, Mrs. C reported, “The kids felt successful. And then it carried over into reading and there were so many other applications where they could start explaining their thinking without the writing piece.”

Other teachers also reported that the use of the technology helped promote students’ mathematical agency. In an anonymous end of year survey, one teacher reported, “Students have taken risks to record their thinking and will go back to add or fix their work. Something about the recording seems to motivate students to complete given tasks” (June 3, 2015).
Conclusion

In this paper, we suggest that using technology, specifically one-one mobile devices coupled with screencasting and open mathematical apps can help foster equitable classroom learning. The use of screencasts as a teaching and learning tool can provide more students more access to learning mathematics by giving all students a voice and teachers the ability to listen and space to reflect on all of their students’ explanations. Though not every teacher in our study listened to every students’ explanations, those teachers who did appeared to have a greater appreciation for the learning tool and intentionally build their lessons around their students’ ideas and needs. Those who did not view all of their students’ screencasts all of the time still increased their students’ opportunities to communicate about and justify their mathematical thinking.

By listening to and taking turns sharing students’ videos with the whole class and each other in small groups, the technology was a tool that helped teachers demonstrate that they value all of their students’ ideas and believe all of their students have important mathematical ideas. This technology also helped teachers make students’ ideas the center of the classroom. It appears to have changed both what some of the teachers and the students value as doing mathematics and increase the roll of reasoning in these classrooms. With regular and intentional use of the tool, teachers and students began to believe that the reasoning about the mathematics is an essential part of doing the mathematics.

The fact that students proposed different visuals and ways for solving problems made them more invested and interested in the task (Boaler, 2016). As Boaler suggested, the increase in engagement by students who weren’t typically engaged in mathematics appears to have stemmed from students seeing the creativity in math and the multiple way people see and think about mathematical ideas. The open apps lend themselves to easily representing ideas in multiple
ways and the screening apps make it easier for more students to share their representations and their thinking.

References


Socioscientific Issues to Promote Discussions on Social Justice: Making STEM concepts accessible and relevant to everyday life experiences of grades 6-12 students

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Introduction

Socioscientific issues (SSI) are ill-defined problems that have their basis in science, but necessarily include moral and ethical decisions that cannot be resolved through science alone (Ratcliffe & Grace, 2003). These debatable issues can foster student learning of science, technology, engineering, and mathematics (STEM) concepts by engaging in real-world and authentic problems in deep and meaningful ways that are relevant to students’ lived experiences (Zeidler, 2014). Through integration of SSI, teachers can enhance students’ scientific knowledge and literacy skills, facilitating the development of functional scientific literacy and helping to prepare students to make thoughtful decisions regarding scientific issues in and outside of the classroom (Zeidler et al., 2005). SSI in STEM classrooms helps students to develop skills such as evidence-based reasoning, consideration of multiple perspectives, and reflective scientific skepticism (Minken et al., 2021). Yet, most teachers are unfamiliar with SSI and require coursework or professional development to learn how to effectively plan and implement instructional activities to engage students in its components (Macalalag et al., 2017). Moreover, teachers may also be hesitant or uncertain regarding more fundamental components such as inquiry- and problem-based learning, argumentation based on evidence, and social justice components (Macalalag et al., 2019), particularly when these topics include the difficult or controversial often encompassed by SSI (Johnson et al., 2022). Despite the potential of the SSI framework to engage students in STEM in deep and meaningful ways, effective implementation would be impossible for teachers unfamiliar with the framework or its components without support and professional development.

The USTRIVE project, funded through a large National Science Foundation Discovery Research in K-12 federal grant, was developed to address this issue by supporting teachers in their efforts to
learn about, plan for, and incorporate SSI in their grades seven through twelve STEM classrooms. Over a two-year period, participating teachers attended an intensive nine-day summer institute during which they would become familiar with the SSI framework and begin planning SSI unit plans and attend regular professional learning community meetings and field trips to support their unit development. They also had access to $500 to order classroom supplies for their units, access to academic coaches, and friendly visits from project researchers to support their lesson implementation.

This study aimed to explore the effectiveness of the USTRIVE project for facilitating SSI integration into participant teachers’ lessons, particularly in fostering discussions of social justice in STEM classrooms. Specifically, this study explored the following research question: To what extent do teachers implement components of SSI in their unit of study?

**Literature Review**

The Pedagogical Content Knowledge (PCK) is a special amalgamation of knowledge and teaching practices that directs teachers’ actions while planning and implementing their lessons (Shulman, 1987). Several teachers’ PCK on teaching SSI include orientation for teaching SSIs, which shapes their knowledge of instructional strategies, assessments, curriculum, resources, and students’ experiences (Lee, 2016). For example, the PCK orientation for teaching SSI requires learning contexts based on the background knowledge, experiences, culture, and interests of students, while considering issues grounded in their community (Minken et al., 2021). It also requires instructional strategies to craft and engage students in debatable issues or questions, support students in their inquiry experiences, and develop their reflective scientific skepticism as they compare and contrast multiple perspectives (Macalalag, Johnson, & Lai, 2019). However, it is challenging for teachers to incorporate unconventional topics in teaching science such as debates with regards to engaging students in political, social and civic decisions to help them become critical citizens (Barrue and Albe, 2013).

Successes regarding the development of PCK for SSI teaching have been found specifically through shifts in teachers’ orientation and knowledge of instructional strategies, understanding of students’ knowledge and interests, and connections with STEM content (Kutluca, 2021). In terms of orientation, teachers that utilize SSI experience a shift in their orientation of teaching from being teacher-centered to student-centered (Kutluca, 2021). In other words, teachers’ instructional strategies become less lecture-based and more engaging for students through methods such as the employment of debates and the argumentation process. The implication of this further develops teachers’ PCK with respect to their knowledge of students’ understanding of science, suggesting that teachers base their instructional strategies on addressing the needs (i.e. academic challenges, and misconceptions related to the topic), prior knowledge, or interests of the students (Bayram-Jacobs et al., 2019). Some examples of these instructional strategies for SSI include group discussions, observation demonstrations, and overall classroom discursive interactions that emphasize student-student communication rather than just teacher-student communication (Kutluca, 2021). In identifying the students’ learning needs and prior understanding of STEM content, teachers are able to tailor their lesson plans to use the most
effective teaching methods for their students to learn SSI; thus, the students are better able to relate to or find meaning in the STEM content (Macalalag et al., 2019; Bayram-Jacobs et al., 2019). In addition to making meaningful connections to facilitate student engagement with SSI context, another success in the development of PCK is that it increases teachers’ and, as a result, students’ knowledge and understanding of STEM content (Johnson et al., 2020).

Despite these successes, teachers also face barriers to developing their PCK in teaching SSI. In a study by Ariza et al. (2021), secondary science teachers in the Netherlands experienced difficulty in addressing ethical components within SSI topics that misaligned with their values and beliefs. For example, although their lesson plans were able to incorporate both the scientific and social components of the content, many of the lesson plans were lacking a personal component in which students are given the opportunity to form and articulate their own opinions on the topic based on the evidence presented in addition to their own personal values and beliefs (Ariza et al., 2021). Additionally, the incorporation of SSI topics in teaching STEM was found to be a challenge for teachers with a lack of knowledge or experience on the topic. In the study by Bayram-Jacobs et al. (2019), teachers’ PCK showed the least development in their knowledge of the assessment component when tasked to design SSI lessons. This could be attributed to teachers not having the knowledge of the strategies or instruments to appropriately assess student learning due to the content and skills required to engage with the content being unfamiliar (Bayram-Jacobs et al., 2019). In relation to Ariza et al. (2021) and Bayram-Jacobs et al. (2019), the presentation of new knowledge that conflicts with an individual's personal values or interests can lead to varying levels of engagement depending on the topic. For example, Johnson et al. (2020) studied how teachers in the U.S. Northeastern state of Pennsylvania employed argumentation in 2 case-based SSI lessons regarding the mystery of missing bees and the drought in California, a West Coast state. Their results showed differences in the levels of claims and reasoning. The case of the bees produced high levels of claims and reasoning, indicating that teachers had more difficulty making meaningful connections and engaging with the content in the case of the California drought (Johnson et al., 2020). Another challenge for teachers’ PCK development is maintaining the balance between the social and scientific components of SSI. A shift in focus explicitly toward the social component or toward SSI skills suggests that there is a lack of emphasis on the scientific component (Minken et al., 2021; Bayram-Jacobs et al. 2019). For instance, Minken et al. (2021) highlighted this challenge in the experience of one teacher, Ms. Lee, planning her SSI lesson. With a topic focused on urban gardening, Ms. Lee scored high on the social component as she introduced discussions of articles and real-world examples that emphasized not only the impacts of urban gardening on the local community such as the beautification of the environment but also the consideration of system dynamics and multiple perspectives. However, Ms. Lee’s scores were lacking in the scientific component of the SSI lesson plan as she missed the opportunity to explicitly identify or explore any scientific phenomena such as ecology or sustainability (Minken et al., 2021).

**Social justice STEM pedagogy**

Equitable teaching practice as a pedagogical strategy towards social justice learning involves knowledge of students' background and interests in order to connect to STEM content in a
meaningful way (Yolcu, 2019). This is supported by the finding by Baek et al. (2022) in which students reported that they had a hard time connecting with the content because they do not feel directly affected by climate change. Similarly, an immersive scenario presented by Zeidler et al. (2022) utilized an interdisciplinary approach to participate in a simulation of a real world event within close proximity to the students environment intended to facilitate equitable science instruction. This method of relating math and science content to the students increases engagement and creates opportunities for them to form evidence-based stances on the relevant social justice issues, resulting from critical decision making, which can lead to student agency, independence, and citizenship (Ariza et al., 2021; Yolcu, 2019). Additionally, incorporation of relevant sociocultural contexts into STEM teaching provides an avenue for STEM teachers to recognize and affirm students’ home cultures and, by situating content in this context, make learning more relevant for students (Ladson-Billings, 1995). For example, by situating the concept of pollution within a cultural context relevant to their students, pre-service teachers saw students make connections between the content associated with pollution and how it could impact their lives specifically (Mensah, 2011). Furthermore, when teaching STEM in ways that are socioculturally relevant to students, issues of injustice tend to arise naturally, as students examine the implications of a given SSI (Esposito & Swain, 2009). For instance, in examining the impact of pollution on a local river, students began to see this pollution not as inevitable, but as a problem that needed to be solved in order to improve quality of life, and in which they saw themselves as playing a part in solving (Dimick, 2012).

What helps teachers develop storylines

According to Next Generation Science Storylines (NGSS), storylines are a sequence of lessons in which students can immerse themselves in learning about a new phenomenon (NGSS, 2013). The idea of storylines is intended so that students are guided by the nature of inquiry-based learning; and through exploration and research, the students can come to an evidence-based conclusion about their position on the topic or propose a solution. Experiential learning and collaboration between educators are two methods that teachers can use to develop their own storylines. Two cases presented by Ariza et al. (2021) exhibit this through which teachers from Cyprus and Spain formed co-design groups to create unit lessons using a Socioscientific Inquiry-Based Learning (SSIBL) model after immersing and participating in the SSIBL activities themselves. The implementation of SSI in lesson planning involves the exploration of scientific phenomena through scientific modeling, considering system dynamics and multiple perspectives, skepticism, and the formation of an opinion or solution (Minken et al., 2021). The SSIBL model employs this approach in addition to two other pedagogical approaches including Inquiry-based Science Education in which inquiries serve as the starting point for learning and Citizenship Education which encourages agency through engagement or participatory learning (Ariza et al., 2021). Through participating in the SSIBL activities first-hand, each community of teachers was able to experience SSI as both learners and reflective instructors, thus, developing their PCK as well (Ariza et al., 2021; Yendol-Hoppey et al., 2018). With regard to lesson planning and the development of storylines, several facilitators have been identified by different studies. The study by Chan & Yung (2018) detailed the experiences of two experienced high school biology teachers and their approaches to teaching polymerase chain reaction (PCR) as a newly
introduced topic in their science curriculum. Specifically, one of the two teachers, Alex, exhibited significant development of his PCR-related PCK due to his ability to apply the instructional strategies that he used for previously taught topics to the new topic of PCR; the strategies Alex used in the pre-lesson planning phase included careful consideration of students’ prior knowledge on PCR, predictions of potential learning difficulties during the interactive phase, and purposeful design of assessments to identify unpredicted learning difficulties (Chan & Yung, 2018). The implementation of purposeful assessments is important in creating lesson plans as it allows teachers to identify critical knowledge gaps within the students as well as reflect on previous lesson designs so that they may refine and make adjustments for a more tailored, effective lesson plan (Chan & Yung, 2018; Leung, 2022). The collaborative aspect of the co-design groups in the Ariza et al. (2021) study also facilitates an exchange of ideas for lesson planning while offering constructive feedback, a sense of support and mentorship, and discourse that strengthens teachers’ PCK (Yendol-Hoppey et al., 2018). Additionally, teachers in the study by Leung (2022) found that analyzing lessons from other experienced teachers helped to challenge their perceptions of their own SSI lesson plan designs as they recognized instructional strategies that they themselves used but did not agree with after observing other teachers’ lesson plans.

Teachers often experience difficulty planning lessons for content that is new or unfamiliar to them. For example, illustrative cases provided by Kinskey & Zeidler (2020) described two teachers’ concerns regarding their students’ developmental abilities, at the first- and third-grade levels, in learning SSI. They both expressed difficulty in designing a lesson plan that would be appropriate for the developmental level of each grade; one of the teachers, Kendall, reflected on how these concerns were evident in her lesson plan and may have hindered the development of students’ argumentation skills (Kinskey & Zeidler, 2020). Kendall focused on preventing negative behavior by avoiding certain language (i.e. using words like “conversation” instead of “debate”) and providing templates to guide student dialogue (Kinskey & Zeidler, 2020). The other teacher, Crystal, noted her use of a “trial and error” method in her lesson planning (Kinskey & Zeidler, 2020); this method was also utilized by another teacher, Chris, instead of considering the students’ prior knowledge through the use of assessments (Chan & Yung, 2018). This strategy was not effective for either teacher and has the potential to lead to other issues in lesson implementation, one common challenge being the lack of time in building discourse and argumentation skills in students (Kinskey & Zeidler, 2020; Chan & Yung, 2018).

Methods

Professional Development Program/Workshops

In order to develop teachers’ PCK on SSI, we conducted a study to answer the following question: In what ways, if any, does our program support the teachers’ implementation of SSI? We engaged our teacher participants on 3-hour Professional Development (PD) Tuesday evening workshops (45 hours total); 3-hour Professional Learning Community (PLC) sessions for
teachers (18 hours total); classroom support visits (a minimum of two in-person per teacher); 6-hour Saturday workshops and field trips (12 hours total); and a 6-hour end-of-year conference will be held in May 2022. The PD Tuesday evening workshops focused on introducing teachers to SSI. For instance, in one of our workshops, teachers engaged in an SSI discussion on “Should plastic bags be banned in Philadelphia?” As part of this workshop, they explored different resources pertaining to the plastic ban and discussed the advantages and disadvantages of a plastic ban. They considered several STEM phenomena such as: (a) biodegradability of plastics—how long would it take for a particular plastic to degrade, (b) innovation and pollution due to landfills and garbage recycling, (c) problems of plastics in waterways and oceans (e.g. Great Pacific Garbage Patch), (d) the STEM concepts behind recycling, and (e) society’s successes and failures with regards to garbage and recycling. Here are several example activities for teachers to use with their students: create their own investigation to see what materials biodegrade after buried in soil outside for few months (Bury Your Trash Experiment from Teach Engineering https://www.phila.gov/programs/plastic-bag-ban/), students calculate how much trash they generate in a day, week, month, and year or calculate how much trash their family, classroom, school, or city generates per month (Calculate Your Impact by Project Learning Tree https://www.plt.org/educator-tips/reduce-reuse-recycle-lesson-ideas), and students are challenged to inform customers in a local restaurant of how their use and disposal of plastics contributes to the Great Pacific Garbage Patch (from Teach Engineering https://www.teachengineering.org/lessons/view/uoh_dig_mapping_less3). In terms of social justice components related to plastic ban, teachers studied its economic and environmental impacts on marginalized people in our community. For instance, they discussed the following questions: (a) who benefits from the revenue of plastic ban (e.g. city government, manufacturers, shopping centers)?, (b) can people afford to buy recycled bags?, (c) who is being affected the most by our city’s plastic pollution (e.g. plastics in drainage and waterways that causes flooding), (d) who owns the water in those water bottles - the community or bottling companies?, and (e) how do water bottles benefit communities without clean water? In addition to these activities and discussions, teachers consider factors beyond STEM disciplines that are related to plastics and a potential plastic bag ban. (e.g., manufacturing industries, economics and costs of plastics compared to other alternatives, etc), and explain how that influences their views relating to the original stance on this SSI. They also discussed how to engage their students to obtain, explore, compare, or contrast perspectives from a range of stakeholders (e.g. environmental activists, political groups, parents, students) that are connected to the plastic ban discussion.

In addition to workshops, the PLCs began in spring 2022 and was developed to offer teachers an extensive professional network, trust among colleagues, and deeper content knowledge. For the classroom support visits, we provided each participating teacher with two in-person classroom support visits and a minimum of two additional out-of-classroom support visits over the school year. This support provides teachers with guidance as they develop and implement their units of study and instructional strategies; help monitor teachers’ challenges both in the classroom and within the school; and provide a level of teacher accountability to implement SI lessons. Saturday workshops and field trips were offered to continue teachers’ learning engagement in SSI. The two workshops were held at informal learning sites in the Philadelphia-area. The workshops were a combination of field trips and invited speakers on SSI and social justice. The year-end conference was held on May 7, 2022. The purpose of the conference was to cultivate
teacher leadership toward teaching SSI. Participating teachers had an opportunity to present mini lessons from their units of study. This conference promoted dialogue among teachers, students, school leaders and community members, allowed teachers to reflect on learning experiences, provided an avenue for local community involvement, disseminated project work, and celebrated classroom successes.

SSI/sTc Framework

The professional development program that participating teachers engaged in was designed to help teachers develop and implement a unit of study aligned to an SSI/sTc Framework consisting of four components: STEM, Social, Discursive, and Justice. The first three components of the framework are adapted from our previous work (Minken et al., 2021), and drawn from SSI frameworks developed by Zeidler (2014) and Sadler et al. (2019), while the fourth component, Justice components, is a newer addition to our work, and draws from the work of Rodriguez’s (1998; 2021) sociotransformative constructivism (sTc).

The STEM components of the framework involve teachers’ knowledge and PCK of scientific phenomena, and the ways in which they engage students in STEM modeling. Following the framework, teachers’ knowledge of scientific phenomena involves understanding the mechanisms underlying a chosen phenomenon and connecting it to scientific and/or mathematical topics relevant to the chosen SSI (Sadler et al., 2019). The PCK of scientific phenomena, we mean the teacher’s knowledge of how to relate the phenomena to student’s everyday lives and provide opportunities for students to observe and explore the phenomenon in detail (Minken et al., 2021). Teachers can engage students in STEM modeling by having students develop, critique, revise, and use models to pose predictions and explanations for and about scientific phenomena (Macalalag, 2012; Minken et al., 2021).

The Social components of the framework describe ways teachers identify, and engage students around, an SSI for their unit of study, as well as plan for students to consider system dynamics and multiple perspectives relating to the SSI. According to the framework, teachers should ensure that the debatable SSI is explicitly stated and used as an organizing theme throughout the unit of study, engaging students in through the use of primary sources and real-world examples that connect the SSI to students’ lives (Zeidler & Kahn, 2014). The framework also guides teachers to build into their lessons a variety of opportunities for students to consider dynamic systems related to the SSI, which might include systems such as politics, economics, health, religion, and nature (Sadler et al., 2019), as well as to compare and contrast a plurality of diverse perspectives representing individuals who might have a stake in the resolution of the SSI, which might include groups such as parents, small business owners, transportation workers, scientists, etc (Minken et al., 2021).

The Discursive components of the framework describe ways teachers empower students to discuss their own perceptions of the SSI and surrounding controversy, reflect on what they feel to be the quality of evidence presented by various sources, and ultimately articulate and defend their own stance on how to resolve the SSI. According to the framework, teachers can coach students to employ reflective scientific skepticism by reflecting on potential biases that could affect how and what information is presented, including who is disseminating information and
for what purpose, how that information was gathered, the qualifications of different individuals espousing opinions related to the SSI, and the different groups of people impacted both positively and negatively by the SSI and it’s potential resolutions (Minken et al., 2021; Sadler et al., 2019). Additionally, teachers can guide students to elucidate their own position or solution to the SSI through the use of data students have gathered over the course of the unit of study, and to reflect on their position or solution by considering the pros and cons of their stance on the SSI, as well as any personal biases they may have, or any other limitations related to their position or solution regarding the SSI (Minken et al., 2021; Sadler et al., 2019).

The Justice components of the framework involve the four components of sTc: Reflexivity, Authentic Activity, Dialogic Conversation, and Metacognition (Rodriguez, 1998). Reflexivity involves providing avenues to elicit and voice with respect to one’s cultural background, moral and ethical stance, socioeconomic status, belief systems, values, education, and skills influence what we consider is important to teach/learn (Calabrese, 2003 in Rodriguez, A. J., Morrison, D., 2019; Zeidler, 2019). Authentic Activities in this sense mean activities that involve inquiry-based, hands-on, minds-on activities that are also socio-culturally relevant and tied to the everyday life of the learner. Dialogic Conversation provides opportunities for students to voice their own reasons (emotional tone, ideological, and conceptual positions) the speaker chooses in a specific context. Metacognition provides opportunities for students to use their learning experiences to transform (actions) themselves and others.

Participants

Study participants included 16 teachers of STEM subjects in grades 6-12. The majority of teachers (59%, n=10) taught Science only, while others (24%, n=4) taught only Mathematics, one teacher taught both Science and Mathematics, one teacher taught Science and Engineering, and one teacher taught both Engineering and Technology courses. In terms of grade level, most teachers (53%, n=9) taught High School (grades 9-12), some (18%, n=3) taught Middle School (grades 6-8), and roughly one third (29%, n=5) taught both Middle School and High School classes. Participants also represented a range of teaching experience, with 18% (n=3) having 1-5 years of experience, 18% (n=3) having 6-10 years of experience, 24% (n=4) having 11-15 years of experience, and 41% (n=7) having 16 or more years of experience. All study participants engaged in the same two-week summer institute of professional development aligned with the SSI/sTc framework, and worked cooperatively to develop a unit of study aligned to their content area and our framework.

Data Source:

In preparing our teachers to develop and implement a unit of study aligned to their content area and our SSI/sTc Framework, we had them engage in brainstorming and constructing an outline for their unit that we call a storyline. The purpose of the storyline was to ease teachers into developing a fully-fledged unit of study by allowing them to think about the overarching SSI, underlying STEM content, and impactful learning activities, and how these elements should connect. In creating their storyline, teachers identified the SSI they would use to anchor their unit
of study, and brainstormed learning activities related to the SSI aligned to the 5E model (Engage, Explore, Explain, Elaborate, Evaluate; Bybee & Landes, 1990). The expectation for teachers was that the storyline should focus on how the SSI should unfold and flow cohesively over the course of the unit of study, as opposed to getting into granular details of how each learning activity would be structured, and would also be a place where they could include links to helpful resources and activities that they might incorporate and adapt into their unit of study later on. To make this expectation clear, an example storyline (see appendix) was provided for teachers to use as a reference.

**Data Analysis**

We used a quantitative analysis of qualitative data approach (Chi, 1997) to analyze the teacher-created storylines (n=16), describing the level of sophistication in the different areas of SSI/sTc: social, STEM, discursive, and justice components. The storylines were double-coded by two research assistants using an analysis guide based on these components. The analysis guide included levels ranging from one to three for each component of our framework, with three being the most sophisticated, and one being the least. The first component of our SSI/sTc framework, **Social Contexts**, involves three components: **Exploration of SSI**, **Consider Issue System Dynamics**, and **Compare and Contrast Multiple Perspectives**. **Exploration of SSI** refers to the ways in which teachers organize their lessons around an SSI that is relevant to their students’ lived experiences. A level three for this component indicates that the teacher used one SSI as an organizing construct for the unit to frame the purpose of student learning of STEM content, whereas a level one indicates that the storyline was centered instead around the traditional content knowledge and skills students must learn without regard to any problem of social significance. The component, **Consider Issue System Dynamics** refers to the ways that teachers plan to help students uncover the ways that the overarching SSI is embedded within larger social systems. A level three would have clear and explicit connections between the STEM topics and related social systems (e.g., political, economic, religious) that are thoroughly explored by students, whereas a level one would have implicit, unclear, or no connections made between the STEM topics and the social systems. The component, **Compare and Contrast Multiple Perspectives**, describes how teachers plan for students to gather and evaluate information from a plurality of stakeholder groups, such as politicians, business owners, and environmental activists, relating to their views on the SSI. A level three for this component would show the instructional strategies the teacher plans to have students obtain, explore, compare, or contrast perspectives from a range of stakeholders that are connected to their SSI discussion, whereas a level one would fail to illustrate any scaffolding necessary for students to engage in this type of learning activity.

The second component of our framework, **STEM Content**, consists of three components: **Knowledge: Explore and Explain the Underlying Scientific Phenomena and/or Concepts in Mathematics**, **PCK: Instructional Strategies on Exploration of SSI**, and **Engage with STEM Models**. The first of these, **Knowledge: Explore and Explain the Underlying Scientific Phenomena and/or Concepts in Mathematics**, refers to the teacher's knowledge of what scientific phenomena or mathematical concept is associated with the SSI, and is also a part of the school’s curriculum. A level three in this component clearly shows the scientific phenomena or mathematical concepts associated with the SSI and the school’s curriculum, while a storyline at a level one would lack clarity around what the scientific phenomena or mathematical concept is. The second component, **PCK: Instructional Strategies on Exploration of SSI**, describes the
instructional methods teachers use to engage students in the type of learning described by the previous component. A level three here indicates a focus on active learning strategies, while a level one indicates use of only passive learning strategies, such as lecture. The last component of STEM Content, *Engage with STEM Models*, refers to the extent to which teachers have students work with scientific, mathematical, engineering, and computer-oriented models. A level three in this component would include teachers asking students to develop, test, and/or revise models based on students’ investigation(s) embedded in the lesson that are connected to the SSI discussion, whereas a level one would have teachers asking students only to use the models as a tool for conveying information, and that the models are disconnected from the SSI discussion.

The third component of our framework, Discursive Aspects, include two components: *Employ Reflective Scientific Skepticism* and *Elucidate Own Position/Solution*. The first of these, *Employ Reflective Scientific Skepticism*, describes the teachers’ attempt to have students reflect on and evaluate the quality and possible biases present in various sources of information related to the SSI. A level three with respect to this component means that the storyline includes instructional strategies for students to engage in the aforementioned reflection and evaluation, whereas a level one would not provide any such focus or attention in connection with the SSI. The other component, *Elucidate Own Position/Solution*, refers to the way teachers engage students to defend and explain their position and/or propose a solution to the SSI using their data, and reflecting on the strengths, weaknesses, and/or biases and limitations of their claim/solution. A level three in this area shows clear instructional strategies to guide students through this process, whereas a level one would not provide any scaffolding for students to be able to do this.

The fourth and final component of our framework, Justice, includes the following four components: *Reflexivity*, *Authentic Activity*, *Dialogic Conversation*, and *Metacognition*. *Reflexivity* refers to the opportunities teachers provide for students to bring their whole selves into the SSI discussion, acknowledging their own perspective on the SSI, and how that perspective is shaped by their own experiences, including the acknowledgement of any social privilege(s), or lack thereof, relating to the SSI. A level three in this area shows how teachers prompt students to elicit, voice, and reflect on their perspective, and how privilege plays a role in the resolution of the SSI. A level one includes opportunities for students to discuss the SSI as a class or group, but does not provide opportunities for students to elicit and voice their own perspective on the SSI. *Authentic Activity* refers to the ways that teacher-planned activities are inquiry-based, hands-on, minds-on, and socio-culturally relevant and tied to the everyday life of the learner. A level three for this component includes students engaged in inquiry-based activities that are both tied to their everyday life and mirror professional practices in STEM fields. Additionally, a level three includes student ideas stemming from these activities being shared beyond the walls of the classroom. Moreover, a level one includes only activities that are not inquiry-based or connected to students’ everyday lives. *Dialogic Conversation* refers to the opportunities teachers provide students to engage in constructive dialogue with others about the SSI that includes the students reflecting on the reasoning and positionality of the speaker in a particular context. A level three in this area includes opportunities for students to co-construct knowledge through structured debates and discussions where students are directed to develop understanding and explore the emotional tone, ideological, and/or conceptual positions of their arguments, whereas a level one includes minimal opportunities for students to interact with their peers relating to the SSI. The final component, *Metacognition*, refers to the opportunities students are given to take ownership of their learning, using their learning experience to transform themselves and others. A level three for this component shows teachers providing
opportunities for students to purposely reflect on their learning experiences, and those of their peers, so that they might take ownership of and improve their own learning.

For training purposes, the two research assistants, together with one of the authors, reviewed and analyzed 30% (n=5) of the storylines to establish consensus on the use of the analysis guide and clarify the meaning of each code. Each storyline was then coded independently by each coder before coming together to discuss the codes and resolve any disagreements under the supervision of one of the authors. Interrater reliability was 93.4% before discussion, and 100% after discussion. Findings from the storyline analysis are detailed in the following section.

Findings

Based on our analysis of teachers’ storylines, the Scientific component of SSI was determined to be the strongest (2.63), followed by the Social component (2.29), Justice component (1.97), while the weakest component was Discursive (1.00). See table 1 below. The Scientific component includes two elements: explore and explain the underlying scientific phenomena and/or concepts in mathematics and STEM Modeling. Most teachers were successful in incorporating the underlying scientific phenomena and/or concepts in math into their storylines. Examples of scientific phenomena introduced into the storylines include pollution, mining, flooding, and global warming, while math concepts included compound interest and budgeting. The results indicate that teachers did struggle with STEM modeling. Only six of the 16 teachers were successful in incorporating this component of the scientific component into their storylines, while two math teachers and two sciences did not include any STEM modeling.

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Table 1. Average scores per domain in teachers’ storylines.

In terms of the Social component that includes the elements: exploration of SSI, considering issue system dynamics, and comparing and contrasting multiple perspectives, most teachers were successful in including them into their storylines. We saw that each SSI unit of study was unique in order to make the issue more relevant to their students. For example, Ms. Martin teaches math and to help her students understand growth rates, her SSI focused on savings accounts, “Should Pennsylvania automatically open a children’s savings account for each child born in the state and fund that account each year of residency until their 18th birthday or no longer a resident (whichever event occurs first)?” To make global warming more relevant,
Mr. Harris asked his students to consider the costs and benefits of electric vehicles and introduced the following SSI, “Are EV’s the solution to meeting our climate goals as a nation?” Most teachers (15 out of 16) were successful in their efforts to incorporate the element consider issue system dynamics into their storyline. Ms. Parker’s SSI questioned whether we should move toward plant-based diets. She situated her SSI within the larger social systems of the Philadelphia area. For example, she asked students to think about whether healthy food was accessible for everyone in their neighborhood – could it be accessed by foot, bike, public transportation, and personal vehicle. Students were asked to review maps of the disparities in food retailers in the local area. Ms. Parker introduced the idea of food deserts to her students and asked them to think about whether food deserts exist in Philadelphia and why.

The Social component where teachers have the potential for the greatest growth is, compare and contrast multiple perspectives (1.25). To be most successful in implementing this element, the storyline must include instructional strategies for students to obtain, explore, compare, or contrast perspectives from a range of stakeholders (e.g. environmental activists, politicians, political groups) that are connected to their SSI discussion. Teachers struggled to provide scaffolding for students to obtain, explore, compare, or contrast perspectives from a range of stakeholders. For instance, Mr. Jackson described an activity that proposes a community meeting, yet he did not specify who would be represented, how the students would learn about the various stakeholders, or how the various voices would be compared and contrasted. The storyline states:

Students will host a community meeting. This meeting will consist of students presenting the information they found on gentrification. Presentations will include information about Strawberry Mansion, make projections about how gentrification will affect the ability to live in Strawberry Mansion in the coming years. We will invite local groups with interests in the gentrification of Strawberry Mansion.

Through this activity, Mr. Jackson did not provide scaffolding for students to explore perspectives from a range of stakeholders. What groups are a part of this community meeting? How will students obtain and evaluate this information? This storyline is missing the instructional strategy and scaffolding to explore, compare, or contrast perspectives from various stakeholders.

The Justice component includes the elements of reflexivity, authentic activity, dialogic conversation, and metacognition. Of the four elements of this component, authentic activity was the one included in the majority of the storylines (2.69). For example, Mr. White provided his students with opportunities to engage in inquiry-based learning activities relevant to the everyday life of the learners. The students also had the opportunity to share their ideas with others. Mr. White plans to have a conversation with his students about global warming and discuss housing in low flooding areas within Philadelphia and other urban areas. The students will review data from the federal government, National Weather Service, and the University of Pennsylvania. His students will be allowed to showcase their findings to the class, principal, and parents as well as potentially present this information to representatives from Urban League, City Council, and House Representatives. On the other hand, metacognition (1.31) is the element of the Justice component which has the most potential for growth. Ideally, a storyline would include opportunities for students to reflect on their learning experiences and those of their peers in order to improve their own learning as well as provide them with more ownership over their own
learning. Teachers struggled with this element as demonstrated by Ms. Scott, who only asked her students, “What do you need to know to clarify your decision?”

The Discursive component (1.0) consists of the elements employ reflective scientific skepticism and elucidate own position/solution elements. This component is the one in which teachers have the potential for the greatest growth. Employ reflective scientific skepticism invites students to analyze, critique, or be skeptical of any information connected to their SSI discussion; whereas, elucidate own position/solution elements requires students to use data to explain their position, the strengths and weaknesses of their claims, or identify their biases or limitations that are connected to their SSI discussion. Reflective Skepticism (0.06) was the lowest element. For example, Ms. Walker’s storyline only included, “Consider bias in articles, stakeholders, etc EQUITY!” Through this statement, Ms. Walker is employing skepticism but is not providing a plan to be skeptical of the SSI discussion, but rather of the stakeholders’ information. This storyline is missing the instructional strategy and the connection to their SSI discussion which includes banning or regulating the use of bottled water.

Table 2. Average element score per domain in teachers’ storylines.

**Discussion and Conclusion**

SSI are ill-defined problems and debatable issues that can enhance student learning of scientific knowledge and literacy skills (Zeidler et al., 2005). However, most teachers are unfamiliar with planning and implementation of SSI (Macalalag et. al, 2019). Our USTRIVE project aimed to support the development of teachers’ PCK through planning and implementation of SSI lessons.
in their classrooms. In this study, we explored the following research question: To what extent do teachers implement components of SSI in their unit of study?

The development of teachers’ PCK orientation for teaching components of SSI requires learning contexts based on students’ background knowledge, culture, interests and experiences (Minken et al., 2021). Based on our analysis of teachers’ storylines, the Scientific was determined to be the strongest component of SSI. Most teachers were successful in incorporating the underlying scientific phenomena and/or concepts in math into their storylines. Compared to the teachers in study of Ariza et al. (2021) who were unable to provide opportunities for students to incorporate their own opinions, values, and beliefs in their lesson plans, we saw that each SSI storylines developed by our teachers was unique in order to make the issue more relevant to their students. Most of their SSI storylines were connected to the events and contexts in which they discuss and debate in their community. Examples of scientific phenomena introduced into the storylines included pollution, flooding, and local effects of global warming, while math concepts included compound interest to purchase a house and budgeting. However, similar to the study of Macalalag (2012) who saw preservice Biology teachers’ struggle to incorporate scientific models in their lesson plans, most teachers in this study were challenged to include STEM modeling in their SSI storylines. Although NGSS (2013) has emphasized the use of science and engineering models as representations of objects, systems or events as tools for understanding and predicting the natural and designed worlds, many teachers are still in the process of developing their PCK in order to design lessons and learning experiences that incorporate these models (National Academies of Sciences, Engineering, and Medicine, 2019).

In terms of the Social component of SSI, most teachers were successful in their efforts to incorporate the element consider issue system dynamics into their storyline. However, our teachers struggled to provide scaffolding for students to obtain, explore, compare, or contrast perspectives from a range of stakeholders. These successes and challenges were similar to those teachers in the study of Minken et al. (2021) and Bayram-Jacobs et al (2019). For instance, in the development of teachers’ PCK, Minken (2021) saw that Ms. Lee was able to consider system dynamics and multiple perspectives in her lesson plan on impacts of urban gardening on a local community, but she missed the opportunity to connect it to any scientific phenomena such as ecology or sustainability. In addition to employing multiple perspectives, teachers were unable to incorporate reflective scientific skepticism as part of the Discursive component of their SSI storylines. This finding is similar to the study of Johnson et al. (2020) who saw that teachers themselves had limited success in making meaningful connections among claims, evidence, and reasoning on different cases (e.g. missing bees and drought in California) presented to them.

Finally, in terms of the Justice component of SSI, most teachers included authentic activity in their storylines. The teachers in our study identified math and science issues that create opportunities for their students to discuss social justice issues in their communities. Examples
included: (a) Should the US require that all roadway vehicles be electric?, (b) Can my family afford an electric vehicle?, (c) Where does my food come from?, and (d) Can my family afford healthy food? These real-world cases with relevant social justice issues have a potential to develop students’ agency, independence, and critical citizenship skills (Ariza et al., 2021; Yolcu, 2019). Moreover, when teaching STEM in ways that are socioculturally relevant to students, issues of injustice tend to arise naturally, as students examine the implications of a given SSI (Esposito & Swain, 2009).

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References


Appendix

Example Storyline

What are storylines?
A storyline is a coherent sequence and outline of instructional activities that students will engage in to inquire about, discuss, and/or investigate a socioscientific issue. The SSI storyline should consider and include the different components of SSI such as social, scientific and discursive (link).

Reference: NGSS’ Storylines

ENGAGE: Establish relevance - help learner determine need of learning new concepts

sTc: “Why am I learning about this topic?”

The SSI question for discussion is: Should plastic bags be banned in Philadelphia?

Students explore different resources pertaining to the plastic ban. What are the advantages and disadvantages?

➢ https://www.mvorganizing.org/what-are-the-disadvantages-of-banning-plastic-bags/

The STEM phenomena can include one or more of the following topics:
1. Biodegradability of plastics - math of how long it would take for X type of plastic to degrade?
2. Landfills/pollution – (math: land area needed for landfills)
3. Great pacific garbage patch (showing effect of plastics on marine life)
4. Recycling (science, technology and engineering) - what is the science of recycling? How
did our technologies evolve over time?
5. Recycling (society’s practices - successes and challenges) - what are the successes and challenges of convincing people to recycle and to avoid using single use plastic products?

**EXPLORE:** Engage students in the content - help learner understand concepts, process/procedures, facts or principles

**sTc:** “Why am I learning these concepts in this way?”

STEM modeling and explorations of one or more of the following:

1. Biodegradability of plastics - math of how long it would take for X type of plastic to degrade?
   a. **Bury Your Trash Experiment** - Students create their own experiment to see what materials biodegrade after being buried in the soil outside for a few months.

2. Landfills/pollution – (math: land area/volume needed for landfills)
   a. Activity Option 1: **Design, Build and Test Your Own Landfill** - Teams design and build model landfills using materials similar to those used in full-scale landfills. Their small-size landfills are "rained" on and subjected to other erosion processes. Students analyze their models to see if leachate was contained.
      i. Watch this activity on YouTube
   b. Activity Option 2: **Calculate Your Impact** (#4) - Students calculate how much trash they generate in a day, week, month, and year or Calculate how much trash their family, the school, their city or town, and their state generates per year.

3. Great pacific garbage patch (showing effect of plastics on marine life)
   a. Activity **Option 1:** Students research the Great Pacific Garbage Patch and Propose solutions to address it
   b. Activity **Option 2:** Plastic in the Ocean: Get the Word Out at McDonalds! - Through a hypothetical scenario, students are challenged to inform customers at a local restaurant of how their use and disposal of plastics relates/contributes to the Great Pacific Garbage Patch (GPGP). To do this, they research the GPGP
and present that information in eye-catching newsletter handouts to customers. This activity focuses on teaching students to conduct online research to gather information on a science-technology related topic and present it in an informative manner that includes source crediting without plagiarism.

4. Recycling (science, technology and engineering) - what is the science of recycling? How did our technologies evolve over time?
   a. Activity Option 1: Composting (p. 17)
   b. Activity Option 2: Paper Recycling - students make their own paper
   c. Activity Option 3: (Bioremediation) Water Cycle: Moving without Wheels - Through a teacher-led class demo, students observe a simple water cycle model to better understand its role in pollutant transport. Using kitchen or lab equipment, the demo simulates a point source of pollution in a lake and the resulting environmental consequences—one way in which pollution is affected by the water cycle.

5. Recycling (society’s practices - successes and challenges) - what are the successes and challenges of convincing people to recycle and to avoid using single use plastic products?
   a. Activity Option 1: I-Dot Student Survey This activity is a simple way to measure student environmental habits and awareness.
   b. *This pdf also has other discussions, debates, and activities regarding recycling and topics that fall under the category of recycling

EXPLAIN: Improve understanding - help learner express new learning and provide guidance

Topic: what are the successes and challenges of convincing people to recycle and to avoid using single use plastic products?

Ask students to use data from the Explore stage to:
1. make a claim,
2. provide evidence,
3. provide other viewpoints (counter arguments),
4. explain possible weaknesses with these viewpoints, and provide their reasoning (final ideas that relate to their claim and evidence).

Ask students to consider factors beyond the science, technology, engineering, and/or
mathematics that are related to plastics and a potential plastic bag ban. (e.g., manufacturing industries, economics/cost of plastics compared to other alternatives, pros/cons of plastic alternatives, etc), and explain how that influences their view/position relating to the original SSI. Student activities/tasks could include:

1. Student Research
2. Reading and discussions
3. pros/cons T-charts
4. Filling out teacher-made graphic organizers

**ELABORATE:** Construct new learning - help learner apply prior learning and acquire new knowledge.

**sTc: “What control [voice] do I have in how to proceed?”**

Based on student research from the Explain stage, ask students to analyze, critique, or be skeptical of any information that is connected to their SSI discussion. The analysis could include one of the following: (a) person/group/authors, (b) methodology/procedure, (c) analysis of results, and (d) interpretations/conclusions/implications. For instance, is the information provided in the article reliable and what are the potential biases of the authors?

Ask students to obtain, explore, compare, or contrast perspectives from a range of stakeholders (e.g. environmental activists, political groups, parents, students) that are connected to the plastic ban discussion.

What are the social justice aspects connected to the SSI on plastic ban? In particular, how does plastic ban contribute to economic and environmental impacts on marginalized people in our community? Other questions to consider: (a) who benefits from the revenue of plastic ban (e.g., city government, manufacturers, shopping centers)?, (b) can people afford to buy recycled bags?, (c) who is being affected the most by our city’s plastic pollution (e.g., plastics in drainage and waterways that causes flooding), (d) who owns the water in those water bottles - the community or bottling companies?, and (e) how do water bottles benefit communities without clean water?
**EVALUATE:** Assess learning - help learner measure learning against its corresponding goals

**sTe:** “By what other method(s) can I learn this subject matter best?”

Ask students to use their data to explain their position, the strengths and weaknesses of their claims, or identify their biases or limitations that are connected to their SSI discussion.

They could also create an information campaign and conduct presentations in the school about the plastic ban.

**Elaborate Further / Reflect: Enrichment:**
Rethinking Coursework: Librarian and Faculty Collaboration to Increase Student Access and Agency Through Open Educational Resources and Open Pedagogy

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Abstract

In a literature survey course at a small undergraduate public land-grant campus, a literature professor and an open education librarian, teamed up to transform a traditional literature course with open pedagogical approaches and open educational resources (OER). In this paper, I will share how we piloted a multi-year student-created open anthology project by rethinking what coursework can be and what the affordances are when students become creators rather than consumers of literary scholarship.

Introduction

Open educational resources (OER) create opportunities for undergraduates to not only freely access their course materials, but also to interact and engage with them. OER refers to “a teaching, learning, or research resource that is offered freely to users in at least one form and that resides in the public domain or has been released under an open copyright license that allows for its free use, reuse, modification, and sharing with attribution” (Scholarly Publishing and Research Coalition, 2022). The rights that OER allow let students participate in the creation of new open digital scholarly editions in ways that were previously unavailable to them, a model known as open pedagogy. DeRosa and Jhangiani (2017) describe open pedagogy as “an access-oriented commitment to learner-driven education and a process of designing architectures and using tools for learning that enable students to shape the public knowledge commons of which they are a part.” In Premodern Worlds, a literature survey course at a small undergraduate public land-grant campus, a Renaissance literature professor and an open education librarian, teamed up to transform a traditional literature course by incorporating open pedagogical approaches and open educational resources. In this paper, I will talk about how we piloted a multi-year student-created open anthology project by rethinking what coursework can be and what the affordances are when students become creators rather than consumers of literary scholarship. I will describe the pedagogical challenges of building a project-based open assignment, the project management design, the experience of working with students on an open pedagogy project, the considerations around permissions and student rights, and the impact this approach had on student learning.

Context

English 221W: Premodern Worlds is an undergraduate literature class taught at Penn State Abington, a small campus of around 3000 students outside of Philadelphia. This course typically enrolls a mix of majors and non-majors who might be at any point in their matriculation. Penn State Abington has a high number of first-generation, non-traditional, Pell grant eligible students, many of whom are commuters. The course covers Premodern English literature from
approximately the 900s to the 1800s – from Anglo-Saxon to early American. The professor, Dr. Marissa Nicosia, Associate Professor of Renaissance Literature, introduces a mix of poetry, prose, narrative, and letters. Because of the extensive period of nearly 1000 years of literary history, Nicosia selects course readings that speak to the theme of premodern worlds; exploring readings where medieval, Renaissance, and 19th century authors alike depict the known world, document global exploration, and imagine possible places. We read works by authors such as Marie de France, Aphra Behn, Anne Bradstreet, Thomas More, Phillis Wheatley, Margaret Cavendish, Hester Pulter, Jonathan Edwards, Robert Herrick, and Andrew Marvell, as well as anonymous texts by indigenous authors. Class discussions and assignments address histories of race and colonialism, issues of gender and authorship, and utopian studies that emerge from the readings.

Implementation

Due to the period the course covers, many texts are available in the public domain, but lack the background information and glosses that traditional anthologies offer and that are integral for student comprehension. Because they are in the public domain, however, some have been made more digestible in open editions like *The British Literature 1 Anthology*, in student-edited open anthology textbooks like *The Open Anthology of Earlier American Literature*, or in highly interactive openly licensed digital sites like *The Pulter Project*, and *Margaret Cavendish’s Poems and Fancies*. When Nicosia received two campus grants in 2020, one to adopt OER, which I supported, and an innovative teaching fellowship, which she wanted to use to diversify and globalize this course’s syllabus, we saw this as an opportunity to not just use OER, but to potentially involve students in the creation of new OER as a final open pedagogy project in this course.

These existing OER examples we intended to incorporate thus would provide students with introductory materials and explanatory notes but would also help them critically examine the types of editorial work which enable readers to contextualize a work. *The British Literature 1 Anthology* had a number of texts that fit the course theme, but it also had extensive biographical information in its headers. *The Open Anthology of Earlier American Literature* was selected both for its diverse perspectives on colonial experiences and for its example of student authored introductions that provided textual context. *Margaret Cavendish’s Poems and Fancies*, in addition to introducing an important British female author scientist to the course material, also showed how footnotes can highlight distinctions between early published editions. And finally, *The Pulter Project* introduced both a relatively newly discovered female author to the course while the site’s interactive features enabled students to explore extensive footnotes and clearly enumerated distinctions between scholarly editions. By exploring these OER we would not only be ensuring students had access to their course materials, but we would also be preparing them to become authors of chapters of the draft edition that they would be creating later in the semester.

Our reimagining of this class was thus centered around three questions:

- How has the digital environment created possibilities for undergraduate students to experience situated learning by legitimately peripherally participating in scholarly communities of practice (Lave & Wenger, 1991)?
• What open pedagogical principles could faculty practice that would allow the project to be authentically driven by student inquiry and curiosity?
• What literacies would students need to authentically participate and what literacies would emerge for students throughout the project?

From these questions, we decided to divide the fifteen-week course into two parts, where the first ten weeks would be a traditional English seminar style class which examined all of the readings and relevant literary terms and required students to practice close reading and write a researched argument paper. After those first ten weeks, the final five would be spent on the newly designed final editorial open pedagogy project which students would have the option to consent to include their work in a future open anthology of premodern literature. This final editorial project asked students to annotate, gloss, and contextualize one of the course readings for this future open-access textbook on Transatlantic Premodern Literature centered around the theme of premodern worlds. Rather than writing for the professor, the editorial assignment asked students to write for a public audience which might include fellow students in this class, students who will enroll in future classes, and the general public who might discover the anthology via a search engine or OER repository.

In terms of pedagogy and instructional content, the final five weeks were used for an introduction of Creative Commons licenses, research instruction on finding sources in library databases and relevant museum and national library sites, and practice using the Oxford English Dictionary (OED) to support the extensive footnote writing they were required to do. We also planned workshop time for research and consultations, a peer-review session, and student presentations on their findings and process. This time was also crucial for introducing students to articles and ideas around student agency. We read and discussed articles that we hoped would help students bridge the previous discussions on textual transmission and scholarly editing and connect them with their own developing identity as agents in an editorial process for which technological shifts have made space for their legitimate scholarly contributions.

Student Agency

Student agency is a key tenet of ethical open pedagogy projects. In addition to cultivating student agency around their editorial project, explicit instruction around consent and student labor rights was planned into each semester. Through reading and discussion of the MLA Statement on the Scholarly Edition in the Digital Age (Modern Language Association, 2016), Erick Kelemen’s “Why Study Textual Editing and Criticism” (2008), and Valerie Wayne’s, “The Sexual Politics of Textual Transmission” (1998), students explored ideas around ambiguity, decision-making, and a research-informed iterative editorial process. Our use of Keleman and Wayne found its starting point in Blake’s suggestions on teaching editing in the undergraduate classroom (Blake, 2018). We were also guided by conversations with Robin DeRosa and Liza Blake on how to thread the ideas and skills that would be crucial to the editorial project into the course from its earliest days. Discussions of poems such as the medieval lyric “Earth,” John Donne’s poem “The Sun Rising,” and Phillis Wheatley Peters’ “On Being Brought from Africa to America,” focused not only on the content of the readings, but the history of their textual transmission and how scholars have edited them. This got students thinking about the editions we were using and the instability of the
premodern textual record more generally. In class, students used the OED and compared
dictionary definitions with the glosses defining single words in editions of poems such as Hester
Pulter’s “The Eclipse” on The Pulter Project and John Milton’s “Paradise Lost” from The John
Milton Reading Room. This work not only prepared students to write their formal research paper
in the middle of the semester for their analysis of one of our course readings, but also helped
them hone these same skills they would be using again in the final editorial project.

Students were informed early and then reminded frequently that, while the final editorial project
was not optional, the decision to include their work in the future open scholarly edition was. We
were transparent with students about our intentions and enthusiastic about the affordances of a
project like this, but careful to define student autonomy and agency around their work without
any pressure or penalty on grades. Students were required to read “A Student Collaborators’ Bill
of Rights” (De Pressi et al., 2015) and asked to complete a consent form indicating their
permission around using their work.

Lessons Learned

Even with all the planning, this was different than any assignment either of us had taught and
unlike any assignment we had completed back when we were undergraduate English majors.
Going into this during the pilot semester, we were confident in the assignment, but ultimately, we
had to revise it a lot to respond to student questions. It presented challenges and even some
frustration for students who expressed a mixture of trepidation and enthusiasm for the final
editorial project. Although we had introduced the project at the very beginning of the semester,
when it came time to shift from seminar format to the final editorial project, many students had
questions and even some anxiety about “the what” of the project, as the form was also a
departure from what they were typically asked to do in their previous English courses. We were
frequently asked to explain what they were really doing, what the format should look like, and to
describe what exactly the requirements were in terms of page length and font size. At the request
of some of the students, Nicosia created a rubric and we put together a presentation integrating
clear examples from earlier in the semester reminding students what introductory headings and
footnotes looked like and what purpose they serve for the reader. In the subsequent semester, we
build this signposting in from day one of the course.

Once the project was clarified, the majority of the students were enthusiastic about what they
would be doing, the research they were interested in pursuing, and the potential to be
contributing to and credited for public humanities scholarship. This was evident in students’
presentations and in their discussions. One student asked if this work could be included in a
resume; another expressed a lifelong desire to have their name in a book. Student presentations
and peer feedback during the presentations indicated enthusiasm and ownership of their research;
many used the phrase “my research” to discuss the many library and museum sources they’d
used along with the discoveries they’d made and the newly acquired research skills they needed
to use. Others commented on how much they enjoyed researching and discussed what future
research directions might be. In their final reflections on the process and experience of this
editorial project, many students remarked on how different this project was from previous
courses, even when they found it challenging. One noted how they were able to pursue a
personal historical connection to the text, another described how they would carry the author
with them in a different way than other authors they’d done papers on. And multiple students’ reflections demonstrated their attention to authentic audience both from the peer review process and in their concern for writing footnotes and introducing context that future students would like to read or need to know.

**Conclusion**

Implementing an open pedagogy project like this requires significant time, planning, and openness to iteration throughout the process particularly because open pedagogy is a learner-centered approach which invites students to “shape the public knowledge commons of which they are a part” (DeRosa & Jhangiani, 2017). Thus, we were transparent with students in the first semester in which we implemented this project about the “pilot” nature of the final editorial project and welcomed their input on shaping the learning space around it for the subsequent and future semesters. That student feedback was crucial for discovering which elements of the project energized students, which needed more scaffolding, and which would require rethinking. Establishing faculty as co-learners in the course can be uncomfortable, but this final editorial open pedagogy project demonstrated that authentic research experiences with authentic audiences connected students meaningfully to course content. The result was student-driven careful research, an exploration of the curiosity they felt around certain writers and texts, and an attention in their writing to the needs of future publics who might engage with their work.

**References**


THE EFFECTIVENESS OF BLACKBOARD WRITING IN HIGHER MATHEMATICS EDUCATION

~ IS THE LECTURE USING BLACKBOARD MORE PROACTIVE THAN THE LECTURE BY SLIDE? ~

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Abstract

In order to consider the superiority of writing on the blackboard in higher mathematics education, this study was conducted to compare the practice of lectures on slides, one of the most common tools for transferring information, with lectures on the board. We examined which is more suitable as a lecture environment for independent learning mathematics. Videos of students' behavior during the lecture, student tests, and written notes were used for analysis. The results showed significant differences in test scores and behaviors that lead to more independent learning in lectures with blackboard compared to lectures with slides. It was concluded that lectures on a blackboard are more likely to achieve independent learning than slide lectures.

1. Research Background

In 2020, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan made the following assertion: "As the entire country is moving toward digitization, the effective use of digital technology in the field of education in general is expected to bring new and unprecedented possibilities to lifelong learning" [1]. MEXT also made the following assertion. "Advanced Digital Education in Universities and Colleges of Technology" was established in order to actively incorporate digital technology in universities and colleges of technology, to improve the environment for efforts to contribute to "realization of learner-oriented education" and "improvement of the quality of learning," to materialize educational methods in higher education in the post-corona, and to spread the results of such efforts" [2].
In a survey conducted in 2020 by the ICT Promotion Council for Universities to 1525 higher education institutions in Japan, more than 90% of the institutions answered, "very important" or "somewhat important" to the question, "Is ICT education important? On the other hand, some issues arise from the use of ICT in education [3]. OECD (2015) found that "Where it is more common for students to use the Internet at school for schoolwork, students' performance in reading declined, on average." Similarly, "mathematics proficiency tends to be lower in countries/economies where the share of students who use computers in mathematics"[4].

Considering these claims, this study consider whether the "realization of learner-oriented education" and "improvement of the quality of learning" can be achieved through digitization even in mathematics lectures in higher education.

1-1. Board Writing in Higher Mathematics Education

To begin with, we discuss the role of the blackboard and chalk. Blackboards and chalk are often used in the research activities of mathematicians. In order to find solutions to difficult mathematical problems chalking equations and diagrams on blackboards has long been considered necessary tools for deriving answers. This is evident from the opinions of mathematicians toward the Hagoromo chalk [5]. Therefore, it is natural to think of writing on the board in mathematics not only as a general act of writing letters, diagrams, symbols, etc. on a blackboard or whiteboard but also as a "space to organize our thoughts" [6] (Hosomizu 2007).

1-2. Active learning

Active Learning and the Transformation of the Teaching-Learning Paradigm (2014) referred to “active learning” as any active learning in the sense of overcoming the learning by listening to a one-way knowledge transfer lecture [7]. Fieldwork is mentioned as one of the methods of active learning as a means to realize independent learning (Mitsugi et al. 2016) [8]. If it is possible to incorporate elements of fieldwork into lectures with writing on board, then such lectures can be considered as one of the methods of active learning in mathematics. In addition, board activities in mathematics are considered as Researcher Like Activity because mathematicians use board activities as a research method in fact, and Researcher Like Activity is considered as one of the active learning methods from Karimata’s previous study [9]. Therefore, we consider board writing activities in higher mathematics education as active learning. Among them, this study focuses on the learner’s independence.
We define independent learning in higher mathematics education as learning in which students reconstruct the lecture content using their own knowledge. In other words, if students are observed to reconstruct the lecture content, such as rediscovering theorems, as a simulated experience of research activities, we consider that they have engaged in independent learning. In this study, we verify that students are learning independently by allowing the board lecture to play a role like Researcher Like Activity or fieldwork in other subjects.

1-3. Purpose of the Study

We show that board-style lectures in higher mathematics education are not only effective for knowledge transfer, but also for active learning, in which students themselves incorporate the lecture content into their own thinking, similar to experiments and fieldwork in other subjects. In other words, we show that the board lecture in higher mathematics education has elements necessary for students to learn independently.

The ultimate goal of our research is to show that lectures on the board in higher mathematics have an effect similar to that of fieldwork and experiments in other subjects, compared to other types of lectures. In order to demonstrate this, as an initial goal, we show that a lecture with a written board is more suitable for students to learn independently than a lecture with slides, which is one of the most common types of lectures in which information is conveyed. For this purpose, we compare a slide lecture and a board lecture, and we measure the students' independence toward the lecture by the students' behavior in the lecture and tests, and by the students' own evaluation based on a questionnaire survey.

2. Research Method

2-1. Outline of Practices

Target: Undergraduates in the Department of Mathematics in the Faculty of Science or graduate students who graduated from the Department of Mathematics in the Faculty of Science who belong to a private university in Tokyo

Duration: One university lecture × 2 (2 groups)
Table 1 provides an outline of the practices. Two groups, Group 1 and Group 2, are prepared for the practice. First, Group 1 is given a lecture on "Content A (proof problem)" in slide form. See Appendix 1 for the lecture contents. Students are asked to attend the lecture using the worksheet for the slide lecture that has been distributed to them. Students are not forced to write on the worksheet but are left to their own way of attending the lecture. Students are asked to write not only about the lecture content, but also about what they thought about the written material, if they have any questions or unclear points, or if they have any insights, if possible. This is followed by a test on the exact same proofs as in the lecture ("Lecture content A"). This test is given only as “prove the proposition”, with no hints or instructions on how to solve the problem. After the test, a lecture on "Lecture content B (proof problem)" is given on the blackboard (or whiteboard). Students are expected to attend the lecture using the paper distributed as a notebook for writing on the board, in which only the propositions are written. As in the slide lecture, students are not forced to write on the print but are encouraged to write down what they notice if possible. The test that follows is exactly the same proof problem as in the lecture ("Content B"), with only the propositions given and no hints or solutions given on the test. Group 2 is given the same practice as Group 1, but with the lecture contents replaced. That is, first, a slide lecture on "Content B (proof problem)" is given, followed by a test on the exact same content as "Content B," and then a board lecture on "Content A (proof problem)," followed by a test on the exact same content as "Content A," and then Group2 answer a questionnaire to complete the Group2 practice. The conditions for the test, worksheets, and notes used during the lecture are the same as those for Group 1.

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slide lecture (Lecture Content A)</td>
<td>Slide lecture (Lecture Content B)</td>
</tr>
<tr>
<td>Tests on the exact same content as the lecture.</td>
<td>Tests on the exact same content as the lecture.</td>
</tr>
<tr>
<td>Lecture with a written board (Lecture Content B)</td>
<td>Lecture with a written board (Lecture Content A)</td>
</tr>
<tr>
<td>Tests on the exact same content as the lecture.</td>
<td>Tests on the exact same content as the lecture.</td>
</tr>
<tr>
<td>questionnaire</td>
<td>questionnaire</td>
</tr>
</tbody>
</table>

Table 1. Methods of practice
2-2. Conditions in practice

Contents A and B are completely different proof problems of approximately the same difficulty level, and the prerequisite knowledge required is within the range of high school mathematics. The difficulty level of A and B is almost the same, meaning that the number of operations necessary for the proof process is the same in terms of the number of steps to transform the equations using knowledge of high school mathematics or above.

The prerequisite for the practice was to target students who did not know both two lecture contents. After the practice, students should be asked if they know the lecture contents, and students who know should be excluded from the analysis of test scores and survey results. Actions observed during the lecture are analyzed for everyone, regardless of whether or not there is any known content.

The hand motions during the lecture shall be filmed one by one with an iPad, and the entire lecture shall also be filmed with a video camera.

During the lectures, worksheets are used for slide lectures, and writing activities during board lectures are conducted on notebook paper distributed to students, which are collected after the lectures along with tests and questionnaires.

2-3. Analysis Method

Test scores and descriptions, worksheets and notes, questionnaires, and videos were used for analysis.

· Tests

Since the full score of the test differs from lecture to lecture, the score rate for each lecture was determined, and tests were conducted on the score rate for lectures given on the board and the score rate for lectures given on slides to determine whether there is a difference between them. The test is to prove the proposition, which reproduces the lecture content. We discuss the rationale for measuring the learner’s independence by how well the test is done. In the case of this study, it is to measure the ability to reconstruct knowledge on their own. Kamigaya and Koyama (2016) claim that “the activity of reconstructing a proof with reference to a known proof of a known theorem may be said to be a kind of genuine mathematical activity” [10]. Thus, the activity of re-proving known proofs can be seen as one of the research
activities of mathematicians. We reason that it is appropriate to ask the students to reconstruct the proofs after the lecture to see if they were reliving the mathematician's research activity of reconstructing proofs during the lecture. In other words, by making the proof similar to the lecture content, we could measure by test scores how much knowledge was reconstructed during the lecture.

**Questionnaire**

The questionnaire asks about students' evaluation of board lectures and slide lectures. We find out the difference in students' attitudes between the board lecture and the slide lecture. In the first practice, we conducted a questionnaire with two choices: "lecture on the board or lecture on slides. The three questions were 1) which gave me more time to think, 2) which helped me concentrate more, and 3) which felt better. In the second practice, we asked two questions in the questionnaire. 1) In which lecture was there more situations in which students derived proofs of propositions on their own without listening to the teacher's explanation? and 2) Which lecture gave you more time to think for yourself when writing in your notes?

**Video taken during the lecture**

The study by Elham Zargari, Ashley Marie Adams, and Carol McDonald Connor (2019) describes "gaze time" as a metacognitive measure of eye movements. In their study, "the greater the number or duration of "gaze time" eye movements, the more the learner was metacognitive" [11]. In (Ninomiya 2009), "Metacognitive measures can be taken as one means of measuring learner’s independence" [12]. In this study, "gaze time" is used in the analysis of videos as a means of measuring learners’ independence. The specific condition for "gaze time" is that the time between the start of gazing at one point and moving to another is at least 2 seconds. The number of times the "gaze time" is performed and the length of time spent doing it once is measured.

Brown (1975) found that "bored children often slouch and sometimes look away from the teacher. They often put up their cheekbones and hide their faces. Their facial expressions are emotionless, and they do not smile. Their eyelids are half-closed, and their mouths are not open. Some children doodle or mess with their hair. In more severe cases of boredom, some children doze off, their heads naturally drooping. In a lively and interested class, children’s faces are turned toward us, and their eyes are wide open" [13]. In this study, "face-up time" is measured as well as "gaze time" observation. As well as "gaze time" which focuses on eye position, "face-up time" for more than two seconds, i.e., the time and number of times students look in the direction of the lecture, are also observed.
3. Practice

3-1. First practice (preliminary practice)

Target: 18 university students in the Department of Mathematics, Faculty of Science, a private university in Tokyo
Duration: 40 minutes × 2 (2 groups)
Lecture contents:

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(8 fourth-year students)</td>
<td>(10 third-year students)</td>
</tr>
<tr>
<td>Slide lecture (Lecture Content [Sum of harmonic numbers])</td>
<td>Slide lecture (Lecture Content [infinite product identity])</td>
</tr>
<tr>
<td>Tests on the exact same content as the lectures.</td>
<td>Tests on the exact same content as the lectures.</td>
</tr>
<tr>
<td>Lecture with a written board (Lecture Content [infinite product identity])</td>
<td>Lecture with a written board (Lecture Content [Sum of harmonic numbers])</td>
</tr>
<tr>
<td>Tests on the exact same content as the previous lecture.</td>
<td>Tests on the exact same content as the previous lecture.</td>
</tr>
<tr>
<td>Questionnaire</td>
<td>Questionnaire</td>
</tr>
</tbody>
</table>

Table 2. Method of the first practice (Total 40 minutes)

3-2. Second practice (main practice)

Target: 22 university students in the Department of Mathematics, Faculty of Science, a private university in Tokyo
Duration: 90 minutes × 2 (2 groups)
Lecture contents:

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(11 fourth-year students)</td>
<td>(11 third-year students)</td>
</tr>
<tr>
<td>Slide lecture (Lecture Contents)</td>
<td>Slide lecture (Lecture Contents)</td>
</tr>
</tbody>
</table>
Table 3. Method of the second practice (Total 90 minutes)

<table>
<thead>
<tr>
<th>[Wallis’s formula])</th>
<th>[Veidt’s equation])</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tests on the exact same content as the lectures.</td>
<td>Tests on the exact same content as the lectures.</td>
</tr>
<tr>
<td>Lecture with a written board (Lecture Contents [Veidt’s equation])</td>
<td>Lecture with a written board (Lecture Contents [Wallis’s formula])</td>
</tr>
<tr>
<td>Tests on the exact same content as the lectures.</td>
<td>Tests on the exact same content as the lectures.</td>
</tr>
<tr>
<td>Questionnaire</td>
<td>Questionnaire</td>
</tr>
</tbody>
</table>

See Appendix 1. The lecture content is more difficult in the second practice than in the first, and the lecture time is correspondingly longer. The definition of increased difficulty in this practice is the number of proof processes that use knowledge of high school mathematics or higher to advance the proof process.

4. Results and Discussion

4-1. Test score

In the first practice, the test score showed no significant difference between the content of the board lecture and the content of the slide lecture. This is the actual result of the sign test. Even assuming a significance level of 10%, $p$-value $= 0.2796 > 0.1 = \alpha$. In the first practice, the lecture content was easier, and the lecture time was shorter, so it may be difficult to differentiate between the board and the slides.

However, in the second practice, in which the level of difficulty was increased from the first practice, a significant difference was obtained in the percentage of test scores for the slide lecture content and the board lecture content. A sign test at the 5% level of significance yielded a $p$-value $= 0.04904 < 0.05 = \alpha$. This indicates that the higher the difficulty level of the lecture content, the more significant difference in student independence between the slide and the written lecture board is shown. In this case, it can be argued that when the lecture content is more difficult, the written lecture is more suitable as a lecture tool than the slide lecture.
4-2. Questionnaires

The results of the questionnaire (regarding how the students themselves felt about lectures on the board and lectures on slides) showed that 64% of the students answered that lectures with more time for thinking (for the two groups as a whole) were board lectures, 79% answered that lectures with more focused work were board lectures, and (2 groups as a whole) 64% of the students answered that they had more time to think in a board lecture, 79% answered that they concentrated more in a board lecture, and 71% answered that they felt the lecture was better in the first practice.

However, there was no difference between the board and the slides in the students' evaluations based on the questionnaire in the second practice. Detailed results are provided in Appendix 2.

As a consideration, we reason that the first practice was done by a mathematician, but the second practice was done by a student, and this might be the reason for this result.

4-3. Behavior

As a behavioral analysis, we analyzed the "face-up time" and "gaze time" measures of 21 and 4 participants, respectively. The reason why only four people were able to measure "gaze time" was that the camera performance was not good, and only four people were able to observe eye movement. As a result, the average length, frequency, and percentage of "gaze time" for the four students were all higher for the written lecture than for the slide lecture.

See Table 5.

<table>
<thead>
<tr>
<th>“Gaze time”</th>
<th>lecture of slide</th>
<th>lecture of board</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of &quot;gaze time&quot; (/m)</td>
<td>1.16</td>
<td>1.44</td>
</tr>
<tr>
<td>Length of &quot;gaze time&quot; (s)</td>
<td>7.48</td>
<td>12.46</td>
</tr>
<tr>
<td>Percentage of &quot;gaze time&quot; during lecture (%)</td>
<td>14.76</td>
<td>29.62</td>
</tr>
</tbody>
</table>

Table 5. “Gaze time”
"Face-up time" was also observed more frequently in lectures by writing on the board than in lectures with slides. Indeed, statistical analysis showed significant differences in the length, frequency, and percentage of "face-up time," averaged over the 21 students. See Table 6.

<table>
<thead>
<tr>
<th>“Face-up time”</th>
<th>lecture of slide</th>
<th>lecture of board</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of &quot;face-up time&quot; (/m)</td>
<td>1.35</td>
<td>13.88</td>
</tr>
<tr>
<td>Length of &quot;face-up time&quot; (s)</td>
<td>8.19</td>
<td>17.83</td>
</tr>
<tr>
<td>Percentage of &quot;face-up time&quot; during lecture (%)</td>
<td>17.9</td>
<td>41.47</td>
</tr>
</tbody>
</table>

Table 6. “Face-up time”

We used data on 21 students whose face-up behavior could be accurately identified in the recorded videos of both slide lectures and board lectures. The results of testing with the Wilcoxon signed rank sum test are given below: for Number of "face-up time" p-value = 1.419e-05, for Length of "face-up time" p-value = 3.716e-12, for Percentage of "face-up time" during lecture p-value = 7.241e-07. The Wilcoxon signed rank sum test at the 5% level of significance revealed that there was a significant difference in "face-up time" behavior between the written and slide lectures.

Learners’ behaviors that could be considered as independent learning during lectures were more prevalent in board lectures than in slide lectures. From these results, we can infer that board lectures may be a better tool for learner-centered learning than slides.

5. Conclusion

The results in Section 4 suggest that in higher mathematics education, the use of written boards is more likely to be suitable for a lecture environment in which learners can learn independently than the use of slides, a common tool for conveying information. However, there are still many remaining issues to be addressed. For example, the amount of time it takes to write makes the lecture time difference between a lecture on the board and a lecture on slides. One of our future tasks is to consider how lectures on the board in higher education should be developed more efficiently.
Appendix

1. Lecture contents

<table>
<thead>
<tr>
<th>Content A</th>
<th>First practice</th>
<th>Second practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>[proposition]</td>
<td>If it is</td>
<td>[proposition]</td>
</tr>
<tr>
<td>$H_n = \sum_{k=1}^{n} \frac{1}{k} = 1 + \frac{1}{2} + \frac{1}{3} + \cdots + \frac{1}{n}$</td>
<td>Show that it is</td>
<td></td>
</tr>
<tr>
<td>, show that it becomes</td>
<td>$(1 + x)(1 + x^2)(1 + x^4)(1 + x^8)(1 + x^{16}) \cdots$</td>
<td></td>
</tr>
<tr>
<td>$\sum_{k=1}^{n-1} H_k = nH_n - n$</td>
<td>$= \frac{1}{1-x}$ (</td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lecture time</th>
<th>8 (in board lecture)</th>
<th>9 (in board lecture)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of proof processes</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Content B</th>
<th>First practice</th>
<th>Second practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>[proposition]</td>
<td>Show that it is</td>
<td>[proposition]</td>
</tr>
<tr>
<td>$\lim_{n \to \infty} \frac{([2n]!!)^2}{(2n-1)!! (2n+1)!!} = \frac{\pi}{2}$</td>
<td>Show that it is</td>
<td></td>
</tr>
<tr>
<td>$\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{2 + \sqrt{2}}}{2} \cdot \frac{\sqrt{2 + \sqrt{2 + \sqrt{2}}}}{2} \cdots = \frac{2}{\pi}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lecture time</th>
<th>26 (in board lecture)</th>
<th>22 (in board lecture)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of proof processes</td>
<td>11</td>
<td>10</td>
</tr>
</tbody>
</table>
2. Results of the second questionnaire

In which lecture were there more situations in which students derived proofs of propositions on their own without listening to the teacher’s explanation?

- If I have to choose slide lecture
- Can’t say either way
- a board lecture
- If I have to choose a board lecture
- a slide lecture

Which lecture gave you more time to think for yourself when writing in your notes?

- If I have to choose slide lecture
- Can’t say either way
- a board lecture
- If I have to choose a board lecture
- a slide lecture
References

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[8] Mitsuki, 2016, “Active learning through fieldwork and student perceptions of learning”
TITLE:
Visualizing Career Plans using a “Tree” Metaphor.

AUTHOR:
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University Education Center, Fukuyama University
Email: maeda@fukuyama-u.ac.jp

ABSTRACT:
In modern society where lifestyles and work styles are diversifying, each person is required to select and build a career based on their own values and visions, and to design their career independently. However, up until recently, the general idea of a career in Japan has been for the most part that it is something that is bestowed upon employees by a company or organization, and individuals only make choices within a certain range. From now on we need a to create ways to be able to design our own careers.

In this research, we developed a visualization tool using metaphors as an effective way to easily grasp the overall picture of diverse and complex career development and to derive actions that are required to realize career and lifestyle goals. Metaphors are used as a way to make complex ideas easier to understand and are often used in career education and research. The Life Career Rainbow and Arch Model (Donald E. Super) are well-known examples. In this research we have developed a career design tree, an easy-to-understand metaphor devised as a way for anyone, including non-experts, to get a complete picture of their career possibilities and potential.

The Career Design Tree is a method of drawing a career plan that bridges the gap between the ideal future image and the current image, in the form of a tree. First, the ideal image is drawn in the shape of a sun at the top of a sheet of paper, and then the current image is drawn like the roots of a tree at the bottom of the paper. Finally, in the space between the sun and the roots, the career plan is drawn in the shape of a trunk growing from the roots to become a tree. By expressing the career plan as a graphic, we can visualize people's ambiguous views of their careers. By doing so, the overall picture of the career plan can be grasped objectively, and it becomes possible to create a career plan with free ideas that are not bound by any preconceived framework. In addition, the system can be used by people of all ages because it is easy even for those who are not good at expressing themselves in writing. Unlike frameworks such as the "Personal Business Model," which views career planning as a business model, the Career Design Tree allows individuals to freely express their thoughts and ideas, which we believe is novel and unique.
To measure the effectiveness of this hypothesis, we conducted a survey of 27 students in the career education course "Career Design II" of the university to which the author belongs. A workshop was undertaken for drawing career plans using the "tree" metaphor. Deliverables, explanations, and questionnaire results were analyzed. As a result of the analysis, student participants were able to visualize their current situation, career possibilities and potential and gained deeper understanding of their career ideas. Analysis revealed a number of results. The ambiguity of the students' ideal future images, lack of self-understanding, and low sense of purpose in college life were highlighted. Visualization with the career design tree also revealed risks and issues even in cases where the future occupational image was clear. Using the career design tree model to visualize career plans has the potential to give students clues to problems with career plans and can help them develop better ways to realize future goals.
How Teacher Education Should be in order to Nurture Co-agency in Students and Teachers
- Practical Case Studies from Egypt and Japan and the Issues Raised –

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Yuri Hayase, Associate Professor, University of Fukui (y-hayase@u-fukui.ac.jp)
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Abstract

The OECD Learning Compass 2030 which is a product of the ongoing ‘OECD Future of Education and Skills 2030’ project focuses on ‘Student Agency’ as the core of its framework. On the other hand, ‘Teacher Agency’ is also essential to facilitate teaching and learning for students and support them in making decisions. This research aims to explore how teacher education should be in order to support co-agency in teachers and students through two case studies of Egypt and Japan.

Keywords: Teacher Education, Co-agency, Tokkatsu, The Inquiry Network
Introduction

In an uncertain and rapidly changing society, there is a growing consensus that education is the clue to identifying and developing knowledge and skills that are essential in the 21st century to build societies, secure new jobs, and guarantee a better life for all. The OECD Learning Compass 2030 which is a product of the ongoing ‘OECD Future of Education and Skills 2030’ project focuses on ‘Student Agency’ as the core of its framework. Student Agency is defined as the capacity to set a goal, reflect and act responsibly to effect change (Student Agency for 2030 Concept Note, OECD). However, OECD emphasizes that student agency does not mean student autonomy or student choice. People learn, grow and exercise their agency in a social context. The concept of co-agency entails that students are surrounded by their peers, teachers, families, and communities, all of whom interact with and guide the students toward well-being (Learning Compass 2030).

Background and Literature Review

In 2017, Egypt developed a new education system called ‘Education 2.0’ that adopts shifting from teacher-centered education to student-centered education. Part of the educational development is the establishment of Egypt-Japan Schools (EJS) in 2018 under the Egypt-Japan Educational Partnership (EJEP) that was concluded between Egypt and Japan in 2016 (Mostafa, 2019; Mostafa, 2020; Mostafa 2021). EJS embraces ‘Education 2.0’ while implementing Japan’s holistic educational curriculum model, known as ‘Tokkatsu’. In Japanese schools, tokkatsu is a practice used to nurture the noncognitive skills in children in both subject and non-subject classes by developing agency in students and creating an atmosphere for them to lead the learning process. Some examples of tokkatsu activities in Japan are cleaning schools, school events, class meetings, class instructions, school clubs, etc (Tsuneyoshi et. al., 2020; Takayanagi 2017). All these activities aim to develop agency in students through communication, collaboration, and problem solving. Students are the leaders of the activities. They consult with each other in assemblies and decide on what activity they want to do. They constantly communicate and collaborate to achieve what they aimed for. They look for solutions when they face problems and they learn through trial and error. The teacher is constantly observing and provides support and consultation whenever needed without excessive interference. Tokkatsu nurtures in children the spirit of co-inquiry, collaboration and problem solving which is reflected in academic classes as well. Students lead their learning process and learn through trial and error. The teacher proceeds with the class based on students’ understanding and correspondence to the lesson. Therefore, tokkatsu is a practice that nurtures in children all the necessary skills that enable them to lead their learning process and have agency in their classroom and their society, in general. However, due to the lack of knowledge and training in this new field in Egypt, there has been a misconception among the teachers on how to practice tokkatsu in the classroom.

On the other hand, in 2022, the University of Fukui in Japan has been designated by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) as one of the Flagship universities that will lead the revolution of teacher education to develop teachers’ and student-teachers’ professionalism. The curriculum of teacher education at the University of Fukui is distinguished by allowing undergraduate students to exercise their agency and engage in practical activities besides their teaching practicum. The researchers will specifically focus on one of these practical
activities called “The Inquiry Network” which started in 1995 and has been running for 27 years. The ideas of ‘Mutuality’ and ‘Generational cycle’ of Erikson were determined as the key points of this activity when it started (Yanagisawa, 2004). This activity is designed for children from grade four and above in elementary schools in the local community. They participate every other week from May to December. The activity is operated by first-, second-, and third-year students of the Faculty of Education. Almost all first-year students participate and second- and third-year students participate voluntarily. Students and children are divided into 9 blocks, each block specializes in some activities, for example, indoor cooking block, outdoor cooking block, science block, city exploration block, etc. The researchers support the students as ‘Professional Learning Communities’ (Hayase, 2019) by guaranteeing several opportunities of reflection. This practical activity is related to ‘Co-agency’ in the planning document of the application for the Flagship universities.

The purpose of this research is to discuss the problems related to teacher education approaches and examine how these problems limit the development of teacher agency which is, by turn, reflected in student agency. Moreover, the researchers will explore how teacher education should be in order to support co-agency between students and teachers.

Methodology

This research adopts a case study approach on two targets. One target is studied from the viewpoint of tokkatsu in Egypt Japan Schools in Egypt, and the other target is studied from the viewpoint of pre-service teacher education with focus on “The Inquiry Network” activity at the University of Fukui in Japan. With regards to tokkatsu, the study involves four EJSs based on recommendations from the Project Management Unit (PMU)¹ in the Ministry of Education. The selection and approval process started in May 2021 and took almost eight months. The investigation started in March 2022 and is conducted via online lesson observations, discussions with the teachers, and analysis of the teachers’ reports and evaluation sheets.

As for “The Inquiry Network”, students design, plan, and operate this activity and reflect on their practice at the same time. They write self-reflective reports after they finish the last activity in the academic year. The study is conducted by analyzing the self-reflective reports written by a student who continued this activity for three years to examine how he has developed professionally within a social context. Moreover, the study will also investigate how to nurture ‘Co-agency’ over three years.

Study

1. Tokkatsu in EJS

Tokkatsu in EJS is still immature and is separated from the academic classes. It is practiced only in class meetings. Class meetings are assemblies where students choose a topic to discuss and share their opinions and feelings about a problem or an issue that they want to improve and collaborate and communicate to achieve what they want. The teacher’s presence and interference

¹ Project Management Unit is the unit that has jurisdiction over EJS. Since the establishment of EJS is a national project, the Ministry of Education’s and PMU’s approval was essential.
are greatly marked, but students are given more freedom to exercise their agency than in academic classes. On the other hand, student agency is not seen or noticed in academic classes and this is due to several reasons: 1) the lack of experience in combining academia and tokkatsu, 2) a dense curriculum that does not allow much time for activities, 3) teacher’s evaluation. This study focuses on the lack of experience and teachers’ evaluation as the main cause of the absence of student agency in academic classes.

In Egypt, these two factors are interrelated. Teacher evaluation, in specific, has a direct effect on teacher education. In 2018, with the launch of EJS, Lesson Study was introduced to EJS as a professional development approach that aims to cultivate and improve teachers’ capacity and ability. However, Lesson Study observation considers only the teacher’s performance and lesson delivery and does not focus on how to promote student agency or create a self-learning environment for the students. Therefore, the teachers are focused only on the items they will be evaluated on, and they do not focus on developing new methodologies and strategies that stimulate agency and collaboration in students and pave the way for better learning.

The Lesson Study cycle in Egypt consists of three stages; planning, performance, and reflection (feedback). The following is an example of one of the lesson planning sessions that the researchers participated in and observed in EJS. After careful observation and study, the researchers found that the issues raised in this example are almost the same in the four schools. The session was a planning session of an Arabic lesson on ‘Personal Pronouns’. In all planning sessions in EJS, the subject teachers sit together with the class teacher and design a very specific plan following the teacher’s guidebook of the subject. They decide what strategies will be used in each activity and the duration of the activity regardless of the situation of the students and their understanding. They even decide what pronouns each student should use in each activity to ensure that all the pronouns are covered and used. Everything is pre-decided in a solid frame with no space for students to think or create. Moreover, the class teacher is given too many instructions by his/her peers to follow during the planning session, and is advised to follow the plan as designed since he/she will be evaluated by the observers based on the plan, which deprives the teacher of their freedom to exercise their agency and create a learning community in the classroom. ‘Teacher Agency’ is essential to facilitate teaching and learning for students and support them in making decisions. If the teacher lacks agency in their classroom, they cannot nurture it in children.

2. “The Inquiry Network”
The researchers investigated an example of self-reflective reports written by a student who continued this activity for three years to examine how to develop ‘Co-agency’ between students and teachers. The target is Mr. Terashima who is currently an elementary school teacher. Mr. Terashima was an exceptionally impressive student. He cared a lot about his juniors and interacted fluently with the children’s parents. He belonged to the ‘paper-craft block’ and was a representative of the block from his second year since no third-year student continued the activity in his block. His reflection report of the first year is mainly about the interaction with the children in his block. His senior and local people affected his reflective practice. The reflection of his second year is about various things because second-year students design the activity of each block and he was in charge of the block. His reflection is not only on the children but also on his juniors, objects, the design of the activity, and the organizational matters of his block. His senior, local people, children’s parents, and his peers had great effect on his second year’s reflective practice.
report. In his third-year reflective report, Mr. Terashima mainly features “The Inquiry Network” itself from the perspective of his three-year career. He also recorded his expectations for the future of the activity since third-year students take charge of “The Inquiry Network” and all its blocks, and they support their juniors to become the future, responsible seniors. His juniors also had a great impact on his reflective practice in his third year. Therefore, ‘Co-agency’ is developed among generations and by the exchange of roles, and by turn, ‘Student Agency’ is developed with the development of ‘Co-agency’. However, this process takes a long time and requires experience. In his reports, Mr. Terashima said that although he had suffered many things, he was able to continue this activity for three years because of the support and the encouragement he was provided with by the people surrounding him. He was well aware that ‘Co-agency’ supports his practice since multiple reflection opportunities were set by students and teachers. As a result, he could develop his ‘Student Agency’ over the three years. Student teachers who have experience in exercising ‘Co-agency’ will be able to exercise ‘Teacher agency’ in order to support their future students exercising ‘Student Agency’ as well.

Conclusion and Areas to Improve
‘Student Agency’ is a reflection of ‘Teacher Agency’. Teachers learn and develop with students in the classroom. When teachers are strained by many instructions and focused only on the evaluation process, they are deprived of their agency, and hence they tend to do the same with the students. Therefore, professional development of teachers should focus more on developing the professionalism of the teachers through developing new learning methods for students and learning environment where co-agency can be nurtured and not through teachers’ evaluation. ‘Co-agency’ experience in pre-service teacher education will support future ‘Teacher Agency’ and ‘Student Agency’. Exercising and developing ‘Co-agency’ requires time; therefore, a common understanding is needed to support student teachers.
Reference


Terashima, Ryota (2013). 子どもたちと共に遊び学ぶ [Learning with Children]. Education


Title: Support Teams as Professional Development Tools: Long-Term Collaboration Among General Educators, Special Educators, and Paraeducators

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Email: vlzelenka@fhsu.edu

Introduction

Inclusive classrooms are customary in the U.S. school system. No Child Left Behind (2002) and the Individuals with Disabilities Education Improvement Act of 2004 (IDEA 2004) support the inclusion of students with disabilities in the general education classroom. Last school year, 7.3 million students had access to special education. Most students with disabilities ages 6-21 spend over 80% of their instruction time in general education classes (National Center for Educational Statistics, 2021). Students with speech or language impairments, specific learning difficulties, health impairments, and developmental delays will likely spend most of their instructional time in general classrooms (National Center for Educational Statistics, 2021).

The initial IDEA legislation became law in 1975; the enactment states that students with disabilities should have access to the least restrictive learning environment to meet their needs (U.S. Department of Education, 2020). Partly as a result, the number of full-time paraeducators in classrooms has grown significantly. In the 1960s, fewer than 10,000 paraeducators served students ages 6-21 in our nation’s schools (Biggs et al., 2016); however, that number grew to over 450,000 by 2017 (U.S. Department of Education, 2020). Additionally, to better support students with disabilities in the general education classroom, co-teaching and collaboration between general education and special education teachers became essential (Pugach & Winn, 2011).

Co-teaching and collaboration teams are commonly characterized as general and special education teachers planning, delivering and assessing instruction concurrently in the general education classroom. This approach to teaching supports all students in meeting their individual needs (Friend & Bursuck, 2019; Pugach & Winn, 2011). Additionally, in the years since IDEA’s passage, new educational frameworks have sought to expand its framework of inclusion and access. Teachers can strengthen co-teaching and collaboration outcomes using research-based tools and practices to deliver curriculum and instruction.

Among the promising evidence-based approaches is Universal Design for Learning (UDL). Developed by the Center for Applied Special Technology (CAST) in the 1980s and 1990s, UDL moves past a binary view of abled and disabled students and toward recognizing each student’s unique learning needs (Center for Applied Special Technology, 2021). UDL recognizes that all classrooms will contain students with varying abilities, interests, and learning styles. The framework challenges educators to plan and execute lessons with these differences in mind, providing “multiple means” of engagement, representation, and action and expression.

UDL challenges educators to include the needs and interests of students with disabilities in lesson plans, but it is not a special education strategy. The model is flexible to accommodate changes in student needs over time. For example, UDL’s guidelines help educators serve
students with disabilities and the needs of gifted children, who may have specialized learning requirements that don’t fit into the traditional disability model (Spencer, 2011.) A teaching approach rooted in Universal Design for Learning principles can help students like Kim, who experience life stressors that disrupt their behavior and capacity to learn. In this way, an inclusive classroom rooted in UDL principles includes students with disabilities and all students across all dimensions of ability.

Inclusive Classrooms, Workload, and Burnout

To lead inclusive classrooms, educators need the skills to plan and teach lessons for students at multiple and dynamic levels of ability. General educators must communicate effectively with their school’s special educators and classroom paraeducators. While these planning and communication tasks are crucial to the success of an inclusive classroom, they represent a significant investment of time and effort in a profession already susceptible to burnout.

Teacher burnout and teacher attrition are major concerns in the United States. A 2018 report on two major surveys of U.S. teachers found that 44 percent of new teachers leave the profession within five years (Ingersoll et al., 2018). The literature shows a strong link between teacher burnout and attrition (Vanderslice, 2010; Fisher, 2011). Research demonstrates that heavy workload and challenging student behavior contribute to teacher burnout (Hoigaard et al., 2012). Special educators, who take on a wide range of responsibilities, are especially vulnerable to burnout (Farmer, 2020). While special educators traditionally focus on a “caseload” of students with IEPs, inclusive classroom models require special educators to split their time between co-instruction, caseload management, and communication with parents and staff (NEA, 2019). These multiple responsibilities can be challenging for special educators to navigate (Murawski & Hughes, 2021).

Teachers cite poor relationships with colleagues as a source of stress and burnout (Hoigaard et al., 2012). While teachers who work with paraprofessionals tend to report higher job satisfaction, research suggests inadequate preparation and communication can cause friction in the teacher-paraeducator relationship (Jones et al., 2012). A 2010 survey of first and second-year teachers found that 80% had received less than 1 hour of training on working with paraeducators. Additionally, most new teachers reported that they did not plan with their paraeducators, and several expressed that they were unsure how to navigate the teacher-paraeducator relationship (Bauman et al., 2010).

Teachers who lack confidence in their skills are more likely to burn out (Stasio et al., 2017). Additionally, teachers who believe they cannot effectively deal with student needs may be less likely to plan and carry out inclusive teaching. For example, many researchers theorize that a disproportionate number of minority children are referred to special education services because some general educators feel unequipped to deal with the learning needs of children from different socio-cultural backgrounds (Giangreco, 2003; Gravois & Rosenfeld, 2006). Furthermore, some general education teachers engage less with students with disabilities when a paraeducator is present, delegating instruction rather than integrating students with disabilities into group learning.
In contrast, teachers who collaborate well with others are more likely to feel confident in their ability to handle teaching challenges (Hamman et al., 2013). Schools that foster a cooperative atmosphere, with high rates of knowledge sharing among teachers, have lower attrition rates (Simon & Johnson, 2015). Effective collaboration among general educators, special educators, and paraprofessionals is crucial for inclusive learning, good working relationships, teacher confidence, and an environment that helps prevent teacher burnout (Hamman et al., 2013). Additionally, teachers, school administrators, and higher education institutions should see regular collaboration among educators and paraeducators as essential for ongoing professional development.

In practice, this collaboration takes the form of regular weekly meetings among special educators, general educators, and paraeducators - each classroom’s “support team.” Support team meetings can serve as informal skills-sharing workshops, helping educators learn techniques from each other that they can implement in various situations. Regular communication among support teams can help clarify each member’s role, provide a space for conflict resolution, and allow educators to seek support with teaching challenges.

This article recommends strategies for facilitating long-term collaboration across three dimensions: (1) pre-service teacher preparation, (2) scheduling and administrative support, and (3) team planning and meetings.

**Recommendations for Fostering Long-term Team Collaboration**

*Pre-Service Preparation*

Institutions of higher education should prepare pre-service teachers with the principles of Universal Design for Learning (UDL) in mind. Pre-service teachers should get in the habit of drafting and adapting lessons for students of multiple abilities. Advocates of UDL use the example of closed captioning as a learning adaptation with applications for many different people. While closed captioning was initially developed for Deaf and hard-of-hearing people, it also benefits English language learners, people with sensory processing issues, and people who prefer to read text rather than listen to it (Waxman, 2020). In the same way, pre-service teachers who practice creating lessons that include students with disabilities will find themselves more skillful and confident in tailoring instruction to a wide variety of learning needs (Murawski & Novak, 2019).

Pre-service teachers should train with the expectation that they will teach alongside and supervise other professionals throughout their careers. As of 2019, most pre-service teachers get less than half a course's preparation in working with paraeducators (Sobeck et al., 2021). Although preparing pre-service teachers to incorporate and manage paraeducators in the classroom environment effectively can be challenging in higher education programs, this skill is valuable to special education and general education teachers (Yates et al., 2020). Specifically, teacher education programs should include mandatory communication and teaching supervision classes.

Research shows that even though special educators are often called upon to contribute to classroom teaching, they are often not trained in co-teaching techniques. A 2014 survey of pre-service special education teachers found that most were exposed to a one-teach, one-assist model
of co-teaching, where the special educator took a backseat to the general educator in the classroom. Many described that approach as less than ideal, seeing power struggles between educators as barriers to learning (Hamilton-Jones & Vail, 2014). A 2007 study of a semester-long co-teaching experience found that pre-service teachers who were allowed to practice co-teaching built knowledge about co-teaching strategies and were less fearful about co-teaching after graduation (Kamens, 2007). Pre-service general and special educators should learn co-teaching strategies and be trained in various techniques, including team teaching.

Scheduling and Administrative support

At the K-12 level, administrators and educators need to be aware of the principles of UDL and committed to implementing them in daily learning. Inclusive education works best when general educators, special educators, and paraeducators have the time and support to collaborate and co-teach (Cook, 2004; Carroll et al., 2021). Schools and school systems should help teachers make time for regular support team meetings in their schedules. For example, schools can facilitate a weekly planning time specifically for support teams.

Special educators may struggle with the expectation to meet regularly with their support teams. While a typical general educator is a member of just one support team, special educators may find themselves co-planning with several teams each week. Co-planning is a significant investment of time for a special educator time and energy, but it is an investment that can pay off over time. This article hypothesizes that general educators who regularly meet with special educators will be less likely to refer their students for intervention. By the same token, general educators who know they can regularly rely on a special educator’s toolbox are less likely to let learning or behavioral management issues reach a crisis point before asking for help. Future research could explore the long-term effects of strong collaboration between special educators and general educators on special education referrals, teacher satisfaction, and student outcomes.

School administrators should be aware of each special educator’s workload and be careful not to assign each special educator to more teams than their schedule can support. The National Education Association (NEA) offers special educators a workload analysis model that helps them balance IEP management, inclusionary work, and special instruction (NEA, 2019). Special educators who do not have enough time to carry out their duties should be able to ask their schools for assistance (Cook, 2004). Special educators should also get the opportunity to co-teach classes.

Student Support Team Planning and Meetings

Brown, Howerton, and Morgan found that the cornerstones of successful collaboration are “(a) communication, (b) co-planning, (c) shared delivery of instruction and assessment, and (d) conflict resolution.” To build on these cornerstones, student support teams should take two forms of meetings: co-planning meetings and team evaluation meetings (Brown et al., 2013). Co-planning sessions focus on co-planning and co-teaching, and team evaluation meetings provide team communication and conflict-resolution opportunities.
Co-planning meetings should occur regularly. In a typical co-planning session, collaborative teams should first prepare a lesson for the entire class. Then, the team should discuss how to incorporate modifications and accommodations to ensure that all student needs are addressed. These meetings should stay focused on the planning process, ensuring that lessons meet all students' needs in the classroom instead of discussing individual student issues.

Collaborative teams can use templates and forms to keep co-planning on track. In their article *Tools and Strategies for Making Co-teaching Work*, Brown et al. (2013) offer a sample agenda that student support teams can follow. In her article *10 Tips for Using Co-Planning Time More Efficiently*, Murawski (2012) gives a sample co-teaching plan that student support teams can use. Team evaluation meetings should be shorter and less frequent. Every few weeks, the team should set aside a few minutes to check each member's satisfaction with the teaching process. This is an opportunity for the team to resolve conflicts, ask for support, or suggest adjustments to the collaboration process. In addition, teams can use this meeting to discuss all students' general needs and well-being. Educators and paraeducators can share their unique perspectives on each student's personality, strengths, and weaknesses (Hamilton-Jones et al., 2014).

Finally, ongoing meetings between collaborative teams allow educators to practice the principles of Universal Design for Learning in their own teaching journeys. Educators can practice adapting their communication and co-planning skills to their team’s unique needs through long-term collaboration in a supportive team. The skill development that occurs in these meetings can help educators gain the efficacy and support they need to be confident, flexible educators inside and outside the classroom.
Works Cited


Introduction

This presentation will focus on challenges in higher education, including faculty leadership’s role in elevating intentional practice in graduate programs, concentrating on developing inclusive higher education classrooms and on-campus and online educational environments. It will offer various perspectives on the changes in United States demographics and will examine dialogue as a sustained opportunity for diverse groups of students to learn together. It will examine the role of higher education and provide specific strategies for classroom situations that faculty can use to create intergroup dialogue classes, programs, and workshops to foster connections with diverse student populations historically absent in graduate programs. Additionally, this chapter will look at institutional change efforts from the level of the individual faculty member, the department or college, to university-wide leadership to ensure diversity in graduate programs in higher education. This chapter will offer instructive guidance to create campus climates that are welcoming for all students and suggest a path forward for faculty development that supports diversity, equity, and inclusion of underrepresented ethnic minority students in graduate-level programs.

Challenges in Higher Education

Higher education faces numerous challenges, from state funding reductions and downturns in economic conditions to demographic changes. Parents and students are concerned with the costs and returns of postsecondary education in the face of high levels of student debt. Therefore, they call on colleges and universities to prove their affordability and simultaneously demonstrate accountability (Cunningham, 2022). Civic leaders and businesses seeking to stimulate economic growth are asking higher education to demonstrate its role in building a skilled workforce. Meanwhile, controversies and debates related to the enrollment of undocumented students, personal safety on college campuses, and academic freedom have demonstrated the need for critically engaged discussions concerning these topics (Smith, 2020). Additionally, internal and external stakeholders are prompting institutions to address new and persistent challenges related to access, retention, and success among increasingly diverse student populations and to develop new strategies for creating inclusive classrooms and other campus environments.

Additionally, retention and success have become essential considerations among an increasingly diverse student population, thereby developing a need for new and innovative strategies for creating inclusive environments (Hrabowski et al., 2019; Rios et al., 2019). Developing inclusive
classrooms and educational settings in higher education graduate programs requires a conscious effort to build a strong base of undergraduate students from underrepresented communities (Cunningham, 2022; Rios et al., 2019). The university and the individual departments share responsibility for making the transition into graduate school smooth and welcoming for potential graduate students from traditionally underrepresented ethnic minority populations.

Changes in United States Demographics

Developing an inclusive environment that encourages student success at the undergraduate level provides a sense of belonging and desire for future admission to graduate studies. As racial and ethnic diversity increases among the U.S. population, developing more inclusive classrooms and educational environments has become a high priority in higher education. From 2000 to 2018, enrollment in post-secondary education increased for all racial and ethnic populations. Higher education witnessed an increase of 18- to 24-year-olds from 56% to 59% for Asian, 39% to 42% for White, 31% to 37% for Black, and the most significant population increase was 22% to 36% for Hispanic students (National Center of Education, 2018). These changes within higher education parallel population changes in our country. In 2011, our nation marked the first year in which most babies born in the United States were not white. In 2016, for the first time, most students in K-12 public schools were minority students. This direction is projected to continue until 2060 (Vespa et al., 2020). Thus, faculty in higher education will need to foster connections with diverse student populations historically absent in post-secondary education.

In a recently published book, Diversity’s promise for higher education: Making it work, author Daryl Smith (2020) states that diversity in higher education is no longer a projection—it is a reality. Over the past fifty years, higher education has faced issues of diversity; however, new challenges are emerging and have grown in urgency. The author declares that understanding the conditions under which diversity works and addressing them across higher education provides an opportunity to confront the unfinished business of the past, even as we address the newer issues of today. Four fundamental issues are addressed: (1) The significance of diversity in higher education in national and global contexts, including immigration, continuing inequities, the formation of nation-states, the history of injustice, and the creation of effective workplaces. (2) An overview of the history of diversity in higher education over the past fifty years establishes the need for a new strategy. (3) Bringing together research from different disciplines to address building institutional capacity for diversity. And ultimately, (4) several approaches to building capacity for diversity over the long term in both practical and conceptual terms.

Higher Education’s Role

Higher education's increasing racial and ethnic diversity is central to its potential role in determining whether societal inequality can or will be eradicated. But fulfilling that critical role requires more than simply bringing diverse groups of graduate students together in one location, as positive outcomes do not flow automatically from the fact of diversity itself (Smith, 2020). Instead, higher education institutions must create intentionally inclusive learning environments
such as course curricula, classrooms, organizations, graduate research opportunities, and community service-learning projects (Hrabowski et al., 2019). Equally important, higher education must facilitate broad, deep, and meaningful interactions across race, ethnicity, and other dimensions of diversity (Cunningham, 2022). The faculty is central to ensuring that all classroom structures and pedagogies equally engage all graduate students in learning, problem-solving, and collaborating. Thus, transcending differences results in growth vitality and social cohesion in our society (Rios et al., 2019). Often the backgrounds of these students differ from the faculty members who are doing the recruiting and admissions decision-making. While there is a need for larger systemic challenges, there are basic practices that higher education can implement to reach more diverse and inclusive graduate students (Cunningham, 2022; Symonette et al., 2014).

Summary

Challenges in higher education include elevating intentional practice in graduate programs and concentrating on developing inclusive higher education classrooms on-campus and online to include underrepresented ethnic minority students. Various perspectives on the changes in United States demographics offer the opportunity for diverse groups of students to learn together and from one another. The increasing racial and ethnic diversity in higher education provides a unique role in eradicating societal inequality. Faculty can create intergroup dialogue classes, programs, and workshops to foster connections with diverse student populations historically absent in graduate programs. Additionally, institutional change efforts from the level of the individual faculty member, the department or college, to university-wide leadership ensures diversity in higher education. Developing an inclusive campus climate that is welcoming for all students will promote the inclusion of underrepresented ethnic minority students in graduate-level programs.

References


The Julius Rosenwald Schools:

Bridging the Gap

A Conference Proceedings Submission for the 21st Annual

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The Julius Rosenwald Schools:

Bridging the Gap

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Julius Rosenwald, the president of Sears, Roebuck & Company during the early 20th century, wanted to improve African American communities in the South and thought that one of the best ways to promote improvement was through the construction of attractive, hopeful, and functional school buildings (Ascoli, 2015; Deutsch, 2011; Finkelstein, 2019; Hoffschwelle, 2014; Siddle Walker, 1996). As a result, Rosenwald provided $25,000 (approximately $600,000 in today’s dollars) to Dr. Booker T. Washington at the Tuskegee Institute in Alabama in order to “build offshoot schools of Tuskegee, with the rule that each school must raise” part of cost to build them (Alcorn, 1986, p. 4).

In contrast to the philosophy of DuBois (1903), the philosophies of Rosenwald and Washington (1901) for improving African American communities through education posited that “all African Americans, not just the appointed few,” were “responsible in some capacity for the direction and progress of the entire” community (Savage, 2001, p. 201). In Washington’s (1901) view, African American “teachers and principals were to empower themselves, become agents, to create a better community for themselves and their children” (Savage, 2001, p. 201). To provide this forum for empowerment, Rosenwald and his fellow reformers believed that “local participation and involvement in the school’s construction was imperative because it could teach the community how to improve the appearance and sanitation of its own neighborhood” (West & Hoffschwelle, 1995, ch. 8, p. 2).
After some initial successes at Tuskegee and with other schools in Alabama, the Julius Rosenwald Fund (JRF) was formally established in 1917 in partnership with George Peabody College in Nashville, Tennessee, (now part of Vanderbilt University) to help build schools in rural African American communities across the South (Alcorn, 1986; Ascoli, 2015; Deutsch, 2011; Hoffschwelle, 2014; Siddle Walker, 1996). The plans used to construct the Rosenwald school were created by Peabody College faculty members and were published in the 1928 booklet *Community School Plans*. This booklet included over 20 school building designs of various configurations along with plans for laboratories, industrial shops, teacher homes, and even privies for locations without running water. In addition, the publication provided detailed information about constructing school buildings and auxiliary buildings in the areas of excavation, iron work, framing, sheathing, roofing, weatherboarding, exterior finish, flooring, windows, doors, interior finish, movable partitions, painting, heating, and landscaping.

One of the major goals of the JRF was the “establishment of improved” school accommodations for African Americans in “rural areas in order to aid them in their quest for equal status in all levels of American society” (Stitely, 1975, p. 9). When the rural school building program of the JRF ceased operations in 1932, it had provided partial funding for the construction of approximately 5,000 schools in 15 southern states with 354 of them being in Tennessee (Alcorn, 1986; Finkelstein, 2019; Hoffschwelle, 2014; Stitely, 1975). Indeed, the Rosenwald school building project was designed to bridge the education gap and provide hopeful, functional learning environments for rural African American communities throughout the South prior to the civil rights movement of the 1950s and 1960s.
References


Abstract
Forty-nine teachers from nine elementary schools on the Big Island of Hawaii completed a six-part Next Generation Science Standards (NGSS) Science, Technology, Engineering, and Mathematics (STEM) needs survey designed to (1) collect demographic and background information, (2) determine teachers’ familiarity with the Next Generation Science Standards (NGSS), (3) examine teachers’ abilities (confidence and skills) to work with students during science lessons, (4) identify the support teachers already had in place for facilitating science lessons, (5) determine teachers’ needs that would help them successfully conduct science lessons in the future, and (6) classify teachers’ interests in receiving professional development in twelve specific STEM science areas—computer science, mathematics, the Citizen Science Project, biomedical sciences, agricultural sciences, geology, oceans and weather, astronomy, electronics and electricity, energy, manufacturing, and drones. Findings revealed that none (0 percent) of the 49 teachers had a “great deal” of familiarity with the NGSS core ideas/concepts, cross-cutting themes, and science and engineering practices, although over one-third (35 percent) had “quite a bit,” nearly half (49 percent) had “some,” and nearly one-fifth (17 percent) had “very little” or “none at all.” Elementary teachers’ four greatest needs were (1) materials that are required for lessons (45 percent), (2) assessments that can help them understand how their students learn science (41 percent), (3) professional development time to implement, reflect, and revise lessons (41 percent), (4) professional development which allows teachers to work with teachers at their grade levels to develop and implement science lessons (37 percent), and (5) unit plans that show the flow of lessons (35 percent). Findings also revealed that over 60 percent of teachers reported a lack of confidence in the following skills: (1) ability to find and use a variety of science assessments, (2) ability to identify and implement strategies to gauge student learning, (3) ability to provide the materials and equipment to support safe science learning experiences, and more. Recommendations for elementary teacher NGSS STEM professional development are provided, based upon these and other findings.
The State of Hawai‘i is unique in relation to all of the other states in America. Hawai‘i’s public-school system was founded in 1840 by King Kamehameha III. It is the oldest public-school system west of the Mississippi. Historically, public education has supported economically disadvantaged students from a wide variety of ethnic and cultural backgrounds. Over 70 percent of Hawai‘i’s public-school students are from ethnic minority groups, including 25 percent Native Hawaiian, 22 percent Filipino, and a growing population of “other Pacific Islanders” (Okumura, 2008; Tanigawa, 2017).

The “Aloha State” has one unified school district with funding divided into 15 regional Complex Areas, which are geographic locations located on each of the five major islands. Because of the isolation and size of the various islands, some of the more remote Complex Areas are defined as all of the schools that feed specifically into one high school. There is a major challenge to bring funding and resources to remote communities to implement Next Generation Science Standards (NGSS)-aligned science for our keiki (children)—our future.

Our strength as a nation is in our small, rural learning communities. Although challenged, the east side of Hawai‘i Island, the site of the study, also offers many exciting opportunities for our students. The community is small, but very diverse, and it supports a variety of businesses aligned to this unique place we call home. When the Hawaiians first populated the islands, they set up their communities to encompass areas from the mountain to the ocean. These ahupua‘a (land divisions) contained the resources from a variety of environments that sustained farming, fishing, hunting, the engineering of tools, wayfaring, and the practice of la‘au lapa‘au (medicine). The local community continues to utilize its ahupua‘a to conduct scientific research and encourage economic development through support of a variety of small businesses. The lifeblood of our smaller community on the Hawai‘i Island will be utilizing the opportunity to “grow our own” STEM education, scientific research and career paths for our island keiki (children).

The Hawai‘i State Department of Education Strategic 2030 Promise Plan drives the goals that Hawai‘i Island has set for the next decade of improvements to public education. The goal of educational equity includes providing high-quality teachers who are prepared and knowledgeable within their content areas. The plan suggests that augmented professional development (PD) that recognizes educator-led design work will benefit schools and impact student learning (Hawaii Department of Education, 2022).

Also embedded within the strategic plan is the full implementation of the NGSS. These standards were adopted by the Hawai‘i Board of Education in 2016, with full implementation required by the 2019-2020 school year. Under the 2030 Promise Plan, schools will provide aina-based (place-based) learning opportunities that implement the NGSS and maximize community resources. The goal is to encourage students to develop an understanding of their “place”—their unique environment and the challenges towards sustainability of Hawai‘i Island’s natural resources.

The NGSS calls for students to develop higher-level thinking and reasoning skills in schools nationwide (National Research Council, 2013). To cultivate higher-level thinking, research suggests that the quantity and quality of science education should be increased in the elementary classroom. The transition to instruction aligned with the NGSS requires teachers to develop the content knowledge and pedagogy relevant to the disciplinary core ideas inherent in the NGSS, thereby fostering teacher effectiveness and efficacy (Marshall, Smart, & Alston, 2017; Qureshi, et al., 2016; Shulman, 1986; Shulman, 1987). Lessons designed to include the scientific practices with the disciplinary core ideas and crosscutting concepts from the NGSS also allow students to construct, explain, and apply “science core ideas to varied
phenomena,” as well as engage students in the process of DOING science (Berland, et al., 2016; Krist, Schwarz, & Reiser, 2018; National Research Council, 2013; Reiser, et al., 2017). This is vital because the scientific process supports “critical language and logic skills” that engage and excite students to make an impact on the world around them (Conderman & Woods, 2008, p. 77).

**Purpose**

This study examined the findings of the Elementary Teachers’ Next Generation Science Standards (NGSS) STEM (Science, Technology, Engineering, and Mathematics) Needs Survey that was administered in the Spring of 2022. This survey had a three-fold purpose—(1) to inform the focus of NGSS STEM professional development for elementary school teachers, (2) to inform the creation of the Envelopes of Science Awesomeness supporting curriculum for teachers and their students, and (3) to provide data necessary for the writing of a DRK-12 grant submitted in the Fall of 2022.

**Participants**

Participants for this survey included 49 teachers (43 female and 6 male) from nine elementary schools on the Big Island of Hawai‘i. Eighteen of the teachers held bachelor degrees. Twenty-five of the teachers held master degrees. Four of the teachers were employed through emergency teacher certification. Two teachers declined to respond to the question related to degrees held.

As far as years of teaching experience, 5 teachers had 1 to 2 years of teaching experience; 8 teachers had 3 to 5 years; 10 teachers had 6 to 10 years; 16 teachers had 11 to 20 years, and 10 teachers had over 20 years of teaching experience.

As far as grade levels taught, 8 teachers taught kindergarten through second grade, 8 teachers taught third grade, 1 teacher taught special education third and fourth grades, 1 teacher taught special education fourth through sixth grades, 10 teachers taught fourth grade, 15 teachers taught fifth grade, 1 teacher taught a fifth and sixth grade combination, and 4 teachers taught sixth grade. One teacher did not provide grade-level information.

As far as minutes teaching science per week, 3 teachers provided 20 minutes of science instruction per week, 15 teachers provided 35 to 50 minutes of science instruction, 15 teachers provided 55 to 70 minutes of science instruction, 10 teachers provided 75 to 90 minutes of science instruction, and 6 teachers provided more than 90 minutes of science instruction per week.

**Instrumentation**

Teachers were provided with an Elementary Teachers NGSS/STEM Survey. Portions of the survey were adapted and used with permission from the Friday Institute for Educational Innovation (2012), and the NGSS/STEM Efficacy Survey (Pinner & Ray, 2021).

The survey contained six parts. Part One of the survey collected demographic and background information, including gender, school, degrees, teaching experience, grade levels, and minutes of teaching science each week. Part Two of the survey collected information related to the teachers’ familiarity with Next Generation Science Standards (NGSS). Part Three of the survey collected information related to teachers’ perceptions of their abilities to work with students during their science lessons. Part Four of the survey collected information related to support received to successfully conduct the science lessons. Part Five of the survey collected information related to support needed to successfully conduct the science lessons. Part Six of the survey collected
information related to participants’ interests in further professional development focused upon teaching computer science, mathematics, the Citizen Science Project, biomedical science, agricultural science, geology, oceans and weather, astronomy, electronics and electricity, energy, manufacturing, and drones.

Findings
The Elementary Teachers NGSS/STEM Survey contained six parts as explained above. Findings for each part of the survey are provided below.

Part One
Part One of the survey collected demographic and background information, including gender, school, degrees, teaching experience, grade levels, and minutes of teaching science each week. Findings for Part One are provided in the Participants section of this paper.

Part Two
Part Two of the survey collected information related to the teachers’ familiarity with Next Generation Science Standards (NGSS). Three questions were asked of teachers. They were:

To what extent are you familiar with . . .

1. the NGSS core ideas/concepts?
2. the NGSS cross-cutting concepts?
3. the NGSS scientific and engineering practices?

Teachers were provided with a five-item Likert scale to record their responses. The scale was:

- A Great Deal
- Quite a Bit
- Some
- Very Little
- Nothing/Not at All

Findings revealed that, on average, no teachers (0 percent) had “A Great Deal” of familiarity with the NGSS core ideas/concepts, cross-cutting concepts, and scientific and engineering practices. Thirty-five percent had “Quite a Bit” of familiarity. Forty-nine percent had “Some” familiarity. Twelve percent had “Very Little” familiarity. Five percent has “Nothing/Not at All” familiarity with the NGSS core ideas/concepts, cross-cutting concepts, and scientific engineering practices. These findings are shown in Table 1 and displayed in Figure 1 below.
Table 1

Part Two: Teachers’ Familiarity with Next Generation Science Standards (NGSS)

<table>
<thead>
<tr>
<th></th>
<th>NGSS Core Ideas/Concepts</th>
<th>NGSS Cross-Cutting Concepts</th>
<th>NGSS Scientific and Engineering Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Teachers</td>
<td>Percent of Teachers</td>
<td>Number of Teachers</td>
</tr>
<tr>
<td>A Great Deal</td>
<td>0</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>Quite a Bit</td>
<td>19</td>
<td>39%</td>
<td>14</td>
</tr>
<tr>
<td>Some</td>
<td>24</td>
<td>49%</td>
<td>24</td>
</tr>
<tr>
<td>Very Little</td>
<td>5</td>
<td>10%</td>
<td>7</td>
</tr>
<tr>
<td>Nothing/Not at All</td>
<td>1</td>
<td>2%</td>
<td>4</td>
</tr>
</tbody>
</table>

Average Percent

Figure 1

Part Two: Teachers’ Familiarity with Next Generation Science Standards (NGSS)

Part Three
Part Three of the survey collected information related to teachers’ perceptions of their abilities to work with students during their science lessons. Fourteen questions were asked of teachers. They were:

To what extent are you . . .

1. able to keep students on task with difficult science activities/assignments?
2. able to get students to construct explanations using the disciplinary core ideas?
3. able to provide an explanation or an example to answer a student’s science question?
4. able to facilitate student discussion with science evidence supporting what they are learning in their science lesson?
5. able to use real-life experiences and interests to help promote the understanding of science concepts?
6. able to find and use a variety of science assessment strategies to gauge student learning?
7. able to craft effective inquiry questions or define problems with your students?
8. able to clearly explain the disciplinary core ideas of your science lesson?
9. able to identify and address student misconceptions in the science core ideas?
10. able to develop lessons that incorporate phenomena to motivate student learning?
11. able to adapt instruction to address student learning differences?
12. able to address difficulty questions from students beyond the teacher notes/worksheets?
13. comfortable assessing prior knowledge and student understanding to inform your instructional decisions?
14. able to provide opportunities for students to assess their own learning of the NGSS?

Teachers were provided with a five-item Likert scale to record their responses. The scale was:

- A Great Deal
- Quite a Bit
- Some
- Very Little
- Nothing/Not at All

Findings revealed that, on average, 3 teachers (5 percent) perceived that they had “A Great Deal” of ability to work with students during their science lessons. Twenty teachers (41 percent) perceived they had “Quite a Bit” of ability. Twenty-one teachers (43 percent) perceived they had “Some” ability. Five teachers (11 percent) perceived they had “Very Little” ability. Zero teachers (0 percent) perceived they had “Nothing/Not at All” ability to work with students during their science lessons. These findings are shown in Table 2 and displayed in Figure 2 below.
Table 2

*Part Three: Teachers’ Perceptions of Their Abilities to Work with Students During Their Science Lessons*

<table>
<thead>
<tr>
<th></th>
<th>Average for Questions 1-14</th>
<th>Percent</th>
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<tbody>
<tr>
<td>A Great Deal</td>
<td>3</td>
<td>5%</td>
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<tr>
<td>Quite a Bit</td>
<td>20</td>
<td>41%</td>
</tr>
<tr>
<td>Some</td>
<td>21</td>
<td>43%</td>
</tr>
<tr>
<td>Very Little</td>
<td>5</td>
<td>11%</td>
</tr>
<tr>
<td>Nothing/Not at All</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Figure 2

*Part Three: Teachers’ Perceptions of Their Abilities to Work with Students During Their Science Lessons*

Part Four
Part Four of the survey collected information related to teachers’ perceptions of support received to successfully conduct the science lessons. Four questions were asked of teachers. They were:

To what extent are you . . .

1. supported with the necessary skills to effectively teach NGSS science and/or STEM lessons at your grade level?
2. supported with the necessary materials to teach NGSS science and/or STEM lessons at your grade level?

3. supported with the professional development and curriculum to teach NGSS science and/or STEM lessons at your grade level?

4. able to provide the materials and equipment to support safe science learning experiences?

Teachers were provided with a five-item Likert scale to record their responses. The scale was:

- Nothing/not at all
- Very little
- Some
- Quite a bit
- A great deal

Findings revealed that, on average, 3 teachers (7 percent) perceived that they received “A Great Deal” of support to successfully conduct science lessons. Fourteen teachers (28 percent) perceived they received “Quite a Bit” of support. Twenty-five teachers (51 percent) perceived they had “Some” support. Six teachers (11 percent) perceived they received “Very Little” support. Two teachers (4 percent) perceived they received “Nothing/Not at All” support to successfully conduct science lessons. These findings are shown in Table 3 and displayed in Figure 3 below.

**Table 3**

*Part Four: Teachers’ Perceptions of Support Received to Successfully Conduct Science Lessons*

<table>
<thead>
<tr>
<th></th>
<th>Average for Questions 1-4</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
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<td>3</td>
<td>7%</td>
</tr>
<tr>
<td>Quite a Bit</td>
<td>14</td>
<td>28%</td>
</tr>
<tr>
<td>Some</td>
<td>25</td>
<td>51%</td>
</tr>
<tr>
<td>Very Little</td>
<td>6</td>
<td>11%</td>
</tr>
<tr>
<td>Nothing/Not at All</td>
<td>2</td>
<td>4%</td>
</tr>
</tbody>
</table>
Part Five

Part Five of the survey collected information related to support needed to successfully conduct the science lessons. Nine statements were presented to teachers. They were:

In order to successfully learn and then teach NGSS lessons, I need the following support . . .

1. professional development to learn and understand the different performance expectations of the NGSS.
2. professional development to practice the labs and lessons I will teach my students.
3. professional development to work with teachers in my grade level to develop and implement NGSS lessons.
4. published lessons that are ready to teach and implement in the classroom.
5. materials that are required for lessons.
6. unit plans that show the flow of lessons.
7. assessment items that can help me understand how my students are learning.
8. professional development time to implement, reflect, and then revise lessons.
9. understanding of how my grade level lessons affect the other grade levels in my school.

Teachers were provided with a five-item Likert scale to record their responses. The scale was:

- Always
Part Five Statement 1
Findings for Statement 1 “In order to successfully learn and then teach NGSS lessons, I need professional development to learn and understand the different performance expectations of the NGSS” revealed that, on average, 15 teachers (31 percent) perceived that they “Always” need professional development to learn and understand the different performance expectations of the NGSS. Eighteen teachers (37 percent) perceived they “Usually” need professional development. Ten teachers (20 percent) perceived they “Sometimes” need professional development. Six teachers (12 percent) perceived they “Occasionally” need professional development. No teachers (0 percent) perceived they “Never” need professional development to learn and understand the different performance expectations of the NGSS. These findings are shown in Table 4 below.

Table 4

Part Five Statement 1: Teachers’ Need for Professional Development to Learn and Understand the Different Performance Expectations of the NGSS

<table>
<thead>
<tr>
<th></th>
<th>Average for Statement 1</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>15</td>
<td>31%</td>
</tr>
<tr>
<td>Usually</td>
<td>18</td>
<td>37%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>10</td>
<td>20%</td>
</tr>
<tr>
<td>Occasionally</td>
<td>6</td>
<td>12%</td>
</tr>
<tr>
<td>Never (not a priority)</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Part Five Statement 2
Findings for Statement 2 “In order to successfully learn and then teach NGSS lessons, I need professional development to practice the labs and lessons I will teach my students” revealed that, on average, 14 teachers (29 percent) perceived that they “Always” need professional development to practice the labs and lessons they will teach their students. Fifteen teachers (31 percent) perceived they “Usually” need professional development. Eleven teachers (22 percent) perceived they “Sometimes” need professional development. Eight teachers (16 percent) perceived they “Occasionally” need professional development. No teachers (0 percent) perceived they “Never” need professional development to
practice the labs and lessons. One teacher (2 percent) did not respond. These findings are shown in Table 5 below.

**Table 5**

*Part Five Statement 2: Teachers’ Need for Professional Development to Practice the Labs and Lessons*

<table>
<thead>
<tr>
<th></th>
<th>Average for Statement 2</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>14</td>
<td>29%</td>
</tr>
<tr>
<td>Usually</td>
<td>15</td>
<td>31%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>11</td>
<td>22%</td>
</tr>
<tr>
<td>Occasionally</td>
<td>8</td>
<td>16%</td>
</tr>
<tr>
<td>Never (not a priority)</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>No Response</td>
<td>1</td>
<td>2%</td>
</tr>
</tbody>
</table>

*Part Five Statement 3*

Findings for Statement 3 “In order to successfully learn and then teach NGSS lessons, I need professional development to work with teachers in my grade level to develop and implement NGSS lessons” revealed that, on average, 18 teachers (39 percent) perceived that they “Always” need professional development to work with teachers in their grade level to develop and implement NGSS lessons. Eighteen teachers (39 percent) perceived they “Usually” need professional development. Ten teachers (20 percent) perceived they “Sometimes” need professional development. Three teachers (6 percent) perceived they “Occasionally” need professional development. No teachers (0 percent) perceived they “Never” need professional development to work with teachers in their grade level to develop and implement NGSS lessons. These findings are shown in Table 6 below.
Table 6

Part Five Statement 3: Teachers’ Need for Professional Development to Work with Teachers in Their Grade Level to Develop and Implement NGSS Lessons

<table>
<thead>
<tr>
<th></th>
<th>Average for Statement 3</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
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<td>Always</td>
<td>18</td>
<td>37%</td>
</tr>
<tr>
<td>Usually</td>
<td>18</td>
<td>37%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>10</td>
<td>20%</td>
</tr>
<tr>
<td>Occasionally</td>
<td>3</td>
<td>6%</td>
</tr>
<tr>
<td>Never (not a priority)</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Part Five Statement 4
Findings for Statement 4 “In order to successfully learn and then teach NGSS lessons, I need published lessons that are ready to teach and implement in the classroom” revealed that, on average, 13 teachers (27 percent) “Always” need published lessons that are ready to teach and implement in the classroom. Sixteen teachers (33 percent) “Usually” need published lessons. Fifteen teachers (31 percent) “Sometimes” need published lessons. Four teachers (8 percent) “Occasionally” need published lessons. No teachers (0 percent) “Never” need published lessons that are ready to teach and implement in the classroom. These findings are shown in Table 7 below.

Table 7

Part Five Statement 4: Teachers’ Need for Published Lessons That Are Ready to Teach and Implement in the Classroom

<table>
<thead>
<tr>
<th></th>
<th>Average for Statement 4</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>Always</td>
<td>13</td>
<td>27%</td>
</tr>
<tr>
<td>Usually</td>
<td>16</td>
<td>33%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>15</td>
<td>31%</td>
</tr>
<tr>
<td>Occasionally</td>
<td>4</td>
<td>8%</td>
</tr>
<tr>
<td>Never (not a priority)</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>No Response</td>
<td>1</td>
<td>2%</td>
</tr>
</tbody>
</table>
Part Five Statement 5
Findings for Statement 5 “In order to successfully learn and then teach NGSS lessons, I need the materials that are required for lessons” revealed that, on average, 21 teachers (43 percent) “Always” need materials that are required for lessons. Twelve teachers (24 percent) “Usually” need materials. Twelve teachers (24 percent) “Sometimes” need materials. Two teachers (4 percent) “Occasionally” need materials. No teachers (0 percent) “Never” need materials that are required for lessons. Two teachers (4 percent) did not respond to the statement. These findings are shown in Table 8 below.

Table 8

Part Five Statement 5: Teachers’ Need for Materials That Are Required for Lessons

<table>
<thead>
<tr>
<th></th>
<th>Average for Statement 5</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>21</td>
<td>43%</td>
</tr>
<tr>
<td>Usually</td>
<td>12</td>
<td>24%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>12</td>
<td>24%</td>
</tr>
<tr>
<td>Occasionally</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>Never (not a priority)</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>No Response</td>
<td>2</td>
<td>4%</td>
</tr>
</tbody>
</table>

Part Five Statement 6
Findings for Statement 6 “In order to successfully learn and then teach NGSS lessons, I need unit plans that show the flow of lessons” revealed that, on average, 16 teachers (33 percent) “Always” need unit plans that show the flow of lessons. Thirteen teachers (27 percent) “Usually” need unit plans. Fourteen teachers (29 percent) “Sometimes” need unit plans. Four teachers (8 percent) “Occasionally” need unit plans. No teachers (0 percent) “Never” need unit plans that show the flow of lessons. Two teachers (4 percent) did not respond to the statement. These findings are shown in Table 9 below.
Table 9

Part Five Statement 6 Teachers’ Need for Unit Plans That Show the Flow of Lessons

<table>
<thead>
<tr>
<th></th>
<th>Average for Statement 6</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>16</td>
<td>33%</td>
</tr>
<tr>
<td>Usually</td>
<td>13</td>
<td>27%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>14</td>
<td>29%</td>
</tr>
<tr>
<td>Occasionally</td>
<td>4</td>
<td>8%</td>
</tr>
<tr>
<td>Never (not a priority)</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>No Response</td>
<td>2</td>
<td>4%</td>
</tr>
</tbody>
</table>

Part Five Statement 7

Findings for Statement 7 “In order to successfully learn and then teach NGSS lessons, I need assessment items that can help me understand how my students are learning” revealed that, on average, 20 teachers (41 percent) “Always” need assessment items that can help them understand how their students are learning. Fourteen teachers (29 percent) “Usually” need assessment items. Twelve teachers (24 percent) “Sometimes” need assessment items. Three teachers (6 percent) “Occasionally” need assessment items. No teachers (0 percent) “Never” need assessment items that can help them understand how their students are learning. These findings are shown in Table 10 below.

Table 10

Part Five Statement 7: Teachers’ Need for Assessment Items That Can Help Them Understand How Their Students Are Learning

<table>
<thead>
<tr>
<th></th>
<th>Average for Statement 7</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>20</td>
<td>41%</td>
</tr>
<tr>
<td>Usually</td>
<td>14</td>
<td>29%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>12</td>
<td>24%</td>
</tr>
<tr>
<td>Occasionally</td>
<td>3</td>
<td>6%</td>
</tr>
<tr>
<td>Never (not a priority)</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>
Part Five Statement 8
Findings for Statement 8 “In order to successfully learn and then teach NGSS lessons, I need professional development time to implement, reflect, and then revise lessons” revealed that, on average, 20 teachers (41 percent) “Always” need professional development time to implement, reflect, and then revise lessons. Fourteen teachers (29 percent) “Usually” need professional development time. Twelve teachers (24 percent) “Sometimes” need professional development time. Three teachers (6 percent) “Occasionally” need professional development time. No teachers (0 percent) “Never” need professional development time to implement, reflect, and then revise lessons. One teacher (2 percent) did not respond to the statement. These findings are shown in Table 11 below.

Table 11

Part Five Statement 8: Teachers’ Need for Professional Development Time to Implement, Reflect, and Then Revise Lessons

<table>
<thead>
<tr>
<th></th>
<th>Average for Statement 8</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>19</td>
<td>39%</td>
</tr>
<tr>
<td>Usually</td>
<td>16</td>
<td>33%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>7</td>
<td>14%</td>
</tr>
<tr>
<td>Occasionally</td>
<td>6</td>
<td>12%</td>
</tr>
<tr>
<td>Never (not a priority)</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>No Response</td>
<td>1</td>
<td>2%</td>
</tr>
</tbody>
</table>

Part Five Statement 9
Findings for Statement 9 “In order to successfully learn and then teach NGSS lessons, I need an understanding of how my grade level lessons affect the other grade levels in my school” revealed that, on average, 15 teachers (31 percent) “Always” need an understanding of how their grade level lessons affect the other grade levels in their school. Eighteen teachers (37 percent) “Usually” need an understanding. Eleven teachers (22 percent) “Sometimes” need an understanding. Five teachers (10 percent) “Occasionally” need an understanding. No teachers (0 percent) “Never” need an understanding of how their grade level lessons affect other grade levels in the school. These findings are shown in Table 12 below.
Table 12

Part Five Statement 9: Teachers’ Need for an Understanding of How Their Grade Level Lessons Affect the Other Grade Levels at Their Schools

<table>
<thead>
<tr>
<th></th>
<th>Average for Statement 9</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>15</td>
<td>31%</td>
</tr>
<tr>
<td>Usually</td>
<td>18</td>
<td>37%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>11</td>
<td>22%</td>
</tr>
<tr>
<td>Occasionally</td>
<td>5</td>
<td>10%</td>
</tr>
<tr>
<td>Never (not a priority)</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Part Six

Part Six of the survey focused on workforce development. It collected information related to teachers’ interests in learning more about computer science, mathematics, the Citizen Science Project, biomedical science, agricultural science, geology, oceans and weather, astronomy, electronics and electricity, energy, manufacturing, and drones.

Teachers were provided with the following prompt for Part Six of the survey:

There are a variety of new technologies and skills that are being used/developed for future science and STEM careers. Indicate which of the following YOU as a teacher have interacted with or want to learn.

There were fourteen technologies and skills presented to teachers. They are listed below.

1. Computer Science—Block Coding or Scratch
2. Computer Science—Robotics: Sphero, VEX, First
3. Computer Science: Python, C++, Coding
4. Mathematics: BIG DATA
5. Citizen Science Project—Using simple tools to gather data in the community
6. Biomedical Applications—Support student learning
7. Agriculture—Support student learning
8. Geology—Support student learning
9. Oceans and Weather—Support student learning
10. Astronomy Applications—Optics, Telescopes

11. Electronics/Electricity Applications—Support student learning

12. Energy—Resources and Alternatives


14. Drone Applications

Teachers were provided with four possible responses to the 14 technologies and skills. The possible responses were:

1. Yes, done this and want to learn more.
2. Yes, but not interested in learning more.
3. No, but would like to learn.
4. No, not interested in learning.

Findings revealed that, overall, over 80 percent of teachers wanted to learn or learn more about the technologies and skills provided. Overall, only 18 percent were not interested in learning or learning more about the technologies and skills. Overall, 2 percent of teachers did not respond to this portion of the survey. These findings are shown in Table 13 and displayed in Figure 4 below.

Table 13

<table>
<thead>
<tr>
<th>Technologies and Skills with Number of Responses</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>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>AVG</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES, done this and want to learn more</td>
<td>11</td>
<td>9</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>5</td>
<td>15</td>
<td>18</td>
<td>21</td>
<td>21</td>
<td>18</td>
<td>7</td>
<td>6</td>
<td></td>
<td>13</td>
<td>26%</td>
</tr>
<tr>
<td>YES, but not interested in learning more</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>No, but would like to learn</td>
<td>29</td>
<td>30</td>
<td>30</td>
<td>35</td>
<td>32</td>
<td>32</td>
<td>26</td>
<td>22</td>
<td>19</td>
<td>17</td>
<td>21</td>
<td>16</td>
<td>36</td>
<td>29</td>
<td>27</td>
<td>55%</td>
</tr>
<tr>
<td>No, not interested in learning</td>
<td>6</td>
<td>6</td>
<td>13</td>
<td>6</td>
<td>4</td>
<td>11</td>
<td>5</td>
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<td>5</td>
<td>13</td>
<td></td>
<td>7</td>
<td>14%</td>
</tr>
<tr>
<td>No Response</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2%</td>
</tr>
</tbody>
</table>
Discussion and Recommendations

The Elementary Teachers’ NGSS STEM-Needs Survey revealed several areas of concern. For each part of the survey, the areas of concern are identified.

Part Two
Two areas of concern stand out from Part Two of the survey. First, more than 60 percent of teachers reported having none, very little or only some familiarity with the NGSS. Further, teachers were the least familiar with the NGSS Cross Cutting Concepts.

Part Three
There were four areas of concern that stand out for Part Three of the survey. The first area of concern was Question 2—To what extent are you able to get students to construct explanations using the disciplinary core ideas? Seventy-one percent of teachers reported very little or only some.

The second area of concern was Question 6—To what extend are you able to find and use a variety of science assessment strategies to gauge student learning? Nearly two-thirds of teachers reported very little to only some.

The third area of concern was Question 7—To what extent are you able to craft effective inquiry questions or define problems with your students? Sixty-three percent of teachers reported very little to only some.

The fourth area of concern was Question 14—To what extend are you able to provide opportunities for students to assess their own learning of the NGSS? Seventy-five percent of teachers reported very little to only some.
Part Four
There were two areas of concern that stand out for Part Four of the survey. The first area of concern was Question 1—To what extent are you supported with the necessary skills to effectively teach NGSS science and/or STEM lessons at your grade level? More than two-thirds of the teachers reported not at all, very little, or only some.

The second area of concern was Question 3—To what extent are you supported with the professional development and curriculum to teach NGSS science and/or STEM lessons at your grade level? Seventy-one percent of teacher reported not at all, very little, or only some.

Part Five
There were two areas of concern that stand out for Part Five of the survey. The first area of concern was related to the overall need for support. Over 68 percent of teachers responded that they usually or always need support to learn/teach NGSS lessons.

The second area of concern was related to the need for grade-level professional development. Seventy-four percent of teachers responded that they usually or always want to engage in professional development with their grade-level colleagues to develop, implement, evaluate and revise their NGSS lessons.

Part Six
There was only one area of concern that stands out for Part Six of the survey. Over 80 percent of teachers wanted to learn or learn more about the 14 technologies and skills provided.

Recommendations
Since the primary purpose of this study was to inform the focus of NGSS STEM professional development for elementary school teachers, the following eight recommendations are provided below.

The professional development designed for elementary school teacher should include sufficient time for teachers to:

1. become familiar with the NGSS curriculum within a small group of colleagues at their grade level.

2. explore the cross-cutting concepts/themes within a small group of colleagues at their grade level.

3. experience the NGSS lessons themselves, so they can hone their own teaching/learning skills, meaningfully adapt the curriculum and instruction to meet the needs of their learners, and more easily construct explanations related to the NGSS core ideas at levels appropriate for their students.

4. explore a variety of ways to assess student understanding of NGSS core concepts both formally and informally.

5. explore a variety of ways to help students assess their own learning of concepts.

6. develop questioning skills designed engage learners, facilitate their scientific thinking, and determine their understanding and mastery of learning objectives.
7. create a support network and resource repository within the professional development learning community based upon grade level.

8. discuss and prioritize their professional development needs related to collaboration, curriculum, communication, materials/supplies, support, and shared resources.
References


Infection Control Education that Is Provided Continuously from the First Year of University: Report on the First Year

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Kousei MITSUHASHI
Abstract

I. Background
The School of Nursing and Rehabilitation Sciences of our university is responsible for training nurses, physical therapists, and occupational therapists. Even before the coronavirus disease (COVID-19: Corona-virus Disease-2019) pandemic, we had been providing infection control education integrating classroom-based education (on-campus) with clinical practice (on-site). For nurses, physical therapists, and occupational therapists, who often closely interact with patients, hand hygiene and donning and doffing of the personal protective equipment are fundamental skills. This study was aimed at introducing infection control education as part of identity education conducted in the first year for the fostering personnel active in the healthcare field.

II. Materials and Methods
We recorded the activities in infection control education for first year students as part of the Infection Control Education Program for Integrating Basic Education to Clinical Practice in Collaboration with Certified Infection Control Nurses Working Clinically, which had been verified to be effective. We modified its content to introduce it for first-year students.

III. Results
This educational program of 90 min consisted of exercises and lectures carried out by a collaboration of ten faculty members, belonging to each department. In the lectures, standard universal precautions were taught. For responses to infectious diseases, COVID-19 and influenza were used as examples to familiarize the first-year students to the conditions. The program was focused on integrating the basic academic perspective with the practical clinical perspective. It included lectures to impart knowledge and personal hygiene training in accordance with the principle of universal precautions by virtue of which blood, body fluids, secretions, vomit, excretions, wounded skin, mucous membranes, etc. are potential sources of infection and should be regarded as infection risk. Hands-on training on how to don and doff personal protective equipment was also provided.
IV. Discussion

This study showed that effectiveness and continuity of infection control were reinforced by implementing this education program, which had been verified to be useful despite some adjustments made to accommodate the readiness of first-year students. Although elementary, knowledge and skills on hand hygiene and personal protective equipment form the foundation of clinical training for students who are set to be the human resources in future healthcare. In addition, repeated training is important for skills, such as donning and doffing of personal protective equipment, discarding biomedical waste, and practicing hand hygiene, that cannot be acquired with only a few training sessions. Since this program also serves to provide repetitive training opportunities, it is considered to be a technical.

V. Conclusion

This report is limited to the introduction of the educational program for infection control implemented with the first-year students. However, we plan to evaluate the effectiveness of this newly developed educational program for infection control in the future. Students who have learned in this program commented that they were able to naturally apply the infection control methods in clinical situations. Validation of the effectiveness of this program will contribute to curriculum planning that considers the future work in situations where infection control measures are required.
A Thousand Tiny Methodologies: Critical Posthumanism and Education Research

Conference Presentation

The Hawaii International Conference on Education 2023

Presenter: Adrienne Kitchin, PhD Student

Affiliation: Brock University

January 03, 2023
As an emerging scholar, each research topic I have grappled with has reached out, into, across, and around the one that followed. In this way, what began as research into the application of international health policy on the lives and practices of traditional birth attendants in northern Namibia has become a living mosaic of critical archival studies, new materialisms, and women’s narratives regarding the embodiment of pain. I use critical archival studies and new materialisms as frameworks to situate women’s accounts of physical pain, how their accounts are reflected in medical and legal archives and how these continue to resonate and circulate in ways that affect women’s bodies, lives, and access to material resources. Inspired by my earlier research in the field of medical anthropology, this is, to quote Elizabeth Adams St. Pierre “what presses on” (2019, p. 13) me, the research and the story that wish to be told. A critical archival and new materialist framing of women’s first-person accounts of their physical pain is not the focus of my talk, however. Today, my focus is on critical posthumanism (which includes new materialisms) and education, broadly, and more specifically, what is meant by the term critical posthumanism. For my discussion I will draw primarily from Rosi Braidotti’s (2019) *Posthuman Knowledge* and Karen Barad’s (2007) ideas regarding the *intra*-action of matter.

Critical posthumanism draws on a multiplicity of disciplines including (but not limited to) proqueer feminisms (Barad, 2007; Butler, 1988; Haraway, 2016), critical race theory, (Hill Collins, 1991; Wynter, 2015 as cited in Braidotti, 2019) and decolonization studies (Gilroy, 2000 as cited in Braidotti, 2019) utilizing what Rosi Braidotti (2019) calls a kind of thinking that “is about acknowledging, capturing and working with extensive and intensive ethical relationality” (p. 93). It is perhaps this ethical relationality that most drew me to critical posthumanisms, as it acknowledges one’s own embedded, embodied, and situated realities as they are co-constructed with the material, human, and non-human worlds of which we are all a part.
As an example of one of the many ways in which our realities are always already co-constructed by material and nonhuman elements, I offer this anecdote. Just before arriving at the conference centre for the day, prior to my presenting, I was going over what I had written. I was in my hotel room and had the sliding door to the balcony open just a little to get some fresh air. I had been watching the pigeons fly onto, then off the balcony, their movement catching my eye and, as they did, offering me an additional moment to look just beyond them and out to the ocean. The pigeons simply being pigeons helped me to connect with this beautiful place even more. I went back to work and then a pigeon walked in through the (barely) open door. Movement indeed caught my eye once more, but this time it was different and not relaxing at all. I jumped up out of my chair when the pigeon strutted further in and looked back at me. I wasn’t sure what it would do, but then it just turned and walked back out.

Who was inhabiting whose space in that moment, me high up on the 25th floor of the conference hotel and the pigeon, also on the 25th floor, but not requiring the hotel’s scaffolding (and additional material elements) as I did to be at such an elevation? Critical posthumanism offers a way to remember the many ways our realities are co-constructed and multiply inhabited, refusing the anthropocentrism at the heart of humanist ideals (Braidotti, 2019).

The title of my presentation, *A Tiny Thousand Methodologies*, was inspired by concepts from Deleuze and Guattari’s (1987) *A Thousand Plateaus: Capitalism and Schizophrenia*. There, in their rhizomatic fashion they discuss the multiplicities, simultaneities, and circular ontologies that add to the notion of becomings. One section (or plateau) that struck me was on becomings, in their many varied ways, including becoming animal and becoming woman. Deleuze and Guattari (1987) reflect “the two sexes imply a multiplicity of molecular combinations bringing into play not only the man in the woman and the woman in the man, but the relation of each to
the animal, the plant, etc.: a thousand tiny sexes” (p. 233). In thinking about the many ways in which ideas, theories, ontologies and epistemologies meet in critical posthumanism, I took this example of a thousand tiny sexes, a “multiplicity of molecular combinations” as a way to consider critical posthumanism as a thousand tiny methodologies, which, of course, are not literally tiny, but are parts of a much greater convergence.

The word ‘convergence’ has particular meaning when discussing critical posthumanism. Rosi Braidotti (2019) writes of the posthuman as “a defining trait of our historical context” (p. 8). Braidotti (2019) also further defines the “posthuman condition” as a “convergence of posthumanism on the one hand and post-anthropocentrism on the other, within an economy of advanced capitalism” (p. 8). The posthuman convergence includes a critique of the ways in which advanced capitalism, with its humanist and anthropocentric underpinnings, has led to our current climate crisis and it also serves as an awareness of how advanced capitalism has benefitted from posthuman conditions that include bio-genetic and technological mediation (Braidotti, 2019).

Part of the critical aspect of the posthuman convergence includes the ways in which it revisions the boundaries that have been historically constituted around academic disciplines. Instead, critical posthumanism works in an “intradisciplinary” fashion. Using the prefix “intra” is a concept from Karen Barad’s intraaction. Intradisciplinarity moves beyond interdisciplinarity, similar to the way intra-action moves beyond interaction as used by Barad who writes

intra-action (in contrast to the usual “interaction,” which presumes the prior existence of independent entities or relata) represents a profound conceptual shift. It is through specific agential intra-actions that the boundaries and properties of the components of
phenomena become determinate and that particular concepts (that is, particular material articulations of the world) become meaningful. (p. 139)

Thus, one of the elements of critical posthumanism that adds to both its complexity and its vitality as a method of scholarly engagement is that through its *intradisciplinarity*, it draws on different forms of analyses such as proqueer feminisms, critical race theory, decolonization studies, and more, to create something that doesn’t simply cherry pick concepts and ideas; instead, it actively works with a broad range of posthuman epistemological, ontological, and critical ideas to create manners of engagement that are not fixed or static, but constantly evolving as they are refined and the language for which to discuss these concepts grows. As Braidotti notes

methodologically, the defining feature of the Post Humanities is their ‘supra-disciplinary’ character. This is what makes them critical. The driving force for their knowledge production is not the policing of disciplinary purity, but rather the modes of relation and cross hybridization these discourses are able and willing to engage in (2019, p. 77).

Supra-disciplinarity and intra-disciplinarity function synonymously and work as an additional reminder of the ways new materialisms are involved in critical posthuman scholarship. Critical posthumanism deconstructs the notion of “man” read as European, white, heterosexual, able bodied and wealthy as *the* measure of what is normal, natural, and desirable. It also brings into focus the agential and thinking properties of non-human beings, including those both animate and inanimate. This is in stark contrast to humanist modes of thinking that, as Braidotti reflects, “historically have resisted acknowledging the thinking powers of non-anthropocentric entities” (2019, p. 77). Critical posthumanism resists social and species hierarchies and also recognizes the agential qualities of matter.
For these and many other reasons, when doing critical posthuman thinking we must “make room for the new” (Braidotti, 2019, p. 104). One way to do this is to engage in defamiliarization, ways to imagine differently how we see ourselves and the world around us (Braidotti, 2019). Braidotti relates that Spivak refers to this as “unlearning one’s privileges” (Spivak, 1990 as cited in Braidotti, 2019, p. 104). This includes critically engaging with and questioning forms of power relations that reflect “Eurocentric humanist and anthropocentric habits of thought” (Braidotti, 2019, p. 104) and include disidentifying from these. Such habits of thought “include the gender system with its binary representations of femininity and masculinity (Braidotti 1991); and white privilege and racialized hierarchies, which are critiqued by postcolonial and race discourses” (Braidotti 2019, p. 104).

Through utilizing disidentification as Spivak envisions, Braidotti (2019) presents an actionable way those engaged in critical posthuman thinking can access the new. This is a tool employed (and revived) by feminist, subaltern and postcolonial theory, writes Braidotti, and offers examples of how to ‘decode’ one’s own role/s in the production of social hierarchies. What emerges from critical posthumanism is the understanding that we cannot create something new by using the same modes of thought that have come before. Perhaps one of critical posthumanism’s greatest strengths is its understanding of posthuman and postanthropocentric relationality. We do not employ the methodology, then drop it as we move on to engage in the day-to-day aspects of our lives. It is the day-to-day aspects, the ways in which we have allowed certain ideas to circulate, without questions, and the ways in which our bodies grow tired, weary from the work itself, or from the infinite other reasons bodies can tire (Ahmed, 2014). Critical posthumanism decentres the human, as well as the hierarchical thinking that places white, European, able bodied and heterosexual males at the centre of what it means to be human.
Critical posthumanism also offers a way to think about and understand the material world and its affects. A critical posthuman approach includes, as Bennett writes, the “animal-vegetable-mineral-sonority cluster” (2010, p. 23) at work on the page right now, and the ways in which, when we listen to one another tell a story, or follow the lines of flight of a presentation, our brainwaves sync, erasing boundaries we once thought of as fixed and given (Gottschall, 2013).

Thus, the concept of their being and ‘outside’ and an ‘inside’ of bodies is troubled, reminding us that we are far more connected to each other and the material world than was previously allowed for in humanist philosophies. Ideas related to the ways in which humans, other animals, ecosystems, nature, and the material world are connected have a far deeper and older resonance in Indigenous ways of thinking and knowing. The application of critical posthumanism is indebted to and intradisciplinarily at work with Indigenous ways of thinking, knowing, and being (Braidotti, 2019; Kimmerer, 2013).

Karen Barad writes of the ways in which boundaries between bodies are illusory in that “all bodies, not merely ‘human’ bodies, come to matter through the world’s iterative intra-activity—its performativity. This is true not only of the surface or contours of the body but also of the body in the fullness of its physicality, including the very ‘atoms’ of its being” (2007, p. 151). Matter is intraacting with matter as are the atoms that comprise matter. Nothing is truly separate. In similar fashion, Braidotti further imparts that within a critical posthuman lens, “the frame of reference becomes the world, in all its open-ended, inter-relational, transnational, multi-sexed, and trans-species flows of becoming” (2019, p. 95). Critical posthumanism is a way of articulating the multiplicity/ies of being.

Reflecting on Braidotti’s notions of relationality and on Karen Barad’s application of the term intraaction, and how these two concepts intertwine, I will close with a quote by Karen
Barad. “What would it mean to deny one’s responsibility to the other once there is a recognition that one’s very embodiment is integrally entangled with the other? (2007, p. 158). Rosi Braidotti and Karen Barad each articulate ways of envisioning ‘doing things differently’ so that we may reimagine our responsibilities in a critically posthuman manner through an erasure of boundaries and an upsurge of “inter-relational and trans-species flows of becoming” (Braidotti, 2019, p. 95). Critical posthumanism offers ways in which to apply intra and supra disciplinarity as aids to fathom the ongoing, ever emerging multiplicity of life and materiality.
References


Bullying Prevention and Prosocial Behavior: Grade Four Student Comprehension of Learning Objectives from the Mental Health Kit “Be Kind to Yourself and Others”

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Bullying Prevention and Prosocial Behavior: Grade Four Student Comprehension of Learning Objectives from the Mental Health Kit “Be Kind to Yourself and Others”

Abstract

The current study explored the effectiveness of the activities “Peer Relations: Bullying and Friendship” from the “Be Kind to Yourself and Others” mental health kit. Trained Community Service Learning (CSL) college students in a second-year psychology class implemented the activities (in 2011) in thirteen schools (30 grade 4 classrooms) in Central Alberta, Canada. The bullying activity was designed to educate students on types of bullying, intervention strategies, and the effects of bullying. The friendship activity was designed to teach students how friendship can change, the qualities of an inclusive versus exclusive friendship, and strategies to avoid excluding others. Of the 750 grade four students who participated in the classroom activities, 300 volunteered to participate in follow-up focus groups. Teachers from participating classes allowed college students to come back in to conduct focus groups of 6 children each during class time. Responses were recorded and transcribed by 5 trained college student research assistants. After many one word and off topic answers were removed, the final number of student responses analyzed included: 60 for the bullying activity, and 52 for the friendship activity. Qualitative theme analysis of responses was conducted by three independent coders and inconsistencies were discussed until 100% agreement was reached. Findings demonstrated that participating grade four students understood most of the learning objectives and engaged in critical thinking about positive peer relations. Implications of these findings are discussed, as well as strengths of the study, limitations, and directions for future research.

Keywords: Bullying prevention, prosocial behavior, elementary school, mental health, qualitative evaluation, learning objectives
Bullying Prevention and Prosocial Behavior: Grade Four Student Comprehension of Learning

Objectives from the Mental Health Kit “Be Kind to Yourself and Others”

Despite substantial anti-bullying legislation, anti-bullying programs, research efforts, and ongoing media attention, in-school bullying continues to be a widespread problem, affecting children worldwide (Grover, Limber, & Boberiene, 2015). The impact of bullying on children is well documented and commonly includes reduced well-being, academic performance, and self-esteem (Grover et al., 2015). A subjective sense of well-being is “a person’s individual judgment about his or her current status in the world” and includes positive affect, absence of negative affect, and general life satisfaction (Lopez, Pedrotti, & Snyder, 2015, pg. 159). Subjective well-being has three components that comprise the model of mental health: emotional, psychological, and social well-being. In addition to subjective well-being, bullying reduces self-esteem and is associated with the development of a negative body image, eating disorders, and withdrawal from previous activities and passions (Body Image, 2010).

Various studies have shown that bullying victimization is highly distressing (Brunstein, Marrocco, Kleinman, Schonfeld, & Gould, 2007). Research within elementary schools concludes that victimized children suffer significant short-term, and potentially long-term mental health effects including but not limited to, depression, anxiety, somatoform disorders and low self-esteem (Fredstrom, Adams, & Gilman, 2011; Sontag, Clemans, Graber, & Lyndon, 2011). Victims may attempt to cope with these negative emotions through self-harm or suicide, or by engaging in delinquent acts (Salgado, Senra, Lourenco, 2014). Due to the implications of bullying a school climate of fear is created; thus, school bullying impacts both victims and bystanders mental and social well-being, physical safety, and academic performance. As suggested by Srabstein and Piazza, (2008) a negative school environment becomes an obstacle to learning for victims as well as bystanders and perpetrators. Holland and colleagues (2015) speculate that a negative environment will decrease social cohesion and collective self-efficacy, thus contributing to a decrease in academic performance. The impact that school bullying has on individuals and the school environment, and the rate at which bullying occurs, underscores a need for schools to incorporate evidence-based prevention efforts.
One in six students in grades three through twelve report a fear of being bullied (Grover et al., 2015). The National Center for Educational Statistics (2015) reported that one in every four students in North America are bullied during the school year, while in a 2012 Canadian study, one in every three children are believed to have been a victim of bullying (CIHR, 2012). Predictable and stable development of bullying behavior begins in elementary school but peaks in middle school; thus, supporting the need for early prevention efforts (Goldbaum, Craig, Pepler, & Connolly, 2007; Cooke, Ford, Levine. Bourke, Newell, & Lapidus, 2007). Without intervention, children who display bullying behaviors may develop antisocial behavior in adolescence and adulthood, engage in sexual harassment or dating violence, and/or become involved in gang-related activities (Government of Canada, 2016). Olweus (1993) found that children in grade six who bully are six times more likely to have a criminal record by the age of 24.

Research and prevention efforts designed to protect children from bullying play a crucial role in advancing children’s rights, particularly the right to education and protection from harm (Cornell & Limber, 2015). In the past century, laws and policies within school districts and individual schools have developed to increase the reporting of bullying, enhance staff knowledge, and improve student-teacher relationships. While it is important that bullying behaviors are consistently punished, implementing research guided prevention programs may stop violence before it occurs (David-Ferdon & Simon, 2014).

**Bullying Prevention Programs**

Attention to bullying and its negative impact has been a central topic in education over the past 20 years (Ross & Horner, 2009). With the goal of increasing school safety, initiatives have included the development of anti-bullying laws and policies, and increased communication between educators, parents, and students around appropriate responses to bullying. Much of the research into bullying has centered on evaluating these initiatives. Commonly, the effectiveness of prevention programs is measured through student incident reports before and after program implementation. While some bullying prevention programs have shown promising results, particularly the Olweus Bergen bullying prevention program, overall, there is mixed evidence regarding program effectiveness (Merrell, Gueldner, Ross, & Isava, 2008).
Operational Definition of Bullying

According to Ross and Horner (2009), a critical reason that bullying-prevention programs struggle to achieve their objective is because the act of bullying is not clearly conceptualized. A widely accepted definition of bullying was coined by Dan Olweus (1993), who identified three distinguishing components: first, the act is intended to harm the victim; second, a power differential exists; and finally, the bullying occurs frequently and repeatedly. Literature on bullying has distinguished between direct bullying, which includes verbal and physical attacks, and indirect bullying which includes social and cyber bullying (Pepler, Craig, Connolly, Yuile, McMaster, & Jiang, 2006). Verbal bullying encompasses insulting, name calling and public embarrassment while physical bullying is exemplified by hitting, punching, and kicking. Social bullying is characterized by isolation through the spreading of rumors, gossip, withdrawal of friendship, and ostracizing. Finally, cyber bullying is the act of harassing, humiliating and/or threatening through online mediums (e.g., social media, emails).

Bullying as a Social Phenomenon

Unlike early research that fixated on bullying being a predisposed personality trait, recent research has focused on the influence of the wider social environment (Boyd & Barwick, 2011). Typically, bullying is seen as a dyad involving the perpetrator and the victim. However, when researchers began to understand the role of bystanders, bullying came to be viewed as a social phenomenon where peers can directly or indirectly influence the occurrence of bullying by choosing to engage, silently observe, or stand up for the victim (Wolfer, & Scheithauer, 2014; Ross, & Horner, 2009; Olweus, 1993). Bystanders who excuse, or do not condemn the act, provide positive reinforcement to the bully and the act continues. Baumeister and colleagues found that high self-esteem is a predictor of aggressive behavior. Individuals with high self-esteem seek opportunities to display perceived power (Baumeister, Boden, Smart, 1996). Maher, Zins and Elias (2006) found that while bullies were not well liked, they were considered popular and powerful by peers. Peer-perceived status and power of bullies suggests that to end bullying, prevention programs should not simply target the bullies and the victims. Using a broad, school wide approach to bullying, bystanders can learn their role in preventing and ending bullying.
When standing up for a victim of bullying, the use of assertive communication may be beneficial in reducing and ending bullying as children will learn how to speak to the bully without escalating the violence (Hong & Espelage, 2012). Assertive communication involves an honest, direct, and respectful expression of one’s thoughts and feelings (Salmivalli, 2014). Research has found that the use of assertive skills is associated with a reduction in bullying as opposed to aggressive or passive responses (Milsom & Gallo, 2006). When bystanders or victims respond to bullying in a passive manner, the perpetrator recognizes the power differential, and is motivated to continue bullying for self-enhancement to maintain self-esteem (Government of Canada, 2016). Rather than responding passively, some victims or bystanders will react to bullying with aggression. An aggressive response further provokes an individual who is bullying, as a bully’s motivation for self-enhancement becomes more prominent in threatening situations. Individuals with high self-esteem typically desire consistent positive views of self, and therefore will respond adversely to anything that threatens the positive view. Milsom and Gallo (2006) suggest that when victims respond assertively, bullies are more likely to stop or to seek a less assertive victim.

Using Bronfenbrenner’s ecological framework, empirical findings on the risk factors associated with bullying can be analyzed (Hong & Espelage, 2012). The microsystem has the most immediate influence and therefore, parent–child relationships and peer relations are emphasized. Peer relations also play a role, as individuals are motivated to maintain a positive social identity and thus continues behaviors that receive positive reinforcement (Duffy & Nesdale, 2008). The remaining levels of the ecological framework include the mesosystem such as parent-teacher relationships; the exosystem which emphasizes social influences like exposure to media violence; and finally, the macrosystem which explains the influence of cultural norms and beliefs (Hong, & Espelage, 2012). It is clear from Bronfenbrenner’s ecological framework that a variety of influences shape bullying behavior. Therefore, effective school prevention programs should create awareness among students, parents, and school staff.

A Safe and Caring School Community - Whole School Approach

Understanding bullying as a socio-ecological problem suggests that the behavior is multifaceted and should be addressed through a whole-school approach (Greene 2005).
Whole school programs begin with administrators who create policies and procedures for the school and individual classrooms. Effective anti-bullying policies should include a clear definition of bullying as well as codes of conduct to establish expectations for the whole school community (Emmer, Sabornie, Everson, & Weinstein, 2011). Subsequently, teachers, bus drivers, cafeteria workers and additional school staff should enforce policies by monitoring students to recognize and respond to bullying incidents. Additionally, teachers can establish a positive and safe climate through effective classroom management, modeling empathy, respecting diversity, and using positive reinforcement for appropriate behaviors (Salgado et al., 2014; Grover et al., 2015; Jennings, & Greenberg, 2009; Hong & Eamon, 2011). Curriculum on friendship, empathy, social emotional skills, and bystander responsibility helps in fostering a positive school environment (Muratori, et al., 2014). Initiating school-wide bullying prevention programs in elementary schools will educate students on how to identify, report and respond to bullying behaviors (Wenos, Trick, & Williams, 2014).

A commonly implemented whole school bullying prevention program is the Olweus’ program. It was the first large scale prevention program, and its components are documented in Olweus’s book, “Bullying at School, What We Know and What We Can Do” (Cecil, & Molnar-Main, 2014). Using an ecological framework, the program’s primary goal of improving the school climate through healthy peer relations is achieved at multiple levels including: the individual level through student curriculum activities, the classroom level through educated and knowledgeable teachers, the school level through support from school psychologists and administrators, and the community level through increased communication and collaboration between students, teachers, and parents (Olweus, 1993).

**Prosocial Behavior**

Simonsen, Sugai, and Negron (2008) encourage schools to reduce their discussion on bad behavior and discipline, and instead take a proactive approach to peer aggression by using evidence-based school wide positive behavior supports (SWPBS). SWPBS is aimed at teaching social skills though positive reinforcement of helping behaviors. Consistent and accurate use of this method has been shown to decrease disciplinary reports, along with enhanced academic achievement.
Children who bully should be taught prosocial behaviors to develop adaptive ways to resolve interpersonal conflicts and frustrations (Government of Canada, 2016). Prosocial behavior is generally defined as intentional, voluntarily actions that enhance the welfare of others (Brownell, Svetlova, Anderson, Nichols & Drummond, 2012). Children who bully need assistance altering their interpersonal patterns before they have the potential to develop into conduct disorders or persistent aggressive tendencies. In addition to curriculum on prosocial behavior being a protective factor for vulnerable children, it is beneficial for the entire school population as it correlated with an increase in positive classroom environments (Roland & Galloway, 2002). Prosocial behavior involves treating others with respect; thus, it can be conducive to teaching victims how to defend themselves without using violence.

Philip Zimbardo, the creator of the “Heroic Imagination Project,” sought to provide children with a “collection of attitudes about helping others in need, beginning with caring for others in compassionate ways and moving towards a willingness to sacrifice or take risk on behalf of others, or in defense of a moral cause” (Lopez et al., 2015, pg. 295). Upon studying negative social influences, including the bystander effect, Zimbardo created the “Heroic Imagination Project” to teach children the skills necessary to be everyday hero’s (Heroic Imagination Project, 2015). Leaders and educators are encouraged to foster heroism and prosocial behavior, to counter antisocial behaviors (Wenos et al., 2014). Brownell and colleagues (2012) assert that empathy is a motivating factor of prosocial behavior as it involves the ability to understand emotional states of self and others and behave in compassionately. Additionally, positive affect may be a motivator of prosocial behavior as those who have a sense of well-being and peace are more likely to help others than those who are distressed (Brownell et al., 2012).

Using ethnographic research and grounded theory, Thornberg (2010) assessed social interactions of children to evaluate prosocial and non-helping behaviors. Thornberg’s research suggests that children construct their moral framework daily and use it to guide their behavior in bystander situations. According to the fifth-grade students, “good” consisted of being kind and helpful, and was motivated by empathy, anger directed at the transgressor, adherence to social norms and/or loyalty to one’s friend.
Effective social functioning is evidenced by a high level of cooperation, reciprocal generosity, goodwill, and perceived social support; therefore, researchers, such as Weber, Puskar, and Ren (2010) advise program coordinators to include these topics in mental health programs. Social-learning theory emphasizes learning through observation; therefore, suggesting that parents can instill prosocial behavior in their child by modeling it (Brownell et al., 2012). Additionally, modelling and reinforcement from school staff will provide a basis for students to adopt prosocial behavior (Grover et al., 2015) while reducing the occurrence of bullying (Lamarche et al., 2006; Muratori, et al. 2014).

“Steps to Respect” is a bullying prevention program for children in grades three through five, with content on social-emotional skills, empathy for victims, friendship skills, and bystander responsibility to cultivate prosocial norms. In Brown, Low, Smith, and Haggerty’s study (2011) as well as Low and colleague’s (2014) study, the “Steps to Respect” program was evaluated by comparing baseline assessments to an annual follow up assessment on school staff, teachers, and students. In both studies it was found that in schools where the program was implemented, there was less bullying and more reports of safety than in the control schools. These findings suggest that content on friendship and prosocial behavior cultivates a positive school climate.

**Bystander Responsibility and Peer Support**

Positive relationships are a salient aspect of children’s academic growth, as well as their mental, social, and emotional well-being (Grover et al., 2015). Positive relations create a sense of school community, which encourages students to support their peers (Emmer et al., 2011). Given that bullying is a social phenomenon, encouraging students to support one another and stand up to bullies is critical to a program’s success (Salmivali, 2014). Sensitizing passive bystanders to the social aspect of bullying behavior and educating youth on appropriate steps in reporting an incident, or defending a victim of bullying, can contribute to a safe environment (Salmivali, 2014). For instance, the program “Second Step” was created for children in grades three to five with curriculum focusing on the responsibility of bystanders (Cooke et al., 2007). Using lesson plans, videos, and group work booklets, children were taught empathy, emotion management, and appropriate problem-solving behaviors. The authors also
evaluated the program with results indicating a significant improvement in positive approach-coping behavior, caring and cooperative behavior, as well as suppression of aggression. While behavioral observations and disciplinary referrals did not significantly change, Cooke and colleagues advised the school staff to increase their connection with students, monitor the students to take immediate action against bullies, and maintain communication with parents.

The “Roots Program” is an anti-bullying initiative that identifies student members as "social referents" or “social influencers” for the purpose of empowering students to visualize a bully free environment and initiate change (Huber & Wilson, 2016). Compared to schools that did not implement the “Roots Program”, those who did reported a thirty percent reduction in disciplinary reports, one year after implementation. A reduction in disciplinary reports for bullying behavior was hypothesized to occur because the “Roots Program” promotes student leadership and social cohesion. “Social referents” internalize the messages and behave; accordingly, thus, modeling positive behavior to peers.

Student Perception of Prevention Programs

In Merrel and colleagues’ (2008) meta-analysis of 16 bullying prevention programs, there was no reduction in bullying incidences, but there was an increase in students’ self-esteem, perception of social competence, and knowledge of prevention methods (c.f. Ross & Horner, 2009). While bullying rates did not decrease, additional analysis demonstrates that the students did benefit from the prevention programs. Merrel and colleagues (2008) imply that baseline and post-intervention records of bullying incidences is not a thorough method for assessing the effects of a bullying prevention program. Rates of bullying may differ or remain stable for reasons other than implementation of a prevention program. Therefore, to measure the effects of a program it is important to assess students understanding and comprehension of a programs content. When assessing the quality of a prevention program, researchers should seek input from the children involved as they have a unique perspective on bullying and prevention programs for several reasons: children experience bullying first-hand within the specific school context, children may observe bullying incidents that adults do not, and children may better understand the attitudes of their peers (Craig, Pepler, & Blais, 2007).
Mental Health Kit: “Be Kind to Yourself and Others”

The current study focused on the learning objectives from the activities “Peer Relations: Bullying and Friendship” derived from the Mental Health Kit: “Be Kind to Yourself and Others”. The Mental Health Kit activities were designed by Edmonton Alberta Health Services (AHS), Canadian Mental Health Association (CMHA), and the Edmonton Public and Catholic Schools (Mental Health Kit, 2006). The interactive Mental Health Kit was designed to promote students’ well-being through 11 activities that were categorized into eight topics: Body Image, Hope, Humor, Peer Relations, Physical Activity and Mental Wellness, Resiliency, and Stress. The kit is curriculum consistent, has manuals for grades K - 3, 4-6, 7-9, and 10–12, and is readily available and free of cost to teachers. The manual contains easy to implement activities, and handouts for students, while promoting parental involvement through parent take home activities and parent newsletters. The curriculum for “Peer Relationships: Bullying”, teaches children about the harm of bullying, maintaining confidence when being victimized, and how to seek help if he/she witnesses bullying or is personally being victimized. “Peer Relationships: Friendship”, emphasizes uniqueness and diversity, positive qualities of friendship, how to cope with changes in friendship, and how inclusive friendship differs from exclusive groups or cliques.

A successful bullying prevention program includes a definition of bullying (Ross & Horner, 2009), policies and codes of conduct (Greene 2005; Salgado et al., 2014), a collaborative approach from school staff (Greene 2005; Salgado et al., 2014; Grover et al., 2015), communication with parents (Olweus, 1993), student engagement (Emmer et al., 2011), as well as content on the role of bystanders (Cooke, et al., 2007; Gini, Pozzoli, Borghi, & Franzoni, 2008), assertive communication (Salmivalli, 2014), and prosocial behavior (Orpinas & Horne, 2006). “Be Kind to Yourself and Others” is a comprehensive wellness kit that educates students and families, fosters a safe school environment, and partners with community agencies. The program provides a clear definition of bullying as well as the four subcategories of bullying and includes content on the role of a bystanders, assertive communication, prosocial behavior, and positive friendship. Additionally, the program provides students with parent take home activities.
The Current Study

The current study explored the effectiveness of the program, “Be Kind to Yourself and Others”, by examining the degree to which learning outcomes of the activities “Peer Relations: Bullying and Friendship” were achieved. In 2011 six of the eleven activities from The Mental Health Kit: “Be Kind to Yourself and Others” were implemented into 13 schools (in 30 grade 4 classrooms in Central Alberta, Canada) and focus groups were conducted to assess student perceptions.

Qualitative methods have made significant contributions to research on bullying behavior and prevention (Cunningham et al., 2016; Forber-Pratt, Aragon, & Espelage, 2014; Guerra, Williams, & Sadek, 2011). In line with the approach taken by Jones, Mitchell, and Walsh (2014) and Cunningham and colleagues (2016), content analysis was used in the current investigation to explore the degree to which the learning objectives of “Peer Relations: Bullying and Friendship” were understood and retained by students. Evaluation of a program’s effectiveness is a necessary step for program administrators to make appropriate changes that better target the program’s goals (Cunningham et al., 2016).

Methods

Participants

A total of 750 grade four students participated in the classroom activities. Some teachers invited the research team back for another visit to conduct focus groups, 300 students participated in the focus groups. After one word and off topic answers were removed the final number of responses included: 60 for the bullying activity, and 52 for the friendship activity for a total sample size of 112 (N = 112). Gender was not systematically collected, but approximately half were male and half female. Ethnicity also was not collected, but most were White, which is representative of the region (Central Alberta).

Procedure

Following approval from the Red Deer Polytechnic’s ethics board, informed consent from parents, consent from teachers, and verbal consent from students was obtained. Teams of 2-4 trained Community Service Learning (CSL) college students in a second-year psychology class implemented 6 of the activities (in 2011) in thirteen schools (30 grade 4 classrooms) in Central Alberta, Canada.
Some teachers from participating classes allowed college students to conduct follow-up focus groups of 6 children each during class time a week after completing the activities. Responses were recorded and transcribed by 5 trained college student research assistants (questions depicted in Table 1).

Table 1

*Question guide for student focus groups*

1. “What does this activity make you think and feel about yourself?”
2. “What does this activity make you think and feel about others?”
3. “Is this activity equally interesting to boys and girls?”
4. “What could we do to improve this activity and make it better for kids in the future?”

**Content Analysis**

Qualitative research methods are used to understand subjective meanings, perspectives, and experiences; hence, these methods may be useful in providing new insight to complex topics such as mental health and well-being (Crowe, Inder, Porter, 2015). As a research method, content analysis describes the dynamic and interconnected factors of a phenomena. Therefore, it was considered appropriate for this data as it allows for an inductive examination of the themes (Byrne, Dooley, Fitzgerald, Dolphin, 2015). Qualitative theme analysis was conducted by three independent coders; inconsistencies were discussed until 100% agreement was reached.

Responses from students who participated in the activities of “Bullying” and “Friendship” were coded using the key words and phrases derived from the learning objectives of “Peer Relations”; thus, providing a systematic method for inferences to be made regarding the effectiveness of the activities. The original learning objectives (see Table 2) contained multiple ideas within one objective, and had abstract or unmeasurable outcomes; therefore, to assist coders in identifying key words and phrases, the learning objectives were rewritten slightly for clarification to better assist coders (see Table 3).
### Table 2

*Original Learning Objectives*

**“Peer Relations: Bullying”:**

1. Through an interactive game, students will choose how they would respond in a bullying situation
2. Students will be able to identify different types of bullying, strategies to help deal with bullying, and how bullying makes people feel.

**“Peer Relations: Friendship”:**

1. Students will understand that changes can happen in a friendship over time
2. Students will be able to identify the differences between a true friendship and a clique
3. Students will become familiar with some survival strategies to deal with cliques

### Table 3

*Modified Learning Objectives*

**“Peer Relations: Bullying”:**

1. Students will be able to identify different types of bullying
2. Students will be able to identify strategies to help deal with bullying
3. Students will be able to understand how bullying makes people feel

**“Peer Relations: Friendship”:**

1. Students will be able to understand that changes can happen in a friendship over time
2. Students will be able to identify the differences between a true friendship and a clique
3. Students will be able to identify strategies to deal with cliques
Results

Sample quotes representing key learning objectives are presented for each activity: “Peer Relations: Bullying” and “Peer Relations: Friendship” in Tables 4 and 5.

Learning Objective: Types of Bullying

Around one fourth of students who participated in the “Bullying” activity indicated that they comprehended components of the four types of bullying, and thus would be able to recognize a bullying situation. Specifically, types of bullying were referenced by 23% of the students. Of the responses that demonstrated an understanding of the four types of bullying, 43% referenced physical bullying as exemplified by a student who stated, “being held under the water […] getting pushed into the water”. Verbal bullying was also referenced in 43% of the responses. To exemplify verbal bullying, one student commented that “in the Collicut, some people laugh at someone in their swimsuit”. Social bullying was exemplified by 29% of the students in this subcategory, including a student who commented that “it is not right to judge people by their clothes or how they look”. Finally, 29% of students in this category referenced cyberbullying, as exemplified by the quote “Facebook can have bullies”.

Learning Objective – Strategies to Deal with Bullying

Approximately half of students stated that the program increased their confidence and provided the knowledge necessary to stand up to bullies or to tell a trusted adult about a bullying situation; thus, suggesting that the program effectively communicated the second learning outcome. Specifically, strategies to deal with bullying were referenced by 47% of students. The phrase “stand up” was used in 75% of the responses coded as “strategies to deal with bullying”; with remaining quotes demonstrating that the students understood how their actions will impact a bullying situation, “we all have to power to stand up to bullies” and “I learned that we can prevent bullying and we have the power to be the solution”. A second strategy to deal with bullying was to tell a trusted adult. This strategy was less frequently reported and there was evidence that it was not endorsed as an effective strategy as one youth asked the question, “What if you tell a grown up that you’re being bullied, and that person finds out and bullies you even more?”. 
Learning Objective: Effects of Bullying

For the third learning objective, nearly one third of students understood that the victim will experience negative emotions (i.e., sadness, feeling unsafe, isolation), and therefore, the students had an increased sense of responsibility to intervene and stop bullying. Specifically, the effects of bullying were referenced by 28% of students. Commonly, students identified the impact that bullying has on the victim by stating “it hurts to be bullied”, and that bullying makes them feel “sad because everyone has feelings and that is not how they like to be treated”. Sadness was referenced in 28% of the responses coded as an understanding of strategies. One student identified that bullying impacts the whole school environment by stating “[I feel] unsafe because if there is lots of people bullying you could be the next victim”. Eighteen percent of the responses within this category reflected a moral understanding of bullying, as exemplified by the student who stated that “bullying is wrong”. Finally, one student stated he/she understood that while the bully experiences positive emotions, they may be motivated by maladaptive emotions; this was communicated through the statement “I would even try to make the bully feel better”.

Table 4

Sample Quotes for Learning Objectives in the Bullying Activity

<table>
<thead>
<tr>
<th>Learning Objective</th>
<th>Example Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of Bullying</td>
<td>“I learned that bullying can happen anywhere and Facebook can have bullies”</td>
</tr>
<tr>
<td>Physical Bullying</td>
<td>“Now I know that there are different kinds of bullying, There is physical and verbal and I did know three other ones”</td>
</tr>
<tr>
<td>Verbal Bullying</td>
<td>“It’s not right to judge people by their clothes or how they look, also if their family looks good”</td>
</tr>
<tr>
<td>Cyberbullying</td>
<td>“I really liked how they did the skits that showed the different types of bullying in them”</td>
</tr>
<tr>
<td>Social Bullying</td>
<td>“I liked the skits. I also head there there is four different types of bullying”</td>
</tr>
<tr>
<td></td>
<td>“Swimming pool aka being held under the water (drowned), getting pushed into the water”</td>
</tr>
<tr>
<td></td>
<td>“In the collicut some people laugh at someone in their swimsuits”</td>
</tr>
</tbody>
</table>
### Strategies to Deal with Bullying

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stand up</td>
<td>“I learned that we should prevent bullying, and that we all have the power to stand up to bullies”</td>
</tr>
<tr>
<td>Tell Someone</td>
<td>“I liked this activity because it taught me a lot about how to stand for others and myself when being bullied”</td>
</tr>
<tr>
<td>Be Assertive</td>
<td>“It was sad but it taught what happens if, and strategies what you should do if you see someone bullied”</td>
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<tr>
<td></td>
<td>“I learned that anyone can be a hero”</td>
</tr>
<tr>
<td></td>
<td>“I don’t think bullying is good and if you see someone getting bullied you should probably help”</td>
</tr>
<tr>
<td></td>
<td>“I liked the skits and what I liked about them was that one person stood up for the victim and made the bully stop bullying others”</td>
</tr>
<tr>
<td></td>
<td>“I feel more aware and safe. I feel more aware because now I can watch for bullies, and more safe because know I can stand up for myself”</td>
</tr>
<tr>
<td></td>
<td>“I learned how to stop bullying and how to stand up. You could tell somebody. 2. You could also stand up. Thank you for teaching us about bullying”</td>
</tr>
<tr>
<td></td>
<td>“I would stand up and stand up for other people, I would even try to make the bully feel better”</td>
</tr>
<tr>
<td></td>
<td>“Bullying is wrong and if I ever get bullied I will stand up for me and my family, friends. Last time I got bullied, my friend stood up for me and the bully stopped.”</td>
</tr>
<tr>
<td></td>
<td>“Learn how to stop being a bully, you have the power to be the solution, [I have] more confidence to stop a bully, stand up for the victim, stand up to a bully, stand up to bullying”</td>
</tr>
</tbody>
</table>

### Effects of Bullying

<table>
<thead>
<tr>
<th>Effect</th>
<th>Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hurts the Victim</td>
<td>“I learned that bullying is not nice to the people who are getting bullied”</td>
</tr>
<tr>
<td>Feelings of Sadness</td>
<td>“I don't like it when she felt bad because bullying is like your being sad”</td>
</tr>
<tr>
<td>Unsafe Environment</td>
<td>“I don't think bullying is a good thing, it hurts to be bullied”</td>
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<tr>
<td></td>
<td>“I felt bad for the people being bullied. But this was true cause that happens to me”</td>
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<tr>
<td></td>
<td>“I think bullying is wrong, [...] I didn't like being pushed around”</td>
</tr>
<tr>
<td></td>
<td>“you don't want to become the bully yourself”</td>
</tr>
<tr>
<td></td>
<td>“Bullying is bad and it hurts peoples’ feelings”</td>
</tr>
<tr>
<td></td>
<td>“Unsafe, because if there is lots of people bullying you could be the next victim”</td>
</tr>
</tbody>
</table>
Learning Objective: Friendship Changes

Student responses were least indicative of comprehension for the first objective, as only four quotes represented this category. Specifically, 3.6% of students (4 students) referenced that changes can happen in a friendship. Of the students who did identify that friendship changes, they acknowledged that this happens to “both boys and girls because they are the same”, and that it is acceptable for one to not participate in the same activities as their friends.

Learning Objective: Friendship versus Clique

Over two thirds of the students demonstrated an understanding of the qualities of true friendship and how they differ from a clique. Specifically, 67% of the students referenced qualities of a true friendship versus a clique. Some students indicated that to have a true friendship, one must “treat [others] how they want to be treated”, and that it is important to include others. For example, one student said, “makes me think of what we do wrong if we don't include others.” Further reflections of the impact one’s actions will have on friendship included, “I liked the presentation, because it really got us to stop and think about ourselves and our friends. It made me think if I was a good friend or if I’m a bully”. Students demonstrated an understanding that cliques do not embrace diversity and therefore, cause members to conform. “Made me feel good to know that you don't have to do things or dress in certain way to make friends” and “I don't always have to be friends with other people’s friends”.

Learning Objective: Dealing with a Clique

For the final learning objective, strategies to deal with a clique, close to one sixth of the students understood the importance of being true to oneself and not conforming. Specifically, strategies to deal with a clique was referenced by 15% of the students. Staying true to self was elaborated on by examples that indicated nonconformity. For example, “you can’t force your friend to do things with you and they can’t force you, you make your own choices in life”. Additionally, a student stated that the activities “helped [him/her] want to be honest with others”, as this will allow one to stay true to themselves to prevent joining a clique. By maintaining honesty, the students understood that they cannot force a friendship, and therefore, in addition to staying true to self, it is necessary to accept and respect others.
Table 5

*Sample Quotes for Learning Objectives in the Friendship Activity*

<table>
<thead>
<tr>
<th>Learning Objective</th>
<th>Example Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Friendship Changes over Time</strong></td>
<td></td>
</tr>
<tr>
<td>Different activities</td>
<td>“Feels okay that I don’t have to do everything my friends do”</td>
</tr>
<tr>
<td>Experience change</td>
<td>“Both boys and girls … can experience problems with friends”</td>
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<tr>
<td></td>
<td>“…can have cliques and friends and the same things can happen to them”</td>
</tr>
<tr>
<td></td>
<td>“…sometimes get into fights with their friends”</td>
</tr>
<tr>
<td><strong>Qualities of True Friendship vs. Clique</strong></td>
<td></td>
</tr>
<tr>
<td>Accept diversity</td>
<td>“I liked the presentation because it really got us to stop and think about ourselves and our friends. It made me think if I was a good friend or if I’m a bully”</td>
</tr>
<tr>
<td></td>
<td>“It helped me not to make a clique”</td>
</tr>
<tr>
<td>Include others</td>
<td>“I liked the presentation and I will try hard to be a good friend and include new friends too”</td>
</tr>
<tr>
<td>Be true to self</td>
<td>“Its okay to like different things”</td>
</tr>
<tr>
<td>Respect</td>
<td>“Feels okay that I don’t have to do everything my friends do”</td>
</tr>
<tr>
<td></td>
<td>“Having a friendship makes me feel good and making a friendship is kind of hard, but once you get in it, it’s good”</td>
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<td></td>
<td>“This presentation was awesome because there were different ideas about how to be a good friend”</td>
</tr>
<tr>
<td></td>
<td>“I noticed that some people have different ways how they think friends should be”</td>
</tr>
<tr>
<td></td>
<td>“Made me understand how relationships and cliques work and what good and bad”</td>
</tr>
<tr>
<td></td>
<td>“now I understand what a clique is and how I can deal with a bad one”</td>
</tr>
<tr>
<td></td>
<td>“Makes me think of what we do wrong if we don't include others”</td>
</tr>
<tr>
<td></td>
<td>“Made me feel good to know that you don't have to do things or dress in certain way to make friends”</td>
</tr>
<tr>
<td></td>
<td>“I don't always have to be friend with other people’s friends”</td>
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<tr>
<td></td>
<td>“Helps me want to be honest to others”</td>
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<tr>
<td></td>
<td>“Your friends should respect you”</td>
</tr>
</tbody>
</table>
Strategies to Deal with A Clique

Stay true to self
Be honest
Don't force a friendship

“I think it kind of helped me not to make a clique, I liked this activity sort of because I know what to do or not”

“now I understand what a clique is and how I can deal with a bad one”

“Made me feel good to know that you don't have to do things or dress in certain way to make friends”

“You can’t force your friend to do things with you and they can’t force you, you make your own choices in life”

“Be true to them and yourself”

“I don't always have to be friend with other people’s friends”

“Helps me want to be honest to others”

“Others will be nice to me if I am nice”

Discussion

The current study evaluated student comprehension and retention of the learning outcomes of “Peer Relations: Bullying and Friendship” from the larger mental health kit, “Be Kind to Yourself and Others”. Qualitative research methods were used to theme focus group responses in line with the program learning objectives. Findings confirm that many students understood the key messages within the two activities: thus, providing validity for their effectiveness.

Bullying prevention programs should include content on effective strategies to deal with bullying, while also teaching children prosocial behavior (Orpinas & Horne, 2006). Teaching children about prosocial behavior may foster a positive school environment while decreasing bullying as compassionate, kind behavior is conducive to more interpersonal relations (Weber et al., 2010). Bullying is a social phenomenon, meaning that bystanders significantly impact the behavior of individuals who bully (Salmivalli, 2014). The bystander-bullying relationship is reciprocal one, as passive bystanders may encourage bullying, yet bullying creates anticipatory anxiety leading to a collective sense of fear (Holland et al., 2015). Therefore, bullying prevention programs should teach students that their actions do affect the behavior of others. These two activities appear to be teaching these concepts effectively.
Bullying Activity

The first learning objective in “Peer Relations: Bullying”, was to identify different types of bullying. Students frequently listed one or more subcategories – physical, verbal, social, and cyberbullying- while also providing examples. The identification of these types of bulling is critical for students to be able to monitor their own behavior as well as the behavior of their peers. In the research of Byrne and associates (2015) adolescents’ definition of bullying was assessed and through content analysis and it was determined that individuals display physical bullying, mental/psychological bullying, verbal bullying, and cyberbullying; therefore, the current studies identification of the four types of bulling is in line with previous research. Kirkpatrick (2009) conducted a cross-sectional quantitative research study on 362 middle school students, which demonstrated that boys were somewhat more likely to engage in physical bullying, while girls were somewhat more likely to engage in social bullying. Thornberg (2010) suggests that since the 21st century, females have increasingly engaged in physical bullying, but this form is still male dominated. Thornberg notes that social bullying is not as detectable as physical aggression and therefore, school staff may not identify and respond to it. While it has been suggested that physical bullying is easier to detect, parents and/or school staff may excuse the aggression of boys, stating that males are physical human beings (Thornberg, 2010). Providing students with knowledge on the types of bullying will assist them in identifying and responding appropriately.

The second learning objective of “Peer Relations: Bullying”, was to provide students with strategies to deal with bullying. Following the activity, students reported that they “felt confident” and were “not afraid to stand up”. In the research of Nickerson and Slater (2009), the extent to which peer victimization was associated with various coping mechanisms was assessed in a national survey of 11,113 adolescents. Boys typically reported that they would protect themselves by carrying a weapon or engaging in the physical fight while girls reported suicidal behavior and feeling unsafe. Thornberg (2010) suggests that female victims are more likely than males to develop anxiety, depression, and to cope through self-harm. Based on the literature, it is necessary that children are taught appropriate behaviors for managing a bullying situation.
The third learning outcome of “Peer Relations: Bullying” was to teach students the effect that bullying has on those directly and indirectly involved. This learning objective was exemplified by the following student responses: “I learned that bullying is not nice to the people who are getting bullied”, “bullying is bad and it hurts peoples’ feeling”, “[I feel] unsafe because if there is lots of people bullying, you could be the next victim”. These responses demonstrate that bullying not only has an emotional effect on the victim, but it induces sadness and fear bystanders. In line with these findings, Byrne and colleagues (2015) identified adolescent’s definition of bullying through content analysis and two themes emerged: the act of bullying is mean, and bullying affects feelings. Within the: “bullying is mean” category, student’s reasoning for bullying behavior included: “the individual bullying is humored by his/her behavior”, “a bully hurts someone because they are hurt themselves”, and “the bully is different” (i.e., physical appearance, academic performance, race, etc.). Within the theme “bullying affects feelings”, responses reflected negative feelings experienced by the victim (i.e., worthlessness, sadness, anger, isolation), as well as the bully will experience both positive and negative emotions (i.e., increased self-esteem). As previously mentioned, research suggests that victimization of bullying can lead to depression, feelings of hopelessness, suicidal ideation and attempts, anxiety, somatoform disorders, and low self-esteem which may affect development into adulthood (Grover et al., 2015; Fredstrom et al., 2011). The effects of bullying as identified by students in the current study, reinforce the research of other scholars who suggest that bullying in elementary schools leads to a variety of negative mental health outcomes.

Friendship Activity

The first learning objective in “Peer Relations: Friendship” is that friendship is not permanent and can change or dissolve over time. With only four students commenting on this learning objective, it appears that future implementation should spend more time discussing this concept. A study suggests that among school-aged children, first graders maintain approximately 50% of their friendships across a school year while fourth graders maintain approximately 75% of their friendships during the same period (Poulin & Chan, 2010). Findings from Poulin and Chan’s study imply that friendship instability does occur at a young age and should be incorporated into prevention programs.
The second learning objective in “Peer Relations: Friendship” is on the qualities that differentiate a friendship from a clique. This learning objective was most discussed by students. Establishing relations with peers constitutes a significant developmental task of childhood (Poulin & Chan, 2010). In the 1950s, Sullivan discussed the salient role of friendship in developing personal competence, identity, and adjustment to developmental stages (Poulin & Chan, 2010). Additionally, social relations are essential to the development of social skills, attitudes, and behaviors; therefore, friends can have positive or negative influences on development. In McDougall and Hymel’s (2007) study on childhood friendships, children were asked about the qualities of friendship. Common responses demonstrated that children believe friendship is the sharing of common activities as well as helping one another (McDougall & Hymel, 2007). While it is important to share interests and engage in common activities, children also need to be taught to accept and respect their friend’s interests and hobbies even when they do not align with their own. In the current study, characteristics of a positive friendship were differentiated from the negative qualities of a clique. Many of the students’ stated that the activity caused them to reflect on their behavior and determine if their actions were a conducive to good friendship. Teaching children to accept diversity may be beneficial in reducing bullying based on sexual orientation, race, ethnicity, weight, learning disabilities or physical disabilities (Almeida, Johnson, Corliss, Molnar, Azrael, 2009; Larochette, Murphy, Craig, 2010; Rosenthal, et al. 2015; Zeedyk, et al., 2014).

The third learning objective in “Peer Relations: Friendship” is strategies to deal with a clique. Cliques are characterized by a small group of friends who spend considerable and exclusive time with each other (Poulin & Chan, 2010). Cliques are hierarchical and have a powerful influence on attitudes, extracurricular activities, self-evaluations, interpersonal skills, and academic standing (Wiist & Smider, 1991). Students provided specific examples of how they would avoid conforming to pressure to join or participate in cliques. To enhance future understanding it may be beneficial to role play potential conversations and strategies around dealing with cliques; as research suggests role playing can be an advantageous method for students to practice social skills within a safe and positive environment (Josette, 1993).
Limitations and Future Directions

While valuable information was gathered through the current study, there are several limitations that warrant mention. First, the process of coding requires a degree of subjectivity and therefore, the results may be influenced by personal biases. However, to minimize researcher bias and produce empirical results three independent coders agreed upon the themes for inter-rater reliability.

Second, while the use of focus groups was beneficial in achieving a large sample size, focus groups have the potential to cause groupthink. Groupthink is defined as a “mode of thinking […] engaged in when concurrence-seeking becomes so dominant in a cohesive in-group that it tends to override realistic appraisal of alternative courses of action” (Myers & Smith, 2012, pg. 165). Further, because individuals are influenced by the presence of others, children may have been reluctant to answer a question if a bully was present in the focus group. Therefore, future research could conduct one on one interviews, or provide a questionnaire so children can anonymously write their responses.

The current study is limited in the ability to generalize cross culturally, as the sample was derived from schools within Central Alberta with a predominantly White sample. It would be beneficial to implement the program in various counties and compare the student’s perspectives, as cultural norms shape one’s viewpoint.

The intent of the current research was to assess students’ understanding of the learning outcomes; therefore, it would be beneficial to conduct a longitudinal study and assess sustained learning impact over time. Evaluating long-term knowledge retention and behavioral changes would provide further validity for the use of the activities “Peer Relations: Bullying and Friendship”. Future research would also benefit from the inclusion of a control group as this would assist in establishing causality.

Finally, when conducting future research, it would be beneficial to add quantitative measures to assess significant changes over time. For example, a pretest and posttest student survey, as used in Low and colleagues (2013) assessment of “Steps to Respect”, could be used to examine knowledge gains. Additionally, to provide information on the school environment, Low and colleagues administrated a pretest and posttest survey on school staff. Using a Likert scale, this survey assessed school staff’s
perception of the school environment, staff, and students’ willingness to intervene in bullying situations, and the degree of bullying related problems within the school. While valuable information can be obtained from school staff, it would be beneficial for future research to administer a survey to students.

**Suggestions to Improve Program Effectiveness**

In the current study, many students responded to the question “is this activity more interesting to boys or girls?”, with a gender bias evident of the endorsement of gender stereotypes. For example, the comments “girls, because most of the time girls have cliques”, and “girls have more feelings than boys” are not accurate and indicate that young children have been exposed to and have internalized gender stereotypes. Due to responses in the current study such as “girls get into more fights over friends and people” and “boys think they are friends always, no matter what they’re doing, but girls worry about whether they’re friends”, it appears that when children are taught it is more common for girls to engage in verbal and social bullying, that generalizations are been made about the lack of stability of female friendships. Further, it appears that the children are assuming that teasing or name calling amongst males is not emotionally impactful, while females are emotional, hypersensitive, or dramatic (e.g., “girls have more feelings”, “girls are more sensitive”, “girls because they are really dramatic and have lots of issues with life”). It is important that the activities in “Peer Relations” be modified slightly to discuss the equally damaging effects that bullying has on both boys and girls. Additionally, the activities should be delivered by an equal number of male and female mentors. The college students who delivered the activities were mostly female. The predominate presence of female mentors may help explain why students were likely to suggest that the activities were applicable to girls. Increasing male mentors may help students understand it is valid for boys to express hurt when being bullied or when losing a friendship.

Children in the current study stated that they enjoyed the skits. It is essential that both males and females act out the skit to demonstrate that both genders can experience true friendship and can be hurt by a bully. While there are benefits to the mentors acting out skits, it may be advantageous to implement a student suggested activity, in which the students’ role play. Like Josette (1993) who used role-playing to reduce discrimination and racism by helping children identify and empathize with minority groups.
Many students indicated that they enjoyed the skits and recommended that more be incorporated. Skits are a form of social learning, which according to research, is a form of learning conducive to promoting prosocial behavior (Lopez et al., 2015). In addition to social learning, research has shown that prosocial behavior can be taught through group work (Government of Canada, 2016). Interventions in elementary school can support children in developing interpersonal skills and the ability to relate to others through completion of a shared task. Collaborative work can help children learn to respect others’ perspectives while also learning to trust and be accepting of diversity.

When the activities were implemented in 2011, college students delivered the activities. Many children responded to the college students with positive regard and asked that these students come again. This finding supports the use of mentoring, particularly by college students. Future research should seek to assess the bidirectional benefits of using college students as well as other potential young mentors, such as high school students (Herrera, Grossman, Kauh, & McMaken, 2011). Being that high school students are closer in age to grade fours; they may be well-received and respected. Additionally, being labeled as a mentor may have positive effects on the high school students as they may have an increased sense of leadership and responsibility to act in a prosocial and appropriate manner; therefore, positively contributing to the learning and well-being of both parties in the mentorship arrangement (Herrera et al., 2011). The positive effects of peer mentoring on the mentor, was demonstrated in Karcher’s (2009) study when 46 high school students served as cross age mentors to elementary students. Results indicate that cross age mentoring increases the mentor’s academic self-esteem, and social connectedness.

Parental involvement is a key aspect in addressing school bullying (Government of Canada, 2016). Improving communication between school staff and parents is important in resolving bullying and teaching children the skills necessary to overcome bullying (Olweus, 1993; Cooke et al., 2007). Additionally, increased parent-school communication is beneficial for developing effective school policies and bullying programs. As the primary caregiver, parents have an important role to play in their child’s life, particularly during adverse experiences such as bullying (Craig et al., 2007; Desforges & Abouchaar, 2003).
Within the Mental Health Kit, “Be Kind to Yourself and Others”, parents are included in the learning process through parent take home activities. Each activity has a parent worksheet so that parents can stay informed on what their child is learning. The parent worksheet also supports parents in teaching their children about mental health. While school prevention efforts are critical, it is important that there is a parallel effort in the home; therefore, in addition to activities and handouts, it would be beneficial to include parents in the creative process of prevention programs to establish more ownership and connection to the content within the home environment. In 2011, parents were provided with the take home activities as well as provided with an online follow-up survey, but there were very few responses. Future research should seek to increase the accessibility and ease of the parent activities, while also providing parents with an incentive.

“Be Kind to Yourself and Others” contains content on self-esteem, which is an overall evaluation of one’s self-worth (Fanti & Henrich, 2015). While building self-esteem has long been advocated within school systems, some research has found high self-esteem to be correlated with aggression and traits of narcissism (grandiose view of self; Baumeister, Bushman, Campbell, 2000). It might therefore be beneficial for the “self-esteem” component to be altered into self-compassion. Self-compassion is an adaptive view of self, despite personal inadequacies or difficult life circumstances (Neff & McGehee, 2010). Neff (2003) identified three components of self-compassion: self-kindness, common humanity, and mindfulness. Being kind to oneself during times of suffering is contrasted with self-criticism, which involves judging or blaming oneself. Common humanity is characterized by an understanding that all humans make mistakes, and that all life forms are flawed and imperfect. Rather than seeing oneself as separate from others, the broad understanding of shared human experiences allows one to be compassionate to self and others. Finally, self-compassion involves a mindful approach to suffering such that one does not suppress nor ruminate on emotions. Instilling children with self-compassion could be influential in reducing bullying. Developing self-compassion motivates one to act in a way that increases the well-being of self and others rather than to improve status or worth relative to or at the expense of others (Neff & McGehee, 2010).
As suggested by Lim and DeSteno (2016), research has shown that adversity enhances some individuals compassion for the suffering of others. Lim and DeSteno’s study support the idea that adversity fosters compassion and empathy; thus, while adversity causes some individuals to remain angry, depressed, or to form maladaptive interpersonal behaviors, individuals who do successfully move beyond the hurt, develop resiliency, potentially through social support and compassion (Lim & Desteno, 2016). When administrating the bullying prevention program within the Mental Health Kit: “Be Kind to Yourself and Others”, lessons on self-compassion may be beneficial in fostering resiliency, while decreasing the desire to hurt others.

**Conclusion**

Since the 1970’s when Dan Olweus disseminated the first large scale bullying prevention program, research on bullying intervention has accumulated (Merrell et al., 2008). As discussed, bullying is prevalent in children and can have adverse developmental impacts. It is important, therefore, that effective prevention efforts be introduced relatively early, as they are in the Be Kind to Yourself and Other’s program. The findings of the present study have implications for bullying prevention programs, particularly the importance of including increased course content on prosocial behavior. Effective bullying prevention programs should foster kindness and compassion within children, as the recipient of the helping behavior is likely to experience gratitude, positive affect, and an increased desire to help others. Therefore, an act of prosocial behavior will have a rippling effect and help to produce a safe, compassionate environment (Lopez et al., 2015). Empathy is a motivator of prosocial behavior and can be enhanced through volunteering, or exposure to diversity (Lopez et al., 2015). By introducing initiatives such as this in childhood, the likelihood of success in reducing bullying and enhancing prosocial behavior will be maximized.
Reference


Shifting Role-Identities of Education Doctoral Students: A Qualitative Study

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Abstract

Due to the increasing number of doctoral students and job competitiveness, there has been a global debate about how to enhance doctoral students’ knowledge and skills so that they might compete in the academic job market. Doctoral socialization is a complex process by which doctoral students gain the knowledge, skills and values required for successful entry into a professional and academic career. This process offers a profound learning experiences which transform students to perform a role in the academic community. Moreover, there have been a dynamic configuration of internal and external elements that influence student development. Identity development of students has been a focus in higher education over the past two decades because it is a key outcome of doctoral socialization. However, it is quite significant to understand students’ interpretation of their own identities and development in PhD programs. Role-identity refers to the character or role/s that an individual devise for him or herself as an occupant of a particular social position. However, this theory offers a useful lens to generate insights into the embedded identity perspectives of doctoral students.

The study aimed to explore the shift in students' expectations and experiences that shape their prominent role-identities in doctoral studies. My PhD study illustrates the narratives of six doctoral students of Education in a university in Pakistan. Thematic
analysis revealed that doctoral students had multiple role-identities which shifted during the developmental stages in their doctoral study. Students changed their expectations and experiences in each stage of their PhD which shifted their prominent role-identities. In stage one, students’ expectations that they would enhance their research skills and knowledge, and then engaged in reading and writing learning activities in each course shaped their prominent role-identity as learners during the coursework. Their self-satisfaction to have learned and improve research skills, and support of teachers and fellows provided them internal and external role-validation as learners. In the second stage, students' expectations shifted to focus on one area of research and apply their theoretical knowledge into a practical research proposal. And their experiences shifted to engaging in reading extensive literature in their area of research, identifying research problem, choosing appropriate research methods and presenting research proposal shaped their prominent role-identity towards that of emerging researchers. Students’ self-satisfaction to have developed a good research proposal, and role support of others (support of supervisors, teachers and peers of the same area of research, and feedback of panel members) provided them role validation as emerging researchers. And in the last stage, students’ expectation changed towards conducting quality research work and enhance their wider academic skills. However, their engagement in scholarly activities such as conducting practical research activities, teaching graduate students, writing and reviewing research articles, managing research journals, and participating research conferences shaped their prominent role-identity as emerging scholars. Students’ self-satisfaction of conducting research and confidence in teaching and communication skills provided them internal role-validation and support of others (feedback of supervisors, academic professionals, teachers and peers) helped them to gain external role-validation as emerging scholars. The combination of these multiple role-identities led to their academic identity development.

This study illustrates the complexity of the doctoral students’ routes/journeys to achieving a doctorate through their personal narratives and experiences. The paper contributes to the literature on doctoral student experience and development by
outlining roles and instances that help students to identify themselves into different academic roles. Moreover, the research provides a conceptual understanding and framework to students’ preparation for academic careers.

**Key words**: Doctoral socialization, identity development, role-identities
Hybrid and Virtual Summer Research Experience for First- and Second-Year Computer Science Undergraduate Students

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Abstract: The outbreak of COVID-19 has significantly disrupted university operations across the nation. Consequently, more than 90% of institutions had canceled in-person classes and moved to online-only instruction. However, this online-only teaching has raised additional concerns about the quality of instruction. Previous studies have shown that students' performance was negatively impacted by online learning. In contrast, current data shows a disproportionate burden of illness and death among racial and ethnic minority groups. There is a growing concern that COVID-19 has significantly impacted STEM education among minority groups. More specifically, throughout the COVID-19 pandemic, engaging students in research via online modality was a challenge. During summer 2021, research activities were undertaken by Engineering and Computer Science (ECS) undergraduate students virtually through the NSF-funded project “Building Capacity: Advancing Student Success in Undergraduate Engineering and Computer Science (ASSURE-US).” In Summer 2022, a new cohort of ECS students was accepted to conduct research in a hybrid modality. Here we present a comparative analysis of virtual instruction and hybrid instructional modalities implemented during the Summer Research Experiences for freshman, sophomore, and junior engineering and computer science students. The findings suggest a greater engagement of the students during the hybrid summer research in 2022 than in virtual summer research in 2021.

Keywords: Summer research, computer science education, undergraduate research, hybrid modality, virtual modality

1. Introduction

The COVID-19 pandemic has affected all facets of life, including personal, professional, and academic life. Amidst this, engaging students and maintaining vibrant undergraduate research activities was challenging. One of the goals of the National Science Foundation (NSF)-funded grant, “Building Capacity: Advancing Student Success in Undergraduate Engineering and Computer Science (ASSURE-US),” (2018-2023), is to close the achievement gap and increase the retention of underrepresented minority (URM) students in STEM. The ASSURE-US project envisaged implementing a holistic, long-term, broad-based, result-oriented, and inclusive strategy to accomplish the goals. In 2018, NSF funded the ASSURE-US program for five-year to enhance learning experiences for first- and second-year URM students enrolled in the College of Engineering and Computer Science (ECS) at California State University, Fullerton (CSUF). The multi-pronged strategy implemented through ASSURE-US project activities aims to promote sociocultural interaction, demonstration-based learning experiences, and curriculum-related research experiences for the
URM students. Specific objectives include 1) creating a nurturing learning environment through the formation of the Student Teacher Interaction Council (STIC); 2) providing culturally meaningful learning experiences involving extensive laboratory and field experiments; 3) providing first-year research experiences to freshman engineering students to generate and sustain interest in STEM; 4) integrating research activities into curriculum to increase real-world relevance of research experiences; 5) and improving the analytical instrumentation and critical thinking skills of undergraduate students that could prepare them for graduate studies.

The multidisciplinary ASSURE-US project team has identified summer research as a possible avenue for students to gain meaningful experience and increase their motivation in their major, thereby promoting their retention. The Summer Research Experience (SRE) is a rigorous, collaborative, immersive, and hands-on learning experience offered by ECS faculty. The freshmen, sophomore, and junior students in ECS were teamed with ECS faculty for an uninterrupted 5-6 weeks (11 hours per week), incentivized (stipend-based) summer research. Faculty mentors were selected from multiple ECS majors: civil engineering (one faculty), computer engineering (two faculty), computer science (three faculty), and mechanical engineering (one faculty). Each faculty proposed various research topics for students to sign up for; however, students were allowed to choose only two topics.

The ASSURE-US project was initially designed for in-person, hands-on student engagement, including summer research activities. Due to the COVID-19 pandemic, in 2021, the ECS faculty conducted summer research activities in virtual mode. The hands-on, project-based research activities were redesigned to promote collaborative research in remote settings using virtual tools. In April 2021, freshmen, sophomore, and junior students in Computer Science were recruited by Dr. Bein to do research in a virtual setting. It was the first time for recruited students and Dr. Bein to conduct research virtually. The students followed a six-week intensive research program that allowed them to gain experience in Data Science, Python Programming, and familiarity with Jupyter Notebook and Microsoft Teams. In the Summer of 2022, a new cohort of first-year and second-year Computer Science students was selected in April 2022 to do research in a hybrid modality where students were expected to spend at least 25% of their time studying in one of the Computer Science labs. We observed a greater engagement of the students during the hybrid summer research in 2022 than in virtual summer research in 2021.

The paper is organized as follows: Section 2 presents a summary of similar work conducted elsewhere, Section 3 presents the student context at CSUF, the ECS, and the Computer Science Department specifically, since the vast majority of students doing summer research were from that department. The research methodology is presented in Section 4, followed by student outcomes in Section 5, student feedback in Section 6, and the conclusion in Section 7.

2. Related Work

Previous studies [1] have shown that students’ performance was negatively impacted due to online learning. Also, current data show a disproportionate burden of illness and death among racial and ethnic minority groups. Given that COVID-19 adversely impacted student engagement in online instructional modality, thereby significantly impacting STEM education among minority groups. Narrowing the achievement gap requires careful consideration of underlying causes that affect URM students’ (Female, Hispanic, and African American) unequal participation in STEM disciplines. For students, often a combination of ethnicity, gender, sociocultural influences, academic experiences and preparation, cognitive, attitude/perceptions, institutional variables, and environmental factors affect not only their choice of majors but also their ability to perform and succeed in the chosen major [2][3]. Retaining students in STEM disciplines is challenging, particularly for low-income, first-generation minority youth who lack foundational skills and knowledge in the STEM fields [4]. Furthermore, multiple studies show that the informal communication and accessibility of faculty role models to provide moral, educational, and cultural support would ultimately result in students maintaining enthusiasm, confidence, and retention in STEM disciplines [5][6]. These studies reported that by building rapport, both the students and the faculty equally benefited.
3. Student Context at California State University Fullerton

California State University, Fullerton (CSUF) is the largest of the 23 CSU campuses. CSUF is recognized as the No. 1 choice for transfer students from community colleges in California. Our student population is among the most diverse in California. CSUF is a recognized Hispanic Serving Institution (HSI) and an eligible Asian American Native American Pacific Islander Serving Institution (AANAPISI). Of the 40,000 students currently enrolled in CSUF, more than 65% of students are ethnic minorities, and nearly one-third of all CSUF students are first-generation college students.

CSUF offers 110-degree programs, of which 55 are undergraduate and 55 graduate programs, including doctoral degree programs in education and nursing practice. Many of these programs have achieved national prominence because of our outstanding faculty and alums achievements. Recently released U.S. News & World Report, in its 2022-23 Best Colleges rankings, praised Cal State Fullerton as a top “national university” offering a full range of undergraduate, master’s, and doctoral programs and committed to producing groundbreaking research. U.S. News also ranked Cal State Fullerton at No. 7 of “Top Performers on Social Mobility” in the nation and No. 83 of “Top Public Schools” in the nation.” These recognitions came after CSUF advanced to the “Doctoral Universities: High Research Activity” category by the Carnegie Classification of Institutions of Higher Education [7]. The Hispanic Outlook in Higher Education in October 2021 ranked CSUF first in California and fourth in the nation among top colleges and universities awarding bachelor's degrees to Hispanic students [8][9].

The Department of Computer Science has seen tremendous growth in the past five years (see Figure 1a) and has doubled in size since 2016.

![Enrollment trend and gender distribution in the B.S. Computer Science program](image)

(a) Trend of student enrollment in B.S. in Computer Science  (b) Gender distribution of C.S. undergraduate students

Figure 1. Enrollment trend and gender distribution in the B.S. Computer Science program

The estimated U.S. gender ratio in 2020 was 49.48% male and 50.52% female [10], which is proportionately reflected in the computer science jobs in the tech industry, with 78.8% male and 21.2% female [11]. Efforts such as peer mentoring and informal advising of female C.S. students supported through ASSURE-US (NSF grant), private grants, and gift-in-kind donations from significant companies increased the percentage of female students from 14.76% in Fall 2018 to 16.72% in Fall 2022. However, the percentage of women majoring in Computer Science (see Figure 1b) is below the national average of 20% [12]. The race/ethnicity of C.S. students at CSUF (Figure 2a) represents the student population in California, and the percentage of underrepresented students shows a steady increase over the years (Fig 2b).
In 2020, the estimated ethnic distribution of the U.S. population was 57.8% white, 18.7% Hispanic and Latino, 12.4% black or African American, and 6% Asian [13]. However, proportionate ethnic representation in STEM jobs is not evidenced, with an estimated 66.1% white, 25% Asian, and 5.2% Hispanic or Latino [4], and very different from the one reported at CSUF (Figure 2). Besides ethnic distribution, economic data shows that nearly half of CSFU students are Pell grant recipients due to low income (Figure 3b), and 28% are first-generation students (Figure 3a).
4. Research Methodology

There were three objectives for the summer research:

1. Engaging students in research through faculty-student meetings, promoting retention, and cultivating interests in their chosen major
2. Encouraging students' teamwork to promote student-student interaction, given that most of them did not know each other
3. Encouraging students to ask questions and delve deeper into specific topics. Being inexperienced in conducting research, students did not know when and how to ask for help.

Increasing participation of URM students was a critical aspect of the ASSURE-US project. The ASSURE-US project team reached out to active ECS student clubs such as the Society of Women Engineers, Association of Computing Machinery - Women in Computing, Latinos in Science and Engineering, National Society of Black Engineers, and Society of Hispanic Professional Engineers. With help from C.S. Department staff, individual recruitment of students from introductory ECS classes was performed during the regular semesters, Spring and Fall. We also invited all ASSURE-US student participants who had enrolled in the program as of Fall 2018. Students applied for each opportunity, and the faculty selected the students. Applicants were selected solely based on their academic status (freshmen, sophomores, and juniors) and not based on academic achievements. Because of NSF funding requirements, the students had to be U.S. permanent residents or citizens.

For the 2021 virtual summer research experience, the faculty mentor first prepared lectures, delivered synchronously on zoom, and shared relevant materials to initiate undergraduate students into research activities and familiarize students with the research objectives. These targeted lectures helped students learn the fundamentals of Python Programming, the use of Jupyter Notebook, choose appropriate datasets and analyze the dataset for a high degree of correlation. The faculty advisors helped students identify research topics such as air quality analysis, fraud detection for credit cards, drones, hardware accelerators, navigation, predicting heart failure, self-driving, voice-controlled robotics, or water potability.

The lectures were scheduled as follows:

- Two 90 minutes lectures in the first week: these lectures were dedicated to explaining the objectives of the research, the flexibility in choosing among the two topics, data science and pair trading, rules of studying and reporting progress, how and where to search for datasets, the supportive online materials available for further reading, how and when to ask for help with reporting worked hours, and allow each student to introduce themselves, talk about their interests in computer science and hobbies, what are their expectations,
- One 90-minute lecture in weeks 2, 3, and 4 to delve into the data science topic and allow students more time to study on their own, a total of two lectures for the two topics
- One sixty-minute meeting in weeks 5 and 6 for students to guide students into choosing a topic for the project, get further help on analyzing the data from the dataset, and report roadblocks,
- Two one-hour meetings in the last few days of the project were dedicated to voluntary oral presentations.

The faculty advisor also mentored and monitored the students' research activities using virtual tools such as Microsoft Teams and Zoom. These tools were used for meetings to track the student’s research progress once or twice weekly. Furthermore, students were encouraged to work as a team to promote student-student and student-teacher interaction. For the summer 2022 hybrid summer research experience, the faculty mentor enhanced and delivered online lectures and shared relevant materials to initiate undergraduate students into research activities and familiarize them with the research objectives. The targeted lectures helped students learn the fundamentals of Python Programming, gain familiarity with Jupyter Notebook and select and analyze appropriate datasets for a high degree of correlation.
Additional topic on pairs trading was much more rigorous, requiring a review of data structures, Greedy method, recursion, parallel arrays, and learning about statistical variables such as standard mean, standard deviation, variance, correlation, and co-integration.

The lectures were scheduled as follows:

- Two 90 minutes lectures in the first week: these lectures were dedicated to explaining the objectives of the research, the flexibility in choosing among the two topics, data science and pair trading, rules of studying and reporting progress, the supportive online materials available for further reading, the on-campus support for summer 2022 provided by peer mentoring, full access to printing, support for poster design, purchased books that were available for studying, how and when to ask for help with reporting worked hours, and allow each student to introduce themselves, talk about their interests in computer science and hobbies, what are their expectations,
- Two 90-minute lectures in the second week were dedicated to thoroughly analyzing two topics, emphasizing searching datasets for a data science topic. Four lectures were dedicated to two topics
- One 90-minute lecture for weeks 3 and 4 to delve into topics and allow students more time to study on their own, a total of two lectures for the two topics
- Two sixty-minute meetings for students to report roadblocks during weeks 5 and 6, irrespective of their topic
- A two-hour meeting for students was scheduled to make oral presentations voluntarily.

The students had to come to campus outside the synchronized virtual lectures to work with the peer mentors and socialize among themselves. The faculty advisor then helped students identify research topics such as student adaptability level in online education, student engagement at CSUF, data generation and analysis for League of Legends: Wild Rift, brain tumor MRI, analysis and prediction on real or fake job postings, correlation and co-integration of stocks for cryptocurrency, analysis of university students’ mental health, and others.

5. Student Results

ASSURE-US project aims to motivate URM students by motivating them and supporting them through multiple academic and sociocultural intervention activities to help them persevere through ECS. The project activities created nurturing and supporting environment to enhance students’ self-efficacy and desire to pursue STEM careers. The ASSURE-US project team sought to close the achievement gap and increase the pipeline of STEM-educated URM student populations by providing a holistic, long-term, broad-based, and results-oriented strategy. Rigorous laboratory and field research activities have boosted students’ scientific understanding and offered an understanding of advanced science and engineering concepts in their respective disciplines. The faculty in Computer Science has dedicated effort to re-organizing the introductory courses and doing summer research with freshman, sophomore, and junior students that have applied.

Applicants were selected solely based on their academic status (freshmen, sophomores, and juniors) and not based on academic achievements. Of the 23 students participated in the summer 2021 virtual research program, 13 made oral presentations on their research findings using zoom. Of these, eight junior students preferred to work in groups. These students met with their teammates for the first time and were introduced during the weekly/bi-weekly meetings. Results of this summer research activity show that Microsoft Teams is a superior tool for organizing and managing the virtual student research experience. Overall, students expressed satisfaction with the experience, stating that this virtual undergraduate research experience helped them gain valuable experiences and better prepared them for the industry and higher education. Of the 26 students who participated in the summer 2022 hybrid research program, 24 made oral presentations on their research findings using zoom. Of these, ten junior students preferred to work in groups. These numbers show a greater engagement of students in hybrid research than in virtual research.

While academic achievement gap between URM and non-URM remains a concern, as evidenced by a large percentage of students repeating the lower-division courses. For example, during Fall 2021, despite
access to tutors and supplemental instruction, 26-34% of ECS students received a grade that required repetition of one or more introductory programming courses (CPSC 120, 121, 131). Compared to non-URM students and depending on the course, the repetition rate is 20-50% higher for URM students [14]. Worse, the retention rate for first-year C.S. students is 3-6 percentage points lower for URM students than non-URM students [15].

6. Student Feedback

In the summer 2022, the student survey responses showed that many students reported positive experiences: 41.2% were strongly positive, 52.9% were positive, and 5.9% were neutral. Students also reported a stronger commitment to the major: 47.1% strongly agree, 23.5% agree, 17.6% neutral, and 11.8% disagree. The data is shown in Figure 3.

![Fig. 3 Anonymous Data Collected from Students at the end of summer research 2021 by Arroyo Research Services](image-url)
In summer 2022, the student survey responses showed a significant number of students reporting a positive experience: 50% were strongly positive, 25% were positive, and 25% were neutral. Students also reported a stronger commitment to their major: 50% strongly agree, 25% agree, and 25% neutral. The data is shown in Figure 4.

<table>
<thead>
<tr>
<th>5. How much do you agree with each statement?</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree nor Disagree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe that I contributed something of value to the project</td>
<td>5 (41.7%)</td>
<td>6 (50.0%)</td>
<td>1 (8.3%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>My role involved doing science, technology, engineering, or mathematics</td>
<td>8 (66.7%)</td>
<td>3 (25.0%)</td>
<td>1 (8.3%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>The results of my work were or will be incorporated into the larger research project that my research supports</td>
<td>4 (33.3%)</td>
<td>2 (16.7%)</td>
<td>2 (16.7%)</td>
<td>3 (25.0%)</td>
</tr>
<tr>
<td>I enjoyed the summer research experience</td>
<td>7 (58.3%)</td>
<td>3 (25.0%)</td>
<td>2 (16.7%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>The SRE changed how I think about courses in my major</td>
<td>6 (46.2%)</td>
<td>2 (15.4%)</td>
<td>5 (38.5%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>As a result of the SRE, I am more committed to my major</td>
<td>6 (46.2%)</td>
<td>4 (30.0%)</td>
<td>3 (23.1%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>As a result of the SRE, I have a better understanding of what professionals in my field of study do</td>
<td>4 (30.0%)</td>
<td>6 (46.2%)</td>
<td>3 (23.1%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>The SRE was a good use of my time</td>
<td>5 (38.5%)</td>
<td>7 (53.8%)</td>
<td>1 (7.7%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>My advisor helped me understand my role on the project</td>
<td>3 (25.0%)</td>
<td>6 (50.0%)</td>
<td>3 (25.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>My advisor helped me understand the science, technology, engineering or mathematics required for the project</td>
<td>5 (41.7%)</td>
<td>4 (33.3%)</td>
<td>3 (25.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>My advisor was open and accessible during the SRE</td>
<td>9 (69.2%)</td>
<td>2 (15.4%)</td>
<td>2 (15.4%)</td>
<td>0 (0.0%)</td>
</tr>
</tbody>
</table>

Fig. 4 Anonymous Data Collected from Students at the end of summer research 2022 by Arroyo Research Services

The students also reported what they had learned due to the summer experience. Selected students’ answers are below:

- “Data science and linear algebra concepts”
- “I learned that as students, there are many ways outside of the classroom, that we can apply ourselves and learn. This SRE has definitely broadened my knowledge and motivated me to pursue my career.”
- “I have started to learn Python, as well as data science, machine learning algorithms, pairs trading and data structures!”
- “I learned a lot about the advanced statistics such as co-integration and time series analysis”
- “I got more comfortable using data science tools.”
● “I learned how to do basic web scraping, manipulating json data, machine learning models via Tensorflow and Keras, and how to use Jupyter Notebook and matplotlib.”
● “I learned about the different tools that are utilized in the world of Data Science.”
● “I've learned to network with other professionals in their respective fields, used the research center at the library, and learned a new skill in coding.”

The students’ suggestions for improvement next year are right on target. Selected answers are below:
● “flexible meeting times”
● “What would help make this a stronger experience for all students is to encourage them to finish their projects and present their work. There is a lot more to learn by committing to their projects.”
● “I really enjoy being in this program and I feel like SRE is a really good experience for me so I don't know how to make it even better!”
● “More group discussion and collaboration would be more enjoyable. Most students work alone.”
● “Having more peer mentors and helpers would be nice.”
● “Having the program helpers reach out and see how we're doing on our projects.”

7. Conclusion

The conclusions from observing student behavior during the oral presentation and anonymous feedback show the impact of the ASSURE-US project’s summer research activities. Student demonstrated immediate enhanced academic performance as evidenced by improved morale, self-efficacy, and grades. Through the oral demonstration of software projects on data science or pair trading, students became more aware of the value and importance of social capital (a set of shared values or resources that allows individuals to work together to achieve a common purpose effectively). The long-term implications of this study are an effective research-based teaching/learning education program that can be replicated at other HSI's science and engineering programs across the country. In Summer 2023, we intend to continue with a similar hybrid model to compare the students’ success.

Acknowledgments

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Equity and Culturally Responsive Practices for Building Leaders

**Topic Area:** Diversity, Equity & Inclusion Education

**Presentation Format:** Workshop

**Description:** Ensuring equitable practices are embedded throughout instruction and school operations is essential for schools with culturally and linguistically diverse populations. All school leaders and collegiate programs developing educational leaders must make culturally responsive practices (CRP) a priority. In order to prioritize CRP, school faculty and staff must first be presented with opportunities for self-examination and analysis that informs and promotes individual growth. School leaders will be equipped with strategies to promote and effectively implement CRP.

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As educators we are uniquely positioned to impact society in deep and meaningful ways. We have an opportunity to impact students’ thinking on equity, unity, and humanity. The disproportionalities in the performance and treatment of culturally and linguistically diverse students is an ever present reality for many students still. What are we willing to do for our students to change this reality?

Ensuring equitable practices are embedded throughout instruction and school operations is essential for schools with culturally and linguistically diverse populations, student populations experiencing poverty, and challenges with students connecting to and excelling academically. All school leaders and collegiate programs developing educational leaders must make culturally responsive practices (CRP) a priority. In order to prioritize CRP, school faculty and staff members must first be presented with opportunities for self-examination and analysis that informs and promotes individual growth. When staff members are able to identify their own ideas and understanding of race, implicit biases, and equity, opportunities for growth are inevitable. Educators experience growth which translates to more effective learning experiences for students.

Equitable practices are practices that provide students what they need to access the curriculum content and other school resources or experiences that promote a sense of belonging, growth, achievement, and increased opportunities to reach their potential. It is essential that educators understand that culturally and linguistically diverse students access curriculum content in unique ways, and they are remarkably impacted by the cadre of educators who facilitate their learning experiences and create their learning environment. It is essential that educators are aware of these differences to inform the selection of teaching methods that are most effective.

At the conclusion of my first year as principal of Bayside Sixth Grade Campus, student performance on both the math and reading Standards of Learning State assessments increased by 7 percentage points each causing the school to go from not being state accredited to being accredited by state standards. By the end of my third year, the reading pass rate was 81% and the math pass rate was 94%.
We made these gains by starting with an examination of data through an ‘equity lens.’ During inservice week of my first year, we facilitated a session entitled “Championing Equity in Our School” through a quantitative and qualitative data analysis of students’ social emotional connection to the school and academic performance by subgroups. Data informs leaders and staff on where the school is on the continuum of growth and achievement, where the deficiencies/areas of focus exist, and where students and teachers are thriving. Frequent data analysis by building leaders, specialists/coaches, teachers, and students is essential to developing a culture of balanced assessment and understanding subgroup growth and academic needs.

Teachers and staff were provided professional learning on equity and equitable practices. We discussed our “equity story” and defined how we wanted the story to evolve. In a school where 70% of our students were economically disadvantaged, leveling the educational playing field through an equity focus, teaching methods and relationship building was an effective approach.

Currently, I serve as the principal of Bayside Middle School. Our school has experienced times of not reaching state accreditation and marginally made accreditation the year prior to my arrival in December 2020. This past school year, 2021-2022, we were able to achieve state accreditation by increasing the school combined reading (reading and writing) pass rate from 70.67% to 75.38%.

In the 2022 - 2023 School Year, we will work to employ more professional learning on equity and culturally responsive practices to include a book study on Culturally Responsive Teaching and the Brain, by Zaretta Hammond, professional learning on cognitive rigor and routines, cultural archetypes, utilizing Responsive Classroom strategies to address social emotional learning competencies, and small group instruction. We anticipate continued growth in student achievement based on above noted practices.
**title of the submission**: Bouncing back in uncertain times: University experience and mental health of students after 24 months of a covid-ruled life.

**Topic area of the submission**: Distance education / Higher education / Educational Measurement and evaluation

**Presentation format**: Paper session

**Description of the presentation:**

The purpose of this study is to explore the academic experience of students faced with the uncertainty brought by the Covid-related situation, and find out its relationship with their well-being, engagement and academic perseverance.

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Abstract

Bouncing back in uncertain times:
Academic experience and mental health of university students
after 18 months of a covid-ruled life.

Most people’s life, in every part of the world, has been impacted by Covid-19 in the last two years and students are among those who have been confronted to the most direct impacts (Unesco, 2021). They had to deal with major changes in their academic experience, going from a full presential situation to a full online one. These changes meant much more than a sole change in the teaching modality; it meant that students had to mobilize, re-organize their life and study habits in order to face the challenges of forced distance learning. Although these changes happened smoothly for some students, such was not the case for all of them. Some studies showed that academic, financial, social and psychological covid related stressors were linked to either a significant decrease in well-being or the development of symptoms of depression (Demarest & al., 2020; Halperin & al., 2021; Koob & al. 2021; Marler & al.; 2021; Van de Velde & al., 2021). The Chegg report (Chegg.org, 2021), based on 16 000 students from 21 different countries, shows that 56 % percent of them mentioned that their mental health suffered during the pandemic. This percentage reaches 73% and 76%, respectively, in Canada and in the USA. A few studies demonstrate that academic stressors explains a substantial portion of variance of well-being or depression of students (Marler & al, 2021; van de Velde et al. 2021). Such a strain on mental health is likely to impact on students' academic engagement and perseverance.

Although it is too early to assume that we are now free of the virus, especially in places where vaccination reaches a large percentage of the population, many preventive measures have been relaxed and the academic experience of university students is expected to be almost “back to normal”. The pandemic context, lockdown measures and distance learning have been associated with a decrease in students' motivation and engagement (Alemany-Arrebola & al., 2020; Heo & al., 2022; Martin & al., 2023; Webster & al., 2021; Yu, 2022). Sense of control and competence have been associated with persistence (Chi & al., 2021; Pelikan & al., 2021). Will the end of lockdown mean less pressure on students ? Will it allow for better levels of well-being and academic engagement ? Will these variables translate in a high level of persistence ?
**Purpose of the study:** The academic context associated with the pandemic may have a strong impact on students. It is important to know what stressors do influence students' motivation and well-being if we want our institutions to be able to react accordingly and support students effectively. So, the purpose of this study is to: 1- Establish which academic stressors do impact students' well-being, engagement and perseverance; 2- Analyze the role of motivation in these relationships, and 3- Analyze the role of well-being on students' perseverance.

**Methods:** **Sample:** This study was conducted with university students from a university located in Quebec, Canada and another one located in Lisbon, Portugal. Both undergraduates and grad students were included in the samples. The sample from Quebec (n= 82) was composed of students from various faculties (78 % female). The sample from Portugal (n=77) was composed of management students (69 % female). **Instruments:** 1-**Academic stressors** were measured by a questionnaire adapted from the *Freshman Stress Questionnaire* (Boujut et Bruchon-Schweitzer, 2009). It is composed of 28 items, 4 dimensions (academic adaptation, course dysfunctions, loneliness, relational difficulties). 2- **Support from professors.** Adapted from the *Distance Education Learning Environments Survey* (Walker & Fraser, 2005). The scale is composed of 8 items. 3- **Student motivation** was measured by 3 subscales (Extrinsic and intrinsic motivation; self-efficacy) of the *Motivated Strategies for Learning Questionnaire* (MSLQ), de Pintrich, Smith, Garcia et McKeachie (1991). The three subscales represent 16 items. 4- **Well-being** was measured by the Warwick-Edinburg questionnaire on mental well-being. Many studies have shown its good psychometric qualities (Taggard, Stewart-Brown & Parkinson, 2016; Tennant & al. 2007; Trousselart & al., 2016). It is composed of 14 items. 4- **Engagement towards studies** was measured by the *Utrech Work Engagement Scale*, of Schaufeli et Bakker (2004) previously adapted for students (Schaufeli, Martinez, Pinto, Salanova, & Bakker, 2002). The scale counts 9 items and is composed of three dimensions (vigor, dedication and absorption). 6-**Perseverance** was measured with a short scale (6 items) developed by the authors. It reflects respondents’ intention to pursue the course of their programme.

**Results:** We used the Smart PLS software to assess the structured equation model. Reliability and validity indices are all satisfactory. Results confirm 7 of the 11 hypotheses. They show that Academic stressors (academic adaptation) are directly linked to motivation (self-efficacy) and indirectly to well-being, engagement and perseverance. Well-being is correlated to engagement but not to perseverance. The percentage of explained variance of the different outcome variables is satisfactory.

**Discussion:** The discussion opens with a reflection on the descriptive statistics in general, and on the observed level of well-being, in particular. It then moves on to a
reflection on the impact of academic stressors on the students, particularly those who report a low self-efficacy. The impact of well-being on academic engagement is also analyzed. The results are considered throughout the lens of the social cognitive theory (Bandura, 1996). Recommendations are provided for universities to adopt in prevision of new eventual major disturbances.

Main references


Title of the submission: Teaching Appropriate Sleep, Rest, and Recovery Techniques Toward Optimum Physical Conditioning and Performance

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The paper follows on next pages
A primary principle underlying the increase of strength and conditioning in human beings is that of the catabolism (break-down) of muscle tissue caused by exercise, and the subsequent anabolism (build-up) of muscle as the fibers are remodeled at an enhanced level (Leonard, 2020; McGlory et al., 2017; Tipton et al., 2018). Exercise causes muscles to be stressed past the point at which they are normally used, resulting in muscle damage and subsequent catabolism. As the muscles that have been stressed recover from exercise, the remodeled muscle fibers emerge with increased strength and endurance, and in the case of major skeletal muscles, size (hypertrophy).

However, another principle that applies to the enhancement of muscle size, strength, and endurance is that sufficient recovery time is a necessary element in the catabolism-anabolism process (Hoffman et al., 2018). If exercisers do not allow sufficient time for the remodeling of the muscle tissue to the enhanced state, the enhancement effects of the exercise cannot be realized. Therefore, it is important for strength and conditioning personnel to work with students and clients toward the end of sufficient rest and recovery time. This brief article addresses the role of the strength and conditioning instructor in guiding students and/or clients toward understanding and implementation of a suitable sleep, rest, and recovery program so that the goals of exercise may be more effectively realized.
With regard to sleep and sleep patterns between workouts, high-quality sleep accomplishes three functions: (1) to minimize overall fatigue; (2) to ensure sufficient energy to perform workouts, and (3) to allow muscle recovery and repair between workouts (Mateo, 2022). Without adequate and meaningful sleep, an exercise program cannot provide the full benefits for which it is designed (Knowles et al., 2018). Unfortunately, for many persons, because of entrenched patterns or the exigencies of life or work the establishment of consistent and healthful sleep patterns is often difficult. Strength and conditioning personnel, therefore, should work with students and/or clients (hereafter simply “exercisers”) toward the establishment of sleep patterns that will serve to maximize the efficacy of their exercise sessions.

Teaching proper sleep patterns is often a difficult undertaking for fitness personnel. This endeavor is especially challenging if “teaching” is understood to include both the provision of information as well as instituting the healthful sleep patterns on the part of the exercising student or client. The establishment of appropriate patterns is thus a mutual undertaking by the exerciser and the fitness professional. To this end, the following actions have been shown to be beneficial toward forming advantageous sleep patterns for the resistance exerciser (after Centers for Disease Control and Prevention, 2022):

- establish a pattern of consistency: go to bed at the same time each night and get up at the same time each morning, including weekends
- ensure a quiet, dark, and relaxing sleeping site, with a comfortable temperature
- turn off all electronics: televisions, radios, telephones, etc. (although some persons may benefit from relaxing music at times)
- avoid large meals as well as caffeinated and alcoholic beverages before bedtime
• for mutual reinforcement, support beneficial sleep patterns with sufficient exercise

The fitness professional can provide an instructional role for exercisers who are attempting to optimize their physical conditioning through practices such as the following;

• Have exercisers keep a record of sleep patterns over a specified period of time (e.g., 2 weeks); the fitness professional can review and analyze the patterns and help the client develop a sleep schedule conducive to realizing maximum benefit from workouts

• Encourage exercisers to follow the practices enumerated above so that sleep patterns become consistent; together, analyze the practices and determine how they can be improved

• With the exerciser, reflect on whether the practices are improving satisfaction with and benefit from workouts

Closely associated with the importance of adequate and supportive sleep patterns is the application of sufficient recovery between exercise sessions. As noted, muscle strength, hypertrophy, and endurance are accomplished with muscle catabolism through exercise and the subsequent remodeling of the fibers with greater girth, strength, and endurance. If sufficient recovery time has not elapsed and remodeling has not occurred, the goals of exercise, particularly resistance exercise, cannot be realized. Recovery from bouts of exercise, therefore, is a primary consideration in any strength training program.

Fortunately for the fitness professional, the instructional practices involved in proper recovery between exercise sessions is a somewhat easier undertaking than the establishment of optimal sleep patterns. This less problematic circumstance is because the fitness professional is largely present with the exerciser during a session, or is closely monitoring the
exerciser to determine when exercise is being accomplished, in contrast to sleep patterns, when the fitness professional is (usually) not in attendance.

In terms of recovery intervals between exercise sessions, each person is different. Standard recommendations between exercise sessions for most exercisers is 24 to 48 hours (Novak, 2017), depending on the physiological state of the exerciser. The available research supports this standard 24-48 hour interval between exercise sessions, although some research indicates that, for some exercisers, an interval of up to 96 hours of recovery time may be necessary before exercise should again be undertaken (Bishop et al., 2008).

For the purposes of statement of review and recommendation, therefore, the following practices will contribute to optimum physical conditioning, in terms of teaching proper recovery patterns:

- Exercisers should listen to their bodies—if sufficient recovery has not occurred, a new workout should be delayed; this decision on patterning a timeframe for workouts should be determined mutually between the exerciser and the fitness professional; everyone’s body is different and responds to exercise differently

- However, exercisers should not “go overboard” with recovery; it is still necessary to carry out one’s training program so that the beneficial effects of the exercise program are not offset by overlong recovery intervals

- As noted in the literature, 24 to 48 hours is sufficient recovery time for most exercisers; experienced exercisers may gain maximum benefit from a shorter recovery time, while developing exercisers may gain maximum benefit from the 48 hour interval between sessions
Whatever may be the age, physical condition, gender, or other consideration for exercisers, sleep, rest, and recovery are integral parts of any exercise program. Strength and conditioning professionals, in honest consultation with exercisers, are in the best position to offer instruction with regard to recovery time. Without proper sleep, rest, and recovery, the maximum benefits of any exercise program cannot be realized.

References


https://www.self.com/story/rest-strength-workouts

Title of the submission: Give Children their Wildhoods Back

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Abstract

North America has a bounty of natural resources and outdoor learning environments, but nature and being in the outdoors can be defined and understood differently by many people. The same can be said about the terms 'outdoor education', 'risk', and 'risky play'. Risk is a word often thought of as a negative term, instead of a term that in the context of play and learning, can simply mean a challenge or something that is exciting or thrilling. Teachers, administrators, and many parents have taken it upon themselves to create rules that stifle or eliminate outdoor play and hinder memorable learning and positive experiences in the outdoors. This is done in an attempt to protect children, but the question that needs to be asked is, "are we doing more harm than good in the long term by keeping kids inside our school building?"

This session is intended to provide real stats and facts and allow all attendees to consider and contemplate their own levels of risk. The intent of this presentation is to provide an opportunity for all attendees to question and consider how we as teachers and parents, utilize the outdoors and whether we give our students and children enough opportunities to learn and express themselves in the "outdoor classroom". Using literature from Richard Louv and other outdoor education theorists as well as educational philosophers, this session will cause teachers to pause and ponder their teaching practices and consider how their personal pedagogy may be enhanced by utilizing the outdoors more and create learning opportunities for students that are rich and potentially more engaging and relevant than the current practices that they employ.

Giving children their wildhoods back is meant to allow children of all ages to be outdoors, disconnect from technology and simply enjoy and embrace the beauty of mother nature. As teachers, we can teach all curricula outdoors and make valuable connections between curricula if we really want to. Taking our indoor lessons outdoors, even a little bit, may provide students with extra motivation and willingness to engage in their learning more profoundly and meaningfully.
Title of the submission: Cell Phone Use and Habits of grade 5 Students

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Abstract

A “digital native” is someone who has grown up in the “cyber age”, surrounded by a culture that significantly uses and depends on technology. It has been well documented that the most vital years of brain development occur between 0 and 6 years of age. The next time of rapid brain development occurs between the ages of 11 and 13 years, during which the brain is “fundamentally wired for the rest of a person’s life” (Herman, 2012).

A growing proportion of children and adolescents' leisure time is consumed by looking at screens and being connected to the Internet. Of particular concern is the amount of time pre-adolescents (students aged 9-12) spend on cell phones. This usage raises questions about possible adverse health effects such as increased inactivity levels, changing social interactions, increased feelings of anxiety and other negative physical and mental concerns.

It can be hypothesized that as the world becomes even more digitized, with more uses and access than ever before, the trajectory of the studies presented would only be higher today. This holds true when taking into account the COVID-19 pandemic and its impact on shifting the world online. While our interest for this study is in the effects on pre-adolescents, this age group has rarely been studied when it comes to cell phone use and habits, therefore the information presented in this study has a focus on students in grade five who are typically 10-11 years old. It is likely, however, that these findings would hold true for children of younger ages as well.

Grade 5 students from a major Canadian city took part in this study by completing an online survey comprised of questions pertaining to their personal cell phone use and habits. The findings could be considered shocking as well over 50% of the 264 students who took part in this research study admitted to already owning a cell phone by grade five. Other key findings included over 27% of the students admitting to having a data plan with their phones, 13% of the students admitted to having owned a cell phone for at least three years, and the top uses for cell phones in order from most to least were playing games, texting/messaging, taking pictures/videos, watching videos/show, and lastly, actually making phone calls.

Although much of what was found in our research held true for both males and females, such as both males and females being almost equally connected to cell phones, there do exist some gender differences around use and usage which tend to increase between genders as their age increases.
How do we as parents and educators bridge the gap between the reality that our youth are coming into possession of cell phones and other technological devices and all the good and bad that comes with them? How do we minimize the negatives that come with them, while also maximizing the good? Whether it be ways to bring them into the classroom in productive, fun and educational ways - to teaching our kids about the realities that come with living in a digital world and how to navigate it, we need to educate ourselves first so we can educate our youth in a rapidly evolving world of cell phones and technology.
An exploratory look at how the effects of moving to a fully online space due to COVID changed the technology being used in higher education classes. Examining how two different courses offered in a digital media program at a regional university are continuing to use live streaming, recorded session and social media classroom protocols to enhance on ground or traditional classroom experience for post COVID students. We explore how the fourth wave of the feminist movement has led the way for a theoretical framework for a more equitable environment through the web of inclusion. By applying those lessons learned while teaching in a fully online environment. This proposal for future research explores the ground work for a possible study looking at how social media, live streaming and other technologies open a pathway to the web of communication as defined in feminist theory.

Many faculty were slow to migrate classes to an online space prior to COVID and are quickly returning to a traditional teaching method. However many faculty are keeping bits and pieces of the online classroom experience that have forever crept into the traditional classroom. In this proposal we discuss changes that COVID brought to the teaching experience and how we at East Tennessee State University are working to integrate what worked during our fully online time back into our traditional course load using the ideas described in feminist theories web of inclusion as our framework to create a more inclusive space for learners. The inclusion of live streamed classes, an online library of lectures and a social media space that allows for non-top down communication creates new pathways for communication in a peer to peer style that has not been possible before. Using this non top down approach to look forward we
examine the protocols we are using in our classes now and discuss possible future iterations of how to improve student engagement.

Jacy Richardson and Todd Emma
Identify Personality Types Quickly

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Identify Personality Types Quickly

Abstract

Personality inventories usage has been limited because of their cost and the length. To overcome these limitations, this study created the Personality Identity Estimator (PIE), an easy-to-use inventory to estimate personality type. PIE is a categorical inventory containing 12 items with 3 items for each of the 4 personality-type dimensions in Jungian theory. A sample of 1,104 was used to create PIE. Validity was established through multivariate analyses using data from the Myers-Briggs Type Indicator. Reliability was established by test-retest. PIE can be completed quickly, is easy to score and interpret, and can be used for self-assessment of personality types.

Introduction

According to the APA Dictionary of Psychology, personality type is “any of the specific categories into which human beings may be classified on the basis of personality traits, attitudes, behavior patterns, physique, or other outstanding characteristics” (para. 1). Carl G. Jung (1921/1971) provided the theoretical basis for the concept of personality types. Isabel Briggs Myers and her mother, Katherine Briggs, developed the Myers-Briggs Type Indicator (MBTI) "to make the theory of psychological types described by C. G. Jung (1921/1971) understandable and useful in people's lives" (Myers & McCaulley, 1985, p. 1). The MBTI is one of the most widely used instruments in the world for identifying personality differences (Randall, Isaacson, & Ciro, 2017, p. 2). Despite its widespread utilization, its cost and the length of time required to complete it have limited its use among many teachers, counselors, and other educational professionals. Cheaper alternatives suffer from a lack of known reliability and validity, indicating the need for more empirical studies (Shen, Prior, White, & Karamanoglu, 2007, p. 63). To overcome these challenges, the purpose of this study was to develop an inventory to estimate personality type, which (a) could be easy to administer, (b) could be completed rapidly, and (c) could be used immediately by teachers, other educational professionals, and individual learners. The new
inventory was named the Personality Identity Estimator (PIE).

This paper describes the development and validation of the Personality Identity Estimator. Following the introduction of the concept of personality types as developed by Jung (1921/1971) and the description of the Myers-Briggs Type Indicator which identifies personality types, the methodology section describes the procedures used to establish construct validity, content validity, criterion-related validity, and reliability for PIE. Establishing content validity involved several multivariate analyses using discriminant analysis and factor analysis. Correlation analyses were used to confirm the strength of each item in the PIE inventory, and chi-square analyses were used to confirm criterion-related validity and test-retest reliability. The study's primary conclusion is that PIE is a valid and reliable inventory for estimating personality type.

**Personality Types**

Personality types were conceptualized by Carl G. Jung (1921/1971). Jung proposed two types of personalities, which he termed extraverts and introverts. He referred to these as the attitudes. The extraversion attitude directs a person toward the external world. In contrast, the introversion attitude orients a person toward the inner, subjective world. Most people are a blend of both of these attitudes. These attitudes are bipolar opposites, with one attitude predisposed to develop more remarkable than the other in each person.

Human behavior can be understood as an interactive set of psychological attitudes and psychological functions (Jung, 1921/1971). The psychological attitudes are Extraversion, oriented toward the outer world of people and action, and Introversion, oriented toward the inner world of thought and reflection. The psychological functions are perception (information gathering utilizing Sensing or Intuiting) and judgment (decision making by Thinking or Feeling).

According to the theory of psychological types (Jung, 1921/1971), people can be
characterized by their preference of general attitude (Extraversion-Introversion), their preference for one of the two functions of perception (Sensing-Intuition), and their preference for one of the two functions of judging (Thinking-Feeling). Extraversion-Introversion indicates the source and direction of a person's energy expression. An extravert's source and direction of energy expression are mainly in the external world, while an introvert's energy source is primarily in their inner world. Thus, extraverts prefer to direct their energy to the outer world of action, people, and objects. At the same time, introverts tend to focus their energy on the inner world of ideas, concepts, and mental images.

The functions of Sensing and Intuition represent how individuals perceive information. Sensing means that a person mainly believes factual, concrete, and tangible information received directly from the external world by the sense organs. Intuition involves information obtained from the internal or imaginative world. The world is seen indirectly as a series of patterns, abstractions, trends, and future possibilities.

The functions of Thinking and Feeling represent how individuals process information for making decisions and judgments. Thinking consists of making a decision mainly through logic. Therefore, it involves forming logical, analytical, sequential, quantitative, and objective assessments. On the other hand, Feeling consists of making decisions based more on a subjectively-held sense of values, on a view toward the probable human consequences of the outcome, and on emotions based on feeling what one should do. Consequently, the base for decisions for the Feeling preference is mainly feelings and emotions.

Eight (2 x 2 x 2) psychological types result from coupling the dichotomous pairs of attitudes and two dichotomous pairs of functions. Personality type is theorized as an individual's preference for particular attitudes and functions over others.
Identify Personality Type—Quickly

Myers-Briggs Type Indicator

Personality style or type is a widely accepted concept among educators. This concept of personality type is based upon Jung's writing on personality. It has been popularized by the availability of the Myers-Briggs Type Indicator (MBTI). The theory underpinning the MBTI is that much behavior that seems random is actually very orderly and consistent due to the fundamental differences in the way people prefer to use their perception and judgment (Myers, & McCaulley, 1985, p. 1).

The MBTI contains four separate indices concerning what people attend to in a given situation and how they draw conclusions about what they perceive (Myers, & McCaulley, 1985, p. 2). The MBTI built on the psychological type model of Jung. It extended Jung's model by adding the Judging-Perception dichotomy that made explicit one aspect of the theory implicit in Jung's work (p. 13). The Judging-Perception dichotomy reflects how a person implements the information that has been processed. Judging refers to organizing all of one's life events and generally sticking to plans that have been made. Perceiving refers to an inclination to improvise and explore alternative options. With the addition of the Judging and Perceiving preference, the number of individual types increased from 8 to 16. The MBTI identified a person's preferences among four pairs of personality variables.

There are several forms of the MBTI ranging from 94 items to 166 items. Each test form consists of forced-choice items representing behavioral preferences and preferred self-descriptive adjectives related to the psychological type theory. Raw scores are tabulated to indicate preferences for each of the indicator's four scales. These results produce both continuous and categorical scores to indicate preferences for the 4 scales of the 16 potential personality types.

Although the MBTI has been popular for usage by practitioners and researchers, its
measurement characteristics have been questioned (Capraro & Capraro, 2002, p. 595). Most criticisms of the MBTI have raised questions regarding its validity and reliability (Randall et al., 2017, p. 5). Yet, several studies have concluded that the MBTI has reasonable construct validity, is reliable over time, and distinguishes the individual personality types in the four dichotomous dimensions (Capraro & Capraro, 2002; Harvey, Murry, & Stamoulis, 1995; Randall et al., 2017).

Despite the evidence of validity and reliability for the MBTI, factor analysis research has indicated that not all MBTI items are necessary (Saggino, Cooper, & Kline, 2001). In addition, an attempt to develop a vignettes-version of the instrument was unsuccessful (Blodgett, 2017). These studies suggest a need for a new, shorter, and easier-to-use inventory. Creating a short scale is not a simple task; it may require using different and innovative approaches and item selection strategies (Ziegler, Kemper, & Kruyen, 2014, p. 187). Multivariate statistical procedures provide a means of instrument construction alternative to traditional scale construction and meet the practitioners' criteria of being easy-to-use (Conti, 2002).

**Methodology**

This study created the Personality Identity Estimator (PIE), an easy-to-use inventory to estimate personality type that can be used at no cost by both professionals and nonprofessionals. PIE has 12 items, can be completed quickly, and is easy to score and interpret. PIE can be utilized for self-assessment to promote self-reflection and to identify individual differences. However, before teachers use a new instrument such as PIE, they must trust that it is valid and reliable. Therefore, while this section is somewhat technical, it is designed to provide teachers with the vital psychometric data needed to give them confidence in PIE. To do this, this section describes (a) the approach used for developing PIE; (b) the participants in the study; (c) the procedures used for creating the 12 items in PIE; and (d) the procedures used for establishing construct validity,
content validity, criterion-related validity, and reliability for PIE.

**Typological Approach**

The inventory created for this study, the Personality Identity Estimator (PIE), utilizes a typological approach to identifying personality types. The research and measurement of personality have focused on two approaches: Typological vs. Dimensional. The dimensional approach is variable-centered because it focuses on understanding similarities and differences among variables. However, in the typological approach, the focus is on people rather than variables (Robbins, John, & Caspi, 1997, p.140). The typological approach is person-centered because it focuses on understanding similarities and differences among people (p. 140). It concentrates on the unique pattern of attributes within each person. More importantly, because the typological approach is helpful for practitioners such as clinical psychologists, counselors, and teachers and for personal use in self-analysis and reflection, the Personality Identity Estimator was established using the typological approach.

**Participants**

The validity and reliability of the Personality Identity Estimator (PIE) were established through numerous steps, and 1,104 participants provided information for this study. All respondents were volunteers. In compliance with APA ethical standards, they were informed of their rights as participants at each study stage. Participants' responses were used for developing and validating the Personality Identity Estimator (PIE) at each of the steps of (1) creating items for content validity, (2) establishing concurrent criterion-related validity by comparing PIE with the Myers-Briggs Type Indicator and by self-reporting on the accuracy of PIE, and (3) establishing reliability.

The sample size was determined by referring to the "Table for Determining Sample Size
Identify Personality Type—Quickly

from a Given Population" (Krejcie & Morgan, 1970, p. 608; reprinted in Gay & Airasian, 2000, p. 135 and Gay, Mills, & Airasian, 2006, p. 111). This table illustrates "that as the population increases the sample size increases at a diminishing rate and remains constant at slightly more than 380 cases" (Krejcie & Morgan, 1970, p. 310). Consequently, "beyond a certain point (about N = 5,000), the population size is almost irrelevant and a sample size of 400 will be adequate" (Gay & Airasian, 2000, p. 135; Gay, Mills, & Airasian, 2006, p. 110). The sample of 1,104 exceeds this minimum number. While the sample size varied for each step of the development and validation process, it is significant that the sample size of 553 for the item construction and content validity step exceeded the minimum of approximately 400. No data were excluded from the analyses.

**Item construction and content validity.** The items for PIE were constructed from the results of the analyses of responses to the Myers-Briggs Type Indicator (MBTI); all statistical analyses for this study were conducted with SPSS® 9.0 for Windows. Data were collected from 553 volunteers in Alberta, Montana, Nebraska, New Mexico, Oklahoma, and Texas. This data set was initially combined with other data to measure the relationship between learning strategies and personality types (Conti & McNeil, 2011).

Respondents provided information concerning their age, gender, ethnicity, and educational level and then completed the 94-item version of the MBTI (Form G Self-Scorable). The sample consisted of 321 females (58.2%) and 231 males (41.8%) with 1 no response. The group's average age was 30.8, ranging from 18 to 90. The ethnic make-up of the group was as follows: White (83.3%), Native American (6%), African American (4.9%), Hispanic (4.2%), and Other (1%). The educational level of the respondents varied as follows: Less than a high school diploma (0.7%), high school diploma (37%), vocational or educational certificate (11.5%), associate's degree (24%), bachelor's degree (12.9%), and graduate degree (13.8%).
Concurrent criterion-related validity—Comparison to MBTI. Both the Personality Identity Estimator and the Myers-Briggs Type Indicator were completed by 174 respondents. The group, 64% female and 36% male, had an average age of 20.9 years. Its racial composition was as follows: African American (42.4%), White (34.7%), Hispanic (12.9%), Asian (2.9%), Native American (2.4%), and Other (4.7%). The educational level of the respondents varied as follows: High school level (87%), bachelor's degree (3%), and graduate degree (10%).

Concurrent criterion-related validity—Self-report. Data were collected from 288 volunteers anonymously via an internet website. Respondents provided information concerning their age, gender, ethnicity, and educational level. The sample consisted of 219 females (76.8%), 62 males (21.8%), 3 others (1.1%), and 1 who preferred not to answer (0.4%). The average age of the group was 44.3 ranging from 15 to 78. The ethnic make-up of the group was as follows: White (65.1%), African American (12.6%), Native American (10.6%), Hispanic (9.2%), Asian (1.1%), and Other (1.4%). The educational level of the respondents varied as follows: High school level (36.6%), associate's/trade school degree (3.5%), bachelor's degree (26.4%), graduate degree (31.3%), and prefer not to say (2.2%). The sample contained all 16 personality types.

Reliability. PIE was administered to a group of 89 at a 1-week interval. The group was 59.8% female and 40.2% male, with an average age of 16.1 years. Its racial make-up was as follows: African American (51.7%), White (25.8%), Hispanic (11.3%), Asian (2.2%), Native American (1.1%), and Other (7.9%). All respondents were at the high school educational level.

Construct Validity

Construct validity assesses the underlying theory of the test. It is the extent to which the test measures the hypothetical constructs that explain some aspect of human behavior. For PIE, these are the theoretical constructs of personality type conceptualized by Jung and extended by
Identify Personality Type—Quickly

Myers and Briggs. Evidence for construct validity can be both logical and empirical analyses.

Establishing construct validity for the Personality Identity Estimator used logical evidence. The constructs used for constructing the Personality Identity Estimator were derived from the Myers-Briggs Type Indicator. Consequently, the construct validity of these items had already been established (Myers & McCaulley, 1985), and their validity did not have to be re-established. Therefore, construct validity was inferred to the PIE. Thus, the Personality Identity Estimator has construct validity due to using the Myers-Briggs Type Indicator to identify concepts for its items and for its development in establishing content validity.

Content Validity

For the Personality Identity Estimator, content validity is concerned with how the items represent the Jungian personality types depicted in the Myers-Briggs Type Indicator (MBTI). The MBTI is a summated-rating scale in which the Jungian concept of personality types groups people along four dimensions: Extraversion (E) and Introversion (I), Sensing (S) and iNtuition (N), Thinking (T) and Feeling (F), and Judging (J) and Perceiving (P). MBTI scoring is conducted by the individual completing the questionnaire and then being categorized into a personality type along each dimension. This classification is a 4-letter personality type such as ENTP with a letter from each dimension. In assigning a letter to each dimension, the continuous values in each dimension change to a categorical label. The content validity analyses for PIE used both the individual items in the MBTI and the categories created by summing these items into dimensional classifications.

Discriminant Analysis

The concepts for the items for PIE were identified by the multivariate statistical procedure of discriminant analysis with the MBTI representing the universe of ideas for Jungian personality
Identify Personality Type—Quickly

types. Discriminant analysis is a multivariate statistical procedure for simultaneously examining
the differences between groups using several discriminating variables. This procedure produces a
structure matrix that shows the interactions within the analysis; the structure matrix can be used for
naming the process which separates the groups. Consequently, the structure matrices from the
discriminant analyses indicated the concepts for the items for inclusion in PIE.

A series of discriminant analyses were conducted to simultaneously examine all items in
each dimension to determine the differences between the two groups. In these analyses, the
discriminating variables were the individual MBTI items that make up the scales for each
dimension. The participants were grouped according to their MBTI personality type on each
dimension. The discriminant analysis produced a structure matrix. This matrix showed the
correlation between the individual discriminating variables and the overall discriminant function.
The variables with the highest coefficients revealed how closely the variable and the overall
discriminant function were related. Interpreting the structure matrix distinguished the groups from
each other. Consequently, by using the groups for each dimension as the grouping variable and by
using the individual MBTI items for that dimension as the set of discriminating variables, each
analysis produced a structure matrix that described the process that separated the two groups in
each dimension (Conti, 1996, p. 71). The nine items with the highest structure matrix correlations
for each discriminant analysis were used as the constructs to determine the wording of the items in
PIE.

Complete MBTI data were available on 553 participants. For each separate discriminant
analysis, the participants were grouped on one of the personality-type dimensions. There were 94
discriminating variables from the MBTI. Each analysis used the Wilks’ lambda method to select
the inclusion variables in the discriminant function.
The criterion used for judging the usefulness of the discriminant function produced by the analysis was that it had to be at least 75% accurate in correctly classifying the participants. For each of the four discriminant analyses, the 553 participants were grouped by their MBTI category for the dimension. The constructs from the nine most relevant items in the structure matrix of each discriminant analysis were used to describe the process that made up this dimension in PIE. Each analysis was either 94% or 95% accurate in discriminating between the groups in the dimension.

The discriminant analysis also provided additional information about each concept. An examination of the group means for each item in the selection reveals the degree to which each group supported the idea in the item. The mean for each group on the item indicated a range of support from extremely low to extremely high for the concept. Consequently, the PIE items have descriptors. As a result, the items in PIE precisely describe each personality type's general feeling toward the idea in the item. Thus, as well as identifying the constructs for PIE, the discriminant analyses also provided additional information about each concept.

**Replication of Discriminant Analyses**

Replication was used as a criterion for cross-validating the accuracy of the discriminant analysis results in identifying the best concepts for the new inventory. Using a common method employed for cross-validation (Sheskin, 2007, p. 1541), replicated discriminant analyses were conducted by (a) splitting the large sample of 553 into two subsamples, (b) extracting structure matrices from each subsample for each of the four personality-type dimensions, and then (c) comparing the results from each subsample to the other subsample and to the previous results from the total sample.

The total sample of 553 was randomly split into two subsamples using SPSS' command for selecting a random sample of cases with approximately half of the total sample in each subsample.
Identify Personality Type—Quickly

Subsample 1 contained 267; Subsample 2 contained 286. There were no significant differences between the subsamples on demographic variables: Gender ($\chi^2=1.35, df=1, p=.51$), Race ($\chi^2=3.74, df=1, p=.29$), Education ($\chi^2=5.59, df=5, p=.35$), and Age ($t=1.31, df=537, p=.19$).

As was done with the entire sample, discriminant analyses were conducted for each subsample. The calculation for each of the four dimensions determined the differences between the two groups in that dimension. The individual MBTI items for each dimension were the discriminating variables in these analyses. The participants were grouped according to their MBTI personality type in that dimension. The matrices from each subsample analysis were compared to each other and to the matrices from the total sample.

The composition of the structure matrices from each subsample and the total sample was very similar. While there were slight differences between the items from the full sample matrix and the matrices of the two subsamples, the subsample matrices generally replicated the total sample matrix. This replication is especially so for the top three items in each matrix. Thus, the similarity of structure matrices of the randomly selected subsamples to that of the total sample supports the accuracy of the discriminant analyses for the full sample in representing the sampling adequacy of the content for the items for the Personality Identity Estimator.

Factor Analysis

Factor analysis provided an additional check on the content validity of the items in PIE. To check the validity of the Myers-Briggs Type Indicator items in the sample, the 94 items from the instrument were factor analyzed using a principal components analysis with a varimax rotation. The initial principal components factor analysis indicated the presence of four significant factors, just as predicted by the structure of the MBTI. Therefore, another factor analysis was calculated using principal components analysis with a varimax rotation in which the factors were limited to
four. In this analysis, each item loaded on the factors as predicted by the MBTI, thus confirming that the item responses for the sample used for constructing PIE were nearly identical to the generally expected responses to the items.

Additional analyses assessed the similarity between the items identified for PIE by the discriminant analyses and those with high loadings in the factor analyses. First, the nine items with the highest factor loadings in each of the four factors were compared to the nine items selected for each PIE scale from the discriminant analyses. Overall, there was a high agreement between the factor analysis and discriminant analyses concerning the essential items in each dimension.

Additional analyses examined each dimension separately. These separate factor analyses used only the dimensions' items, and the factors were limited to one. The nine highest factor loadings for this one factor were compared to the structure matrix of the discriminant analysis for each dimension. For each dimension, the factor loadings were congruent with the correlations in the structure matrix of the discriminant analyses.

While the results from the discriminant analyses and factor analyses identified similar items for the foundation of PIE, there is one meaningful difference in the results concerning instrument construction. The factor loadings only produce correlations that reflect the degree to which the individual item in the analysis relates to the overall factor. In contrast, the group means for the items in the structure matrix of the discriminant analysis indicate the intensity of support for the item. This analysis reveals the extent to which each group supports the concept in the item. This support allowed the new item to include descriptors to reflect this magnitude of support. Thus, using the results from the discriminant analyses, the new items for PIE have a great deal of precision. This precision increased the content validity of PIE by allowing it to more accurately represent the actual universe of possible items for the constructs measured in it.
**Correlation of Items**

The analyses of the 94 items in the MBTI produced a set of 36 concepts to serve as the conceptual basis for forming PIE items. There were nine items in each of the four dimensions of personality type. Odd-numbered scales of 9, 7, 5, and 3 items for each of the 4 dimensions were constructed and analyzed to determine the most robust concepts for inclusion in the final PIE inventory. Each scale contained the items with the highest correlations in the structure matrix from the discriminant analyses. For each scale, each item was correlated with the total score for the scale. This procedure was used because each item is part of the overall concept. The item must contribute to the total score for it to be valid.

The standard used for judging to retain an item for the final form of PIE was that it should explain at least its own weight in variance to the total score. The correlation coefficients for all items on all four scales were above the minimum required for retention in the scale. All items in the 3-item scale were markedly above the minimum, with nearly two-thirds of the items having a coefficient of .8. Therefore, the format of three items for each of the four dimensions of personality type was judged as the best for the final version of PIE. Thus, the Personality Identity Estimator consists of 12 items with 3 paired items for each of the 4 personality-type dimensions of Extraversion-Introversion, Sensing-iNtuition, Thinking-Feeling, and Judging-Perceiving (see Appendix A). The following are the items in each dimension:
### Extraversion-Introversion Scale

<table>
<thead>
<tr>
<th>Option 1</th>
<th>Option 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a. I am almost always sociable</td>
<td>1b. I am usually restrained</td>
</tr>
<tr>
<td>2a. I am inclined to talk a great deal</td>
<td>2b. I am usually quiet</td>
</tr>
<tr>
<td>3a. I can generally talk freely with others</td>
<td>3b. I tend to talk mostly in intimate situations</td>
</tr>
</tbody>
</table>

### Sensing-iNtuition Scale

<table>
<thead>
<tr>
<th>Option 1</th>
<th>Option 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>4a. I want to be viewed as very down-to-earth</td>
<td>4b. I wish to be considered as very resourceful</td>
</tr>
<tr>
<td>5a. The word &quot;actual&quot; often appeals to me</td>
<td>5b. The word &quot;theoretical&quot; usually appeals to me</td>
</tr>
<tr>
<td>6a. I prefer to be with practical people</td>
<td>6b. I generally get along best with creative people</td>
</tr>
</tbody>
</table>

### Thinking-Feeling Scale

<table>
<thead>
<tr>
<th>Option 1</th>
<th>Option 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>7a. Reasoning moderately appeals to me</td>
<td>7b. Being responsive to others strongly appeals to me</td>
</tr>
<tr>
<td>8a. Analyzing things appeals moderately to me</td>
<td>8b. Being compassionate strongly appeals to me</td>
</tr>
<tr>
<td>9a. Sound judgment is more important than enthusiasm</td>
<td>9b. Enthusiasm is much more important than sound judgment</td>
</tr>
</tbody>
</table>

### Judging-Perceiving Scale

<table>
<thead>
<tr>
<th>Option 1</th>
<th>Option 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>10a. Planning is exceptionally appealing to me</td>
<td>10b. I like to improvise</td>
</tr>
<tr>
<td>11a. I tend to plan the timing and activities for a trip</td>
<td>11b. When going someplace, I prefer to be flexible</td>
</tr>
<tr>
<td>12a. I almost always like to plan things</td>
<td>12b. Following a schedule usually restricts me</td>
</tr>
</tbody>
</table>

### Scoring PIE

**How to score PIE.** The Personality Identity Estimator (PIE) is easy to score. The score or result for PIE consists of four letters. Each letter represents one of the four dimensions for the Jungian concept of personality types. Consequently, the four letters in the identified personality type are E (Extraversion) or I (Introversion), S (Sensing) or N (iNtuition), T (Thinking) or F (Feeling), and J (Judging) or P (Perceiving). This combination of four letters indicates the personality type identified by PIE.

In the Personality Identity Estimator inventory, each dimension has three items. The highest number of options selected for each of the binary choices in the dimension indicates the respondent's primary preference in that dimension. Thus, a score of two or three indicates a
preference in that dimension. A respondent's overall personality label is the dominant preference for each of the four dimensions.

**Characteristics associated with personality types.** Characteristics are frequently associated with each personality type preference (Myers, & McCaulley, 1985, pp. 20-21). The EI and JP indicate an orientation to the inner and outer world, while the SN and TF indices show basic preferences for the use of perception and judgment (p. 19). Personality type is created by how people exercise their preferences and can partly describe individuals (p. 19). Nevertheless, those in each personality type differ in many ways (p. 19); factors such as cultural pressures and a person's stage of development can influence these differences.

Consequently, while the characteristics associated with each personality type provide a general description of a person's preferences, individual differences still exist. While these type descriptions may seem like horoscopes to those without special knowledge of personality type theory, they are firmly based on the theory associated with personality types and are supplemented by years of observations of the types and empirical results from research (Myers & McCaulley, 1985, p. 19). Your PIE results will quickly provide you with the letters of your chosen preferences among the 16 possible combinations of letters. Each of the "four-letter type formulas stand for a complex set of dynamic relationships between the functions (S, N, T, and F), the attitudes (E and I), and the orientation to the outer world (J and P)” (p. 15). You can obtain a description of your personality type by referring to the table of the characteristics associated with each personality type (see Myers, & McCaulley, 1985, pp. 20-21; Shetty, 2014, pp. 47-48).

**Identifying your superior function.** When analyzing the scores in each dimension in PIE, it is important to keep in mind the logic used in a discriminant analysis for judging the accuracy of a discriminant function. Here, the general rule is to ask how much improvement the function is
over chance. There is a 50% chance that a person will be placed in either group simply by random chance when there are two groups. Therefore, the usefulness of the function is determined by how much of an improvement its placement is over this 50% chance. Since there are three items in each dimension in PIE, selecting two of the three preferences indicates a two-thirds or 66.6% preference; this is a 16.6% (66.6% - 50% = 16.6%) improvement over chance placement. Selecting all three options for the dimension indicates a 100% preference which is a 50% (100% - 50% = 50%) improvement over chance placement.

Moreover, this logic alleviates the concern that a mere change of one response can switch a person's personality classification in a dimension. Instead, the potential swing item confirms the correct type. While two of the items may have different responses, the third item ensures which of the two items correctly identifies the person's dominant personality trait. Likewise, suppose two of the three items in a PIE dimension are in opposite directions. In that case, the third item will correctly determine which of these two items is the most fully-developed function or superior function and which is the less-developed function or inferior function. Thus, while there are only a small number of items for each dimension, each option selected indicates a considerable improvement over chance placement and the increased probability of correctly identifying the respondent's dominant personality type. As a result, PIE can be scored quickly, and its results are also accurate.

**Criterion-Related Validity**

Criterion-related validity compares an instrument's scores with an external relevant criterion variable. This comparison is a more complicated procedure with an instrument like PIE developed with a multivariate process because the items used to create the new instrument were scored in a univariate format on the original instrument (Conti, 2009, p. 892).
Two separate procedures assessed the criterion-related validity of PIE to overcome this complexity. First, the Personality Identity Estimator responses were compared to those on the Myers-Briggs Type Indicator to establish concurrent criterion-related validity. Second, the participants self-reported the accuracy of the PIE placement for them after reading a description of characteristics associated with the personality type group in which PIE placed them. This self-report provided a check between the response on PIE and the criterion of the real-world of the respondent.

**Comparison of PIE and MBTI**

One hundred seventy-four respondents completed both the Personality Identity Estimator and the Myers-Briggs Type Indicator. Responses on PIE were scored and compared to the dimension preferences on the MBTI. The chi-square test of independence assessed the association between the answers on the Personality Identity Estimator and the Myers-Briggs Type Indicator. Chi-square assesses the statistical independence or association between two or more categorical variables by comparing how the pattern of observed frequencies differs from the pattern of expected frequencies. The personality-type labeling results are categorical both for PIE and for MBTI; therefore, chi-square allowed testing for the relationship between PIE and the external criterion of the MBTI.

A separate chi-square for each of the four dimensions examined the relationship between the responses on PIE and the MBTI. Based upon a significance level of $\alpha=0.05$, significant differences were found for each of the four dimensions: E-I ($\chi^2=86.7, \ df=1, p=.001$), S-N ($\chi^2=40.4, \ df=1, p=.001$), T-F ($\chi^2=29.2, \ df=1, p=.001$), and J-P ($\chi^2=63.1, \ df=1, p=.001$). These values strongly support (a) rejecting the null hypothesis that the responses on PIE and the MBTI are independent (not related) and (b) accepting the alternative hypothesis that there is a relationship between the
responses on each instrument. This confirmation that PIE and the MBTI are associated with (i.e., dependent upon) each other indicates the criterion-validity of PIE. In addition, the residuals from the analyses further verified the strength of the association between PIE and the MBTI: E-I (9.3), S-N (6.4), T-F (5.4), and J-P (7.9). Standardized residuals as high as three or four indicate that extreme associations exist. The exceedingly high standardized residuals indicate that the association between PIE and its criterion-related MBTI is robust. Consequently, the significant chi-square values supported by extremely high standardized residuals demonstrate the concurrent criterion-related validity of PIE.

**Self-Report**

The second criterion-related validity check involved comparing the results from PIE with the criterion of the perception of the real-world of the respondent (cf. Conti, 2009, p. 892). One of the chief purposes of instruments such as PIE is to stimulate the user's process of thinking about how they perceive the learning situation and about their awareness of the process of learning (Shetty, 2014, p. 8). Therefore, to foster this process and to check on the validity of PIE, the participants were asked to provide feedback on how accurately they felt that the general characteristics of the personality-type group identified for them by PIE were in describing them.

After completing PIE and reading the description of the characteristics associated with the personality type based on their PIE responses, the participants reported how accurately they felt this description described them. The participants overwhelmingly felt that the personality characteristics identified for them by the Personality Identity Estimator accurately described them; 95.5% thought that the description was accurate, while only 4.5% felt it was not. Research has found that self-reported data are accurate when respondents feel safe. One of the advantages of using such self-assessments is that it encourages learning by encouraging students to think about
their own learning. PIE will often be used in this way to stimulate self-reflection. Consequently, this high degree of acceptance of the accuracy of PIE in describing a person suggests that PIE can be helpful in counseling, instructional, and self-analysis situations.

Thus, because of the multivariate procedure used for creating PIE, criterion-related validity was assessed in two different ways. The strong association between personality-type group placement by PIE and the MBTI and the powerful testimony by respondents of the accuracy of the personality-type characteristics identified by PIE demonstrated the concurrent criterion-related validity of PIE.

**Reliability**

The reliability of PIE was established by the test-retest method that addresses the degree to which scores on the same test are consistent over time. Reliability information is often reported as a correlation coefficient. Past MBTI reliability studies have used the instrument's continuous scores to calculate reliability coefficients. However, correlation coefficients could not be used for PIE because its scores are categorical for each of the four dimensions. Therefore, chi-square was used to establish the reliability for the Personality Identity Estimator.

The chi-square test of independence was used to assess the association among the first responses on the Personality Identity Estimator and the retest responses. Separate chi-squares were calculated for each of the four dimensions to compare the responses for each testing: Extraversion-Introversion (E-I), Sensing-iNtuition (S-N), Thinking-Feeling (T-F), and Judging-Perceiving (J-P). Based upon a significance level of $\alpha=0.05$, significant differences were found for each of the four dimensions: E-I ($\chi^2=28.7$, $df=1$, $p=.001$), S-N ($\chi^2=16$, $df=1$, $p=.001$), T-F ($\chi^2=23.4$, $df=1$, $p=.001$), and J-P ($\chi^2=8.4$, $df=1$, $p=.004$). These findings confirm that both the test and retest are associated (i.e., dependent) with each other. Thereby, they support rejecting the null
hypothesis that the responses on the first test and the responses on the retest are independent (not related) and support accepting the alternative hypothesis that there is a relationship between the first test and the retest. All of the standardized residuals for the chi-square analyses indicated a strong significant association: E-I (5.4), S-N (4), T-F (4.8), and J-P (2.9). Thus, the chi-square values and supporting standardized residuals confirm the reliability of the Personality Identity Estimator.

**Constraint on Generality**

One crucial caveat relates to PIE: The Personality Identity Estimator (PIE) is not a replacement for the Myers-Briggs Type Indicator (MBTI). The MBTI is a complex instrument containing continuous scores and categorical placement to indicate personality type. It has an expansive array of analysis options. It is supported by a large corporate structure and a significant body of literature related to its validity, reliability, and use. Suppose a detailed and extensive analysis of personality type is desired. In that case, the MBTI has a long track record of being an effective instrument for this purpose.

**Conclusion**

This study created the Personality Identity Estimator (PIE), an easy-to-use inventory to estimate personality types. PIE has 12 items, can be completed quickly, and is easy to score and interpret. PIE can be utilized for self-assessment to promote self-reflection and to identify individual differences.

The Personality Identity Estimator (PIE) is a valid and reliable inventory for estimating a person's personality type. The Personality Identity Estimator is an easy-to-use, categorical inventory that practitioners can use in various settings to estimate personality types following Jung's concept of personality types. PIE can be completed quickly and scored and interpreted
Identify Personality Type—Quickly

easily. PIE is valid in identifying Jung's conceptualization of personality types and is consistent over repeated administrations.

Because PIE is valid and reliable, it can be used confidently and at no charge by teachers and other educational professionals, practitioners, and individuals. **Permission is hereby granted to use the Personality Identity Estimator (PIE) in practice and research.** Thus, the Personality Identity Estimator provides a valuable inventory that can be another handy tool for identifying personality types and for initiating and facilitating self-awareness activities with learners.
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https://dictionary.apa.org/personality-type

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### Appendix A:
Printable Copy of the Personality Identity Estimator (PIE)

**Personality Identity Estimator (PIE)**

**Directions:** Select one phrase that you feel most applies to you from each pair of phrases that are connected by dots (...or...). Put a check mark in the box for the phrase you select. Then go on to the next pair of phrases. Count the total number of checks in each column before going to the next section.

<table>
<thead>
<tr>
<th>E-I Scale</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I am almost always sociable</td>
<td>I am usually restrained</td>
</tr>
<tr>
<td>I am inclined to talk a great deal</td>
<td>I am usually quiet</td>
</tr>
<tr>
<td>I can generally talk freely with others</td>
<td>I tend to talk mostly in intimate situations</td>
</tr>
<tr>
<td><strong>Total No. of checks in this column (E Scale)</strong></td>
<td><strong>Total No. of checks in this column (I Scale)</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S-N Scale</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I want to be viewed as very down-to-earth</td>
<td>I wish to be considered as very resourceful</td>
</tr>
<tr>
<td>The word “actual” often appeals to me</td>
<td>The word “theoretical” usually appeals to me</td>
</tr>
<tr>
<td>I prefer to be with practical people</td>
<td>I generally get along best with creative people</td>
</tr>
<tr>
<td><strong>Total No. of checks in this column (S Scale)</strong></td>
<td><strong>Total No. of checks in this column (N Scale)</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>T-F Scale</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reasoning moderately appeals to me</td>
<td>Being responsive to others strongly appeals to me</td>
</tr>
<tr>
<td>Analyzing things appeals moderately to me</td>
<td>Being compassionate strongly appeals to me</td>
</tr>
<tr>
<td>Sound judgment is more important than enthusiasm</td>
<td>Enthusiasm is much more important than sound judgment</td>
</tr>
<tr>
<td><strong>Total No. of checks in this column (T Scale)</strong></td>
<td><strong>Total No. of checks in this column (F Scale)</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>J-P Scale</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning is exceptionally appealing to me</td>
<td>I like to improvise</td>
</tr>
<tr>
<td>I tend to plan the timing and activities for a trip</td>
<td>When going someplace, I prefer to be flexible</td>
</tr>
<tr>
<td>I almost always like to plan things</td>
<td>Following a schedule usually restricts me</td>
</tr>
<tr>
<td><strong>Total No. of checks in this column (J Scale)</strong></td>
<td><strong>Total No. of checks in this column (P Scale)</strong></td>
</tr>
</tbody>
</table>

**Determine Your Personality Type Group**

1. Circle the letter of your *highest* total number of checks for each scale.

<table>
<thead>
<tr>
<th>E-I Scale: E or I</th>
<th>S-N Scale: S or N</th>
<th>T-F Scale: T or F</th>
<th>J-P Scale: J or P</th>
</tr>
</thead>
</table>

2. Copy the four letters that you circled above to the four blank lines below.

Your personality type group is: ______ ______ ______ ______

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Appendix B:
PowerPoint Slides—Conference Presentation

Identify Personality Types *Quickly*

Gary J. Conti
Oklahoma State University

---

Personality Types

- Specific categories for classifying based on
  - Personality traits, attitudes, behavior patterns,
  - Or other outstanding characteristic
- Carl Jung conceptualized personality types
  - Attitudes habitual to point of stamping an individual’s character
  - Thus, can account for individual differences
- Isabel Briggs Myers and Katherine Briggs
  - Developed test to apply Jung’s concept
  - Widely used throughout world
• Human behavior can be understood as an interactive set of psychological *attitudes* and psychological *functions*.

• **Attitudes:** Oriented toward
  - Extraversion--Outer world of people and action
  - Introversion--Inner world of thought and reflection

• **Functions**
  - Perception: Information gathering utilizing
    • Sensing or
    • Intuiting
  - Judgment: Decision making by
    • Thinking or
    • Feeling

---

**Extraversion-Introversion**

• Extraversion-Introversion: Source and direction of a person's *energy expression*
  - Extravert
    • Energy source and direction mainly in the external world
    • Outer world of action, people, and objects
  - Introvert
    • Energy source primarily in their inner world
    • Tend to focus their energy on the inner world of ideas, concepts, and mental images.
Identify Personality Type—Quickly

Sensing-Intuition

- Represent how individuals perceive information
- Sensing
  - Person mainly believes factual, concrete, and tangible information
  - Received directly from the external world by the sense organs
- Intuition
  - Information obtained from the internal or imaginative world
  - World is seen indirectly as a series of patterns, abstractions, trends, and future possibilities

Thinking-Feeling

- Represent how individuals process information for making decisions and judgments
- Thinking
  - Consists of making a decision mainly through logic
  - Involves forming logical, analytical, sequential, quantitative, and objective assessments
- Feeling
  - Consists of making decisions based more on a subjectively-held sense of values
  - Base for decisions is mainly feelings and emotions
Personality Types

- Eight (2 x 2 x 2) psychological types
  - Result from coupling the dichotomous pairs of attitudes and two dichotomous pairs of functions
  - Personality type is theorized as an individual's preference for particular attitudes and functions over others
- Sixteen (2 x 2 x 2 x 2) psychological types
  - Myers-Briggs added the Judging-Perception dichotomy
  - Implied in Jung's work
  - The Meyers-Briggs Type Indicator identified a person's preferences among four pairs of personality variables

Judging-Perception

- Reflects how a person implements the information that has been processed
- Judging
  - Refers to organizing all of one's life events and
  - Generally sticking to plans that have been made
- Perceiving
  - Refers to an inclination to improvise and explore alternative options
**You** and Personality Tests…

- Have you taken a personality test?
  - Which one(s)?
- Do you presently use any personality tests?
  - Which one(s)?
- What is your impression of personality tests?
- What would increase your use of personality tests as a tool to better address individual differences among your students?

Challenges to Greater Use…

- Major challenges to more widespread use
  - Cost
  - Length of time required to complete
  - Restricted sales and required training
  - Cheaper alternatives lack of known reliability and validity
- To overcome these challenges, this study developed an inventory to *estimate personality type*, which
  - Could be easy to administer
  - Could be completed rapidly
  - Could be used immediately by teachers and individual learners
Personality Identity Estimator

- Personality Identity Estimator (PIE)
  - An easy-to-use inventory to estimate personality types
  - Can be used at no cost
  - Is a categorical inventory containing 12 items with 3 items for each of the 4 personality-type dimensions in Jungian theory
  - Can be completed quickly
  - Is easy to score and interpret
  - Can be utilized for self-assessment to promote self-reflection and to identify individual differences
- Importantly, it is valid and reliable

Let’s Take PIE…

- Answer on the copy of PIE
  - You can download master copy from my website (www.Conti-creations.com)
- We will review scoring procedure
- We will interpret the results
Reactions…

• What is your initial reaction to PIE?
• How can you use PIE?
• What challenges do you foresee in using PIE?

Addressing Individual Differences…

• PIE can be a valuable tool for
  – Objectively making students aware of their interpersonal and intrapersonal preferences
  – Can assist students in developing, regulating, and monitoring their learning patterns
  – Use to depersonalize their feelings and self-concept by giving them an external, objective, and standardized measure against which to analyze and evaluate their personal preferences and behaviors
  – Provide standards and criteria for assessing current behaviors
  – Thus allowing students to objectively reflect upon their beliefs and behaviors
  – Overall, PIE can also be an effective device for improving communication
Increasing Self-Awareness...

- Facilitate self-awareness that can help a learner become self-directed and self-regulated
- Send subtle messages to students indicating to them that they are respected as individuals
- Can help students with self-understanding and with making thoughtful individual choices
- Can help individuals make daily choices and to develop more comprehensive learning plans for students
- Can stimulate increased motivation for learning as a result of more self-reliant and self-directed participation

Interactive Instructional Tool...

- Move student from "object" to an active partner in a potentially dynamic and interactive instructional episode with PIE.
- Student can easily take part in scoring PIE.
- Student can be an active and mutual partner to further personalize and give ownership to their results.
- Teacher and student can engage in a dynamic discussion concerning the items and scoring by using PIE as proxy interview schedule related to the student's preferences.
- Discussions could indicate the depth of the student's feelings in each inventory dimension and the strength of the student's superior personality type.
- Can be the catalyst for a profound discussion about the identified type's meaning and impact.
- Collectively, this knowledge and understanding can assist students in better accepting and appreciating themselves.
Validity and Reliability

- A sample of 1,104 was used to create PIE
- Validity was established through multivariate analyses
  - Myers-Briggs Type Indicator database of 553
  - Discriminant analysis to identify items
  - Factor analysis to confirm discriminant analysis results
  - Correlation to identify final selection
  - Comparison to MBTI—462 participants
- Reliability was established by test-retest
  - 89 participants
  - Separate calculations for each dimension

How to get PIE...

- PIE is available
  - **FREE!!** Download and use it!
  - Interactive on-line
- Go to:
  - [www.Conti-creations.com](http://www.Conti-creations.com)
Identify Personality Type—Quickly

Gary J. Conti
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Curriculum Vita
Doctoral Graduates Supervised

Instruments
- Assessing The Learning Strategies of Adults (ATLAS)
- Personality Identity Estimator (PIE)
- Philosophies Held by Instructors of Lifelong-learners (PHIL) or (PHIL)
- Principles of Adult Learning Scale (PALS)
- Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS)
- Multiple Intelligences Survey by Dr. Joyce McEllan (MIS)

PERSONALITY IDENTITY ESTIMATOR (PIE)
The Personality Identity Estimator (PIE) is an instrument for estimating personality type. It is easy to administer, can be completed rapidly, and can be used immediately by both facilitators and learners. It is an instrument that identifies the hypothetical concept of personality type as conceptualized by Carl Jung.
- View and/or download a copy of the Personality Identity Estimator (PIE)
- PIE is a valid and reliable instrument. View and/or download a paper on the development of PIE.
- The paper version of PIE can be quickly hand scored. However, for research purposes and data analysis, the responses can be entered into a computer. View and/or download a copy of the SPSS syntax to computer-score PIE.
  - PDF version
  - Text version
- View and/or read a copy of the description of the various Jungian personality-type groups
- You can complete PIE online and instantly learn your personality-type classification.
Impact Statement

• This study created the Personality Identity Estimator (PIE), an easy-to-use inventory to estimate personality types that professionals and nonprofessionals can use at no cost. PIE has 12 items, can be completed quickly, and is easy to score and interpret. PIE can be utilized for self-assessment to promote self-reflection and to identify individual differences.

  "As we enjoy the advantages from the inventions of others, we should be glad of any opportunity to serve others by any invention" of our; and this we should do freely and generously" (p. 130).—Benjamin Franklin

  The Autobiography of Benjamin Franklin,

  *instead of "invention", educators can substitute scholarship/research
Development and Trial of Educational Program for Food Loss Reduction Based on Life Cycle Thinking in Japan

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Abstract: Approximately 5.2 million tons of food is lost annually in Japan. Some consumer behaviors cause not only household food loss but also substantial food losses along food supply chains. To reduce food loss, consumers must understand how they contribute to this situation. In this study, we developed an educational program to reduce food loss based on life cycle thinking and verified its effectiveness. This educational program was shown to increase students’ knowledge and awareness of the need to reduce food loss at various stages of the food life cycle. The increase in the number of suggestions by students to reduce indirect food loss provided evidence of the program’s effectiveness.

Keywords: food loss, consumer behavior, educational program, life cycle thinking

1. Background and Objective

Reducing food waste, especially “food loss,” is a global issue. The Sustainable Development Goals, adopted at the United Nations General Assembly in 2015, espouse the reduction of food waste per capita and food loss along supply chains to meet target 12.3 under Goal 12: “Ensure sustainable consumption and production patterns.” Approximately 24 million tons of food waste is generated annually in Japan. Of this, food loss accounts for approximately 5.2 million tons, corresponding to approximately 10% of the food distributed annually in Japan. Of these 5.2 million tons, approximately 2.5 million tons are lost from households, and 2.7 million tons are lost along the food supply chain (e.g., food manufacturers, wholesalers, retailers, and restaurants (Fig. 1)[1].

Fig. 1 Food losses in Japan (estimation in FY2020)[1]
Moreover, certain consumer behaviors cause not only household food loss but also substantial food losses along food supply chains. Consumers must understand the situation to thereby reduce food loss. Moreover, it is hoped that such awareness will result in changes in attitudes.

Accordingly, we developed an educational program on food loss based on life cycle thinking (LCT). LCT is a framework that considers a holistic view of a product, from production through consumption or use to end-of-life. This paper provides information regarding the content of the educational program and the results of its trial.

2. Contents of the Education Program

In developing the program, we first reviewed the report on food loss occurring in food-related industries, published by the Ministry of Agriculture, Forestry, and Fisheries, Japan, [2] as well as books on food loss [3]. Next, we conducted interviews with environmental department managers of major retailers and convenience store chains and obtained information on the current state of food loss that occurs in the supply chain, the factors that cause it, and the factors that hinder effective countermeasures. Moreover, we conducted a field survey at a food waste feed factory and wholesale market and took pictures and videos of food loss caused by various factors (Fig. 2). We then conducted a survey of consumers regarding their awareness of the occurrence of food loss in the supply chain due to consumer behavior and their awareness of behavioral improvement [4].

Fig. 3 Pictures of food losses

The outline of the educational program is shown below.

(1) Understanding the situation

First, a lecturer explains the current state of food loss in Japan and food loss at various stages of the food life cycle (Fig. 3). Pictures of food loss along food supply chains are shown without any explanation of its causes. The lecturer then asks the students to think about the reasons for food loss.
(2) Understanding causes

Second, the lecturer explains the reasons for the food loss shown in the pictures and videos (Fig. 4). For example, they clarify that losses result from “non-standard products,” “returns from retailing,” “over-production and over-ordering,” “delivery delay,” “overdate of best-before,” and “leftovers.”

Next, the connections between the reasons for food loss and the resultant consumer behaviors are explained. In particular, not only are food losses generated directly by consumers, some food losses are generated in the food supply chain as a result of consumer behaviors (Fig. 5). For example, “food over-ordering occurs during an attempt to prevent the number of customers from decreasing due to food being out of stock or sold out” and “consumers attempt to purchase food products with a longer expiration date, even if they intend to consume them on the day of purchase.”
(3) Considering the measures

At the end of the program, a group format was employed to provide students with the opportunity to discuss measures to reduce food loss.

3. Results of Trial and Interpretation

In December 2020 and January 2022, pilot programs were conducted in undergraduate classes at the Department of Electrical Engineering at the Shibaura Institute of Technology. The samples of students who participated in 2020 and 2022 were different. As this class is compulsory, not all students are interested in environmental issues. Questionnaires were administered to the participating students before and after participating in the program to evaluate the program’s effectiveness. The results are shown in Fig. 6.

First, students’ knowledge about food loss and its causes improved significantly after the program. The percentage of students who stated that they could explain food loss to others increased from 44.6% (2020) and 57.8% (2022) before the program to 92.2% (2020) and 94.3% (2022) after the program. Second, students’ awareness of consumers’ responsibility for food loss reduction was higher after the program compared to the pre-program phase. The percentage of students who answered “Yes” to the question “Are consumers responsible for reducing food loss?” increased from 41.0% (2020) and 47.1% (2022) before the program to 65.6% (2020) and 61.9% (2022) after the program. This is most likely because they learned about the life cycle of food and understood how indirect food loss in the supply chain is caused by consumer behavior.

Moreover, students who attended the lecture had more suggestions for specific measures to reduce the
food loss in the supply chain caused by consumer activities. The suggestions are as follows:

- If you plan to eat it right away, choose foods that are close to their expiry date.
- If the items are out of stock or sold out, give up purchasing them.
- Do not worry too much about the color and shape of vegetables.

These results may be due to the students learning about the life cycle of food and understanding how indirect food loss in the supply chain is caused by consumer behavior.

4. Conclusion

In this study, we developed an educational program to reduce food loss based on the LCT and verified its effectiveness. We confirmed that this educational program increased students’ knowledge and awareness of the need to reduce food loss at various stages of the food life cycle. The increase in the number of suggestions by students to reduce indirect food loss, as described above, provides further evidence of the program’s effectiveness.

Acknowledgments

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References

Usage of Sangaku in Mathematics Education

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Abstract: In this study, the author categorized geometry problems by content and shape based on Sangaku that existed throughout Japan. Based on this database collection of teaching materials, this project aims to enable middle and high school teachers and teacher-training students to develop teaching materials in geometry.

Keyword: Wasan, Sangaku, Development of Geometry Teaching Materials

1 Introduction

A high percentage of Japanese elementary school students say they like mathematics, especially in the lower grades. It is probably since classes in the lower grades are mainly designed to shake the students’ sense of numbers and figures by actually using their hands to manipulate what they are learning.

The author calls the method in which students think about mathematics by manipulating objects with their hands “Hands-on Math”.

However, the percentage of students who say they like mathematics decreases as they progress from the upper grades of elementary school to junior high school and senior high school.

Students’ experiences are categorized into two main impressions: liking or disliking mathematics. In all subjects, the content tends to become more difficult as the school year progresses. The content becomes more abstract in mathematics, and many students need help finding it. Furthermore, students are evaluated based on whether they can or cannot solve the problems the teacher gives.

Students’ experiences tend to be categorized into two main impressions: liking or disliking mathematics. In all subjects, the content tends to become more difficult as the school year progresses. The content becomes more abstract in mathematics, and many students need help finding it. Furthermore, students are evaluated based on whether they can or cannot solve the problems the teacher gives.

The author believes it essential to promote mathematics education using ICT and Hands-on Math in high school mathematics.
Mathematics education using ICT means, for example, in terms of figures related to this paper, if you draw the inner center and inscribed circle of triangle ABC using Dynamic Geometry Software (DGS), you may be able to reproduce by yourself that the inscribed circle is tangent to the three sides of the triangle even if vertex A is moved. In other words, students can create by themselves that the mathematical procedure is valid even when the shape is changed, and this will bring out independent learning students.

The author believes that students like or dislike mathematics to a greater or lesser extent in all subjects. However, the author believes that this may be since, in mathematics classes, the main focus is on solving problems given by the teacher, and whether the students were able to solve the problems or not depends on whether they were able to solve the problems or not, which does not lead them to think about mathematics independently.

The author believes it essential to promote mathematics education using ICT and Hands-on Math in high school mathematics. In addition to conventional mathematics, the Japanese high school mathematics curriculum newly requires that students be taught to recognize and acquire, through mathematical activities, the usefulness of mathematical consideration of mathematics and human activities.

In this context, teachers are required to teach students the relationship between concepts related to quantities and figures and human activities and the relationship between mathematics and human activities. They must deepen their understanding of the relationship between mathematics and culture through historical mathematical topics, mathematical games, and puzzles. And so on.

In this paper, the author will propose an approach to the subject matter of the Edo period’s mathematics culture of Wasan, Sangaku, as teaching material in junior high and senior high school mathematics departments.

2 About Sangaku

Sangaku is the culture of Wasan, the mathematics of the Edo period. Generally, Sangaku was dedicated to shrines and Buddhist temples by writing mathematics problems, figures, and answers on a wooden board to thank God and Buddha for helping one’s mathematics performance improve. This custom of Sangaku dedication is said to have started in the early Edo period (the 1650s). In today’s terms, it is considered the same custom as ema (votive tablet).

Some of them dedicated their works to the shrine or temple, a social gathering place for the ordinary people at that time, as a place to present their achievements, and some wrote only problems that needed answers. Approximately 820 such works are known to exist today (see [7]). This custom of dedicating arithmetic frames is said to be a uniquely Japanese culture, unprecedented worldwide.

The photograph of Sangaku below Fig.1 shows a copy of a votive tablet dedicated in 1835 to Osaka Temmangu in Osaka city (see [8]). Fig.2 shows the problem, the figure, the answer, the solution, the name of the person who dedicated it, the date, and the things written in the general Sangaku. Note that the general Sangaku was written on a rectangular board.

The author has translated Atsuta Jingu’s Sangaku into English in the Appendix at the end of this paper. Please refer to it.
2.1 The Usage of Sangaku in Mathematics Education

Most of the mathematics problems consist of geometry problems. In particular, there are many plane geometry problems, but there are also some problems related to spatial figures, sentences, and numbers.

In Japan, junior high and senior high school teachers use Wasan and Sangaku in their mathematics classes. The author has also used Wasan and Sangaku in mathematics education at junior high and senior high schools and fieldwork in integrated learning classes. The author has used Sangaku in his mathematics education practice in the following activities (see [10]).

1. Activity to solve Sangaku problems.
2. Activity focusing on Sangaku’s operative sentences.
3. Activity to find new mathematics from Sangaku problems.
4. Activities to draw mathematically correct figures of Sangaku problems.
5. Activities to create mathematical problems following Sangaku.
6. Activities to compare and study the contents of geometry dictionaries and geometry solution dictionaries with those currently in use.
7. Activities that focus on the relationship with local culture.

Many of Sangaku’s problems deal with plane geometry, such as lines, triangles, quadrilaterals, and circles, and are appropriate for the content of mathematics studied in junior high and high schools. On the other hand, there are also many problems with complicated ranges. For example, there are problems with circles tangent to a process, ellipses, and spatial figures.

3 Purpose of the Study

This study aims to extract Sangaku problems that can be used as geometry teaching materials in junior and senior high school mathematics classes from problems that rely on Sangaku and to develop teaching materials. The author will also develop teaching materials for teaching mathematics in teaching courses.

4 Methods of the Study

In order to achieve the purpose of this study, the author picked up Sangaku problems that can be used as teaching materials from the Sangaku books compiled by local Wasan researchers through surveys and research and compiled a database of issues according to the following classification.

In order to use Sangaku problems in mathematics classes in junior high and senior high schools, it is necessary to classify the problems because it is necessary to consider the preconditions for problem-solving.

The author categorized the Sangaku according to problems and figures.

Categorize

- Circle and tangent line
- Rectangle
- Triangle
  - Right triangle
  - Equilateral triangle
  - Isosceles triangle
  - Common triangles (trigonometric)
- Quadrilateral
  - Square
  - Square and circle
  - Rectangle
  - Trapezoid
In this study, the author focused on the perspective of the above activities and extracted approximately 100 problems from the Sangaku books, and categorized the problems. For each problem, a modern translation, a sample answer, and a discussion are provided. In the discussion, we discuss findings that are relevant to mathematics education.

In the next chapter, the author introduces Sangaku with its problems and sample answers.

5 Sangaku Problems and its Solutions

The author shows two Sangaku problems in this chapter.

There are three circles inscribed in a rectangle. One problem is that the square of the sum of the square roots of the radii of the circles represents the two sides of the rectangle. The other is to divide the court into five equal parts.

5.1 Three circles in a rectangle

This problem of Sangaku is dedicated to Koshindo in Yamatokoriyama city, Nara Prefecture (see [14]).

Problem As shown in Fig.3, there are three circles in a rectangle. Let the diameters of the medium and small circles be 4.5 sun\(^1\) and 2 sun, respectively. If the sum of the two sides of the rectangle is 21.25 sun, find the diameter of the large circle and the length of the two sides of the rectangle, respectively.

![Fig.3](image)

Answer The large diameter is 8 sun, the rectangle 12.25 sun, and the rectangle 9 sun.

\(^1\)The “sun” was the unit of length in the Edo period. 1 sun ≈ 3.03 cm
**Solution** Let $r$ be the radius of the large circle to be sought. From the meaning of the subject,

\[
(\sqrt{r} + \sqrt{2.25})^2 + (\sqrt{r} + \sqrt{1})^2 = 21.25
\]

\[
(\sqrt{r} - 2)(2\sqrt{r} + 9) = 0
\]

Thus, the circle’s diameter is $2r = 8$ sun, and the long and short sides of the rectangle are $12.25$ sun and $9$ sun, respectively.

### 5.1.1 Consideration

As shown in Fig.4 above, the following holds for the relationship between the radii of two circles bounded by perpendicular tangent lines.

\[
r + 2\sqrt{ar} + a = (\sqrt{r})^2 + 2\sqrt{a}\sqrt{r} + (\sqrt{a})^2 = (\sqrt{r} + \sqrt{a})^2
\]

\[
r + 2\sqrt{br} + b = (\sqrt{r})^2 + 2\sqrt{b}\sqrt{r} + (\sqrt{b})^2 = (\sqrt{r} + \sqrt{b})^2
\]

The author was very interested in the fact that the long side of the rectangle is the square of the sum of the square root of the of large circle’s radius and the square root of middle circle’s radius, as in equation (5.1.1).

The same is true for the short side of a rectangle that the short side of the rectangle is the square of the sum of the square root of the of large circle’s radius and the square root of small circle’s radius as in equation (5.1.2).

This beautiful arrangement of mathematical formulas will help students appreciate the beauty of mathematics.
5.2 Equalize the area of a square with four right triangles and one square

This Sangaku is dedicated to Suwa Shrine in Miharu-cho, Fukushima Prefecture (see [4]).

**Problem** Draw four line segments AH, BE, CF, and DG from each vertex of square ABCD so that square EFGH is square, as shown in Fig.5. Also, find the lengths of DH and AH of the right triangle ADH when the areas of the four right triangles AEB, BFC, CGD, DHA, and square EFGH are equal. However, one side of square ABCD is 9 sun.

**Answer** \( DH \approx 4.02 \) sun, \( AH \approx 8.04 \) sun

**Solution** Let \( a \) and \( p \) be the sides of squares ABCD and EFGH, respectively, as in Fig.5.

Since the areas of right triangle ADH and square EFGH are equal. Therefore,

\[
\frac{1}{2} b (p + b) = p^2 \\
(p - b)(2p + b) = 0 \\
b = p
\]

(5.2.1)

Furthermore, square ABCD is divided into five equal parts by the four right triangles \( \triangle FBC, \triangle GCD, \triangle HDA, \triangle EAB \) and a square EFGH.

\[
4 \times \frac{1}{2} b(p + b) + p^2 = a^2 \quad (5.2.2)
\]

Substituting (5.2.1) into (5.2.2), we have

\[
5p^2 = a^2
\]

Therefore,

\[
DH = p = \frac{\sqrt{5}}{5} a
\]
\[ AH = p + b = 2p = \frac{2\sqrt{5}}{5}a \]

Since \( a = 9 \), we have

\[ DH = \frac{9\sqrt{5}}{5}, \]
\[ AH = \frac{18\sqrt{5}}{5} \]

Calculations with a calculator show that

\[ DH = \frac{9\sqrt{5}}{5} \approx 4.0249223 \text{ sun} \]
\[ AH = \frac{18\sqrt{5}}{5} \approx 8.0498447 \text{ sun} \]

### 5.2.1 Another solution by elementary geometry

The author found in Teiichiro Sasabe’s “Dictionary of Geometry,” a similar problem to the one in Miharu-Cho, Fukushima Prefecture, discussed in this chapter. This similar problem asks for a drawing of Fig.5, which is significant as an educational treatment of Sangaku (see [12]).

**Constructions** Let the length of one side of square ABCD be 1, as in Fig.6.

Take a point P on side AB such that BP = \( \frac{2}{5} \). Let Q be where the line drawn from P parallel to side BC intersects side CD, and let F be where PQ intersects the circle whose diameter is BC, as in Fig.6. Suppose the foot of the perpendicular line drawn from vertex A to straight line BF is E, and the foot of the perpendicular line drawn from vertex D to straight line CF is G. The intersection of AE and DG is H. In that case, quadrangle EFGH is a square, and the areas of four right triangles \( \triangle FBC \), \( \triangle GCD \), \( \triangle HDA \), \( \triangle EAB \) and a square EFGH are equal.
Proof Since the area of rectangle PBCQ is $\frac{2}{5}$ of square ABCD, $\triangle FBC = \frac{1}{2} \times 1 \times \frac{2}{5} = \frac{1}{5}$.

$\angle BFC = \angle R$. Next, $\triangle GCD$, $\triangle HDA$, and $\triangle EAB$ are all right triangles congruent to $\triangle FBC$ because their oblique sides and one acute angle equal the oblique side and one acute angle of $\triangle FBC$.

Therefore, the area of the four right triangles is $\frac{1}{5}$ of the area of square ABCD.

Also, since $FE = BE - BF = FC - CG = FG$, quadrangle EFGH is a square, and its area is equal to $\frac{1}{5}$ of square ABCD.

6 Conclusion and Future Work

The educational significance of Sangaku is the possibility of finding alternative solutions. For example, we introduced an alternative solution using elementary geometry in 5.2. As a solution method, in addition to elementary geometry, a solution by analytic geometry is also possible. In particular, using CAS (Computer algebra system) is effective for solving by analytic geometry.

Furthermore, when solving geometry problems, students can draw their diagrams of the problem from the given conditions. The geometry construction has the advantage of visualizing the conditions through a diagram. In drawing the diagram, students may draw the diagram freehand. Some students may use a ruler and compass, or they may use dynamic geometry software.

As pointed out in Chapter 4, Sangaku has a wide variety of content problems. Therefore, when using Sangaku problems in class, the teacher needs to categorize and organize Sangaku according to the contents of the problems.

We discussed the use of Sangaku in mathematics education. Here, we proposed a case study using Sangaku as a teaching tool for mathematics. In the future, we will develop mathematics teaching materials according to the classification in chapter 4 while keeping in mind the forms of use described in 2.1.

Acknowledgements

The publication of this paper was only possible with the help of the books listed in the bibliography, which include books on Sangaku, Wasan, and research. The author would like to take this opportunity to thank all the authors and research organizations. The author would like to thank Dr. Satoh Ken’ichi for his helpful advice. The author would also like to thank Dr. Kotera Hiroshi for permission to use the photographs published in Wasan no Yakata (see [8]). The author would also like to thank the Atsuta Jingu Museum for permission to use the photograph (see [1]).

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References


Appendix: Sangaku example, translation into English.

1. Isosceles triangle and its inscribed circle

The author will introduce a problem involving three equal circles separated by two line segments inside an isosceles triangle from Sangaku of Atsuta Jingu Shrine in Nagoya City (see [1]).

Fig.7 Restored Sangaku of Atsuta Jingu Shrine dedicated in 1806.

2. Contemporary translation

**Problem** As shown in Fig.8, we will draw two orthogonal line segments inside an isosceles triangle, and we will insert three circles of equal diameter. If the length of a lower right part is 2 sun, find the diameter of the circles.

**Answer** The answer is 1 sun.

**Technique** Half of a lower right part is the circle’s diameter to be found.

**Name** EHARA Masanori.

**Date** May, 1806.
Using Corpus Analytical Techniques for Language Testing:  
Identifying Frequent Question Items and Examining Authenticity

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Abstract

Corpora, electronically collected written or spoken text representing a particular language for linguistic analysis, have been used in various linguistic fields as a methodology (e.g. McEnery & Wilson, 2001). Language teaching is one of the fields of corpus application. Recently, the use of corpora has been revisited and discussed in the field of language testing and assessment (e.g. Park, 2014; Cushing, 2017; Xi, 2017). Since Alderson’s (1996) suggestion of the application of general and learner corpora for language testing and assessment, more concrete suggestions and practical studies have already been carried out. For example, different types of corpora, such as general, learner, and specialised corpora, have been utilised for different purposes: examining authenticity and frequency, analysing learners’ English, and compiling corpora, respectively. However, corpus analytical techniques have not been suggested or discussed in corpus applications to language testing and assessment. Therefore, this study aims to demonstrate and discuss how corpus analytical techniques such as wordlists, keyword lists, collocations and clusters, and dispersion plots available in online corpora such as BNCweb and concordancers such as WordSmith Tools and #LancsBox can be applied to language testing and assessment in various ways to identify the frequent target vocabulary question items and parts tested in grammar questions and examine the authenticity of the English used in grammar questions. The findings suggest that item writers should access corpora and utilise corpus analytical techniques when identifying frequent question items and examining their authenticity.

1. Introduction

A corpus is defined as an electronically collected written or spoken text that represents a particular language for the purposes of linguistic analysis (e.g. Baker et al.,
2006; McEnery et al., 2006). Corpus linguistics and different types of corpora have been applied in various linguistic fields, following the idea that corpus linguistics is a methodology (e.g. McEnery & Wilson, 2001). Applications of corpus linguistics and corpora have recently been revisited and discussed in the field of language testing and assessment (e.g. Park, 2014; Cushing, 2017; Xi, 2017), though this application is new and shows little development over time (e.g. Hunston, 2002).

Since Alderson (1996) suggested the use of general and learner corpora for language testing and assessment, concrete suggestions have been made and practical studies have already been conducted, applying different types of corpora for different purposes, such as general corpora for obtaining authenticity and frequency and developing wordlists and question items (e.g. Crossley et al., 2007; Jaén, 2007; Hughes, 2008), learner corpora for analysing learners’ English and automatic scoring (e.g. Burstein et al., 2004), and learner and specialised corpora for compiling corpora containing learners’ or specific English (e.g. Biber et al., 2001; Alexopoulou, 2008). However, corpus linguistics techniques used to analyse corpora have not been suggested or discussed in the application of corpora to language testing and assessment.

Therefore, this study aims to demonstrate and discuss how corpus analytical techniques such as wordlists, keyword lists, collocations and clusters, and dispersion plots available in online corpora such as BNCweb and concordancers such as WordSmith Tools and #LancsBox can be utilised to language testing and assessment to 1) identify the frequent target vocabulary question items and parts tested in grammar questions and 2) examine the authenticity of the English used in the stems of grammar questions.

2. Literature Review

2.1 Various Methods of Applying Corpora to Language Testing and Assessment

Different types of corpora have been applied to various linguistic fields (e.g. McEnery & Wilson, 2001). Applications of corpus linguistics and corpora in the field of language testing and assessment have recently been revisited and discussed in the journal Language Testing (e.g. Park, 2014; Cushing, 2017; Xi, 2017). Alderson (1996) first suggested and discussed the use of general and learner corpora in language testing and assessment. Since then, further concrete suggestions and practical studies have already been carried out (e.g. Barker, 2006).
Probably, the most basic and simple method is to compile corpora for the use of language testing and assessment. For example, learners’ written or spoken productions obtained from proficiency tests or exercises in classrooms were collected and compiled into learner corpora (e.g. the Cambridge Learner Corpus, Cambridge Corpus of Spoken and Learner English; Boyle & Booth, 2000; Ball, 2001; Barker, 2004, 2006). Furthermore, corpora in the specific fields of English that a given researcher is interested in have been collected and constructed as specialised corpora for the use of language testing and assessment (e.g. the TOEFL 2000 Spoken and Written Academic Language Corpus (T2K-SWAL Corpus), Biber et al., 2001; the Exam Corpus, Usami, 2021).

Second, once corpora are constructed, wordlists or keyword lists are created and analysed through the single words or phrases that occur frequently or characteristically. For example, wordlists obtained from learner corpora are used to characterise the learners’ English by comparing them to those of native speakers or different learners in Contrastive Interlanguage Analysis (CIA; Granger, 2002, 2003) and to characterise learners’ English such as collocational patterns and errors at different proficiency levels in the framework of the English Profile Programme (EPP; Alexopoulou, 2008). For another example, wordlists or keyword lists in specialised corpora can be obtained and examined to find technical terms used in specific fields of English, as Barker (2010) suggested (e.g. the Business English Certificate Preliminary wordlist using Business English Texts Corpus, Ball, 2001, 2002; Horner & Strutt, 2004; language use in the university, Biber et al., 2004; fine arts English vocabulary, Chatburapanun & Yordchim, 2014).

Third, once wordlists or keyword lists are obtained and examined, they can be applied to investigate and validate existing question items. For example, the frequency lists in general and specialised corpora can tell us which words or phrases occur more frequently in authentic and specific English, respectively. Moreover, the lists can be utilised to judge whether specific vocabulary or grammatical structures should be tested (e.g. examining university-level language skills with T2K-SWAL Corpus, Biber et al., 2004; examining the English presented in Japanese university entrance exams with the UEEJ Corpus, Usami, 2005).

Fourth, these frequency lists and keyword lists could help item writers actually write authentic items relatively easily and effectively (e.g. Crossley et al., 2007; Jaén, 2007; Hughes, 2008). For example, frequency lists obtained from general corpora can be
used in writing stems for multiple-choice vocabulary or grammar questions (e.g. Usami, 2012, 2015). In addition, the frequency lists obtained from specialised corpora could help item writers determine the target words or phrases that should be tested (e.g. a listening test and pronunciation assessment with the Michigan Corpus of Academic Spoken English (MISCASE), Read, 2002; Levis & Cortes, 2008; a grammar test with the British Academic Written English corpus, Sharpling, 2010). Moreover, as Alderson (1996) suggested, learners’ productions could contain errors and these errors can be used in writing distractors (e.g. Usami, 2012, 2013, 2015).

2.2 Analytical Techniques in Corpora

2.2.1 Frequency List

Once appropriate corpora or texts are chosen for the research purpose, they are expected to be analysed using corpus analytical techniques available in online corpora or concordancers. The most basic and first approach to analyse corpora is a frequency list (also known as a word list or a vocabulary list). This is a list of all the types (unique word forms) in a corpus or text, along with the number of occurrences (tokens) of each type displayed in rank order of frequency or in alphabetical order (Hunston, 2002; Baker et al., 2006; Evison, 2010). Frequency lists can also contain fixed combinations of two or more words called n-grams, as well as single words (e.g. Scott, 2010).

Table 1 shows the beginning of a rank order frequency list of a small corpus containing approximately 4,000 words of paired discussion tasks, indicating the rank order, raw frequency, and percentage of tokens within the whole corpus (Evison, 2010). According to the list, the definite article the is most frequent, with 203 occurrences and occupying 4.76% of the whole corpus.
Table 1. Sample rank order frequency list (extracted from Evison, 2010: 124)

<table>
<thead>
<tr>
<th>N</th>
<th>Token</th>
<th>Freq.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>the</td>
<td>203</td>
<td>4.76</td>
</tr>
<tr>
<td>2</td>
<td>I</td>
<td>199</td>
<td>3.02</td>
</tr>
<tr>
<td>3</td>
<td>a</td>
<td>116</td>
<td>2.72</td>
</tr>
<tr>
<td>4</td>
<td>and</td>
<td>109</td>
<td>2.55</td>
</tr>
<tr>
<td>5</td>
<td>it</td>
<td>89</td>
<td>2.09</td>
</tr>
<tr>
<td>6</td>
<td>to</td>
<td>86</td>
<td>2.02</td>
</tr>
<tr>
<td>7</td>
<td>think</td>
<td>81</td>
<td>1.9</td>
</tr>
<tr>
<td>8</td>
<td>of</td>
<td>80</td>
<td>1.87</td>
</tr>
<tr>
<td>9</td>
<td>you</td>
<td>78</td>
<td>1.83</td>
</tr>
<tr>
<td>10</td>
<td>yeah</td>
<td>76</td>
<td>1.78</td>
</tr>
</tbody>
</table>

2.2.2 Keyword List

After obtaining and analysing a frequency list of the corpus, keyword lists can be obtained by comparing the frequency lists of two corpora. A keyword is a word (or word cluster) that is statistically significantly more frequent in a small or specialised corpus than would be expected by chance, compared to larger, reference corpora, as determined using different types of statistical tests, such as chi-squared tests or log-likelihood (Hunston, 2002; Baker et al., 2006; Scott, 2010). Keywords can be obtained by comparing two big reference corpora, comparing a learner corpus to a native corpus, or comparing two learner corpora (Ishikawa, 2012).

Table 2 shows sample keyword clusters of the play *Hamlet*, compared to the clusters of all the Shakespeare plays (including *Hamlet*), using a concordancer, WordSmith Tools, extracted from Scott (2010). According to Table 2, the cluster *AYMY LORD* ranks first with keyness of 25.74.
Table 2. Sample keyword clusters in *Hamlet* (extracted from Scott, 2010: 149)

<table>
<thead>
<tr>
<th>N</th>
<th>Key word</th>
<th>Freq.</th>
<th>%</th>
<th>Freq.</th>
<th>RC. %</th>
<th>Keyness</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AY MY LORD</td>
<td>9</td>
<td>0.03</td>
<td>20</td>
<td>25.74</td>
<td>0.0000003887</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>MY LORD I</td>
<td>17</td>
<td>0.06</td>
<td>108</td>
<td>0.01</td>
<td>22.10</td>
<td>0.0000025882</td>
</tr>
<tr>
<td>3</td>
<td>GOOD MY LORD</td>
<td>15</td>
<td>0.05</td>
<td>90</td>
<td>0.01</td>
<td>20.71</td>
<td>0.0000053490</td>
</tr>
<tr>
<td>4</td>
<td>TO A NUNNERY</td>
<td>5</td>
<td>0.02</td>
<td>5</td>
<td>19.95</td>
<td>0.0000079332</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>MY LORD I HAVE</td>
<td>6</td>
<td>0.02</td>
<td>14</td>
<td>16.72</td>
<td>0.0000433459</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>I THE EARTH</td>
<td>5</td>
<td>0.02</td>
<td>8</td>
<td>16.71</td>
<td>0.0000435916</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>I MY LORD</td>
<td>6</td>
<td>0.02</td>
<td>18</td>
<td>14.45</td>
<td>0.0001440618</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>LORD I HAVE</td>
<td>6</td>
<td>0.02</td>
<td>18</td>
<td>14.45</td>
<td>0.0001440618</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>WELL MY LORD</td>
<td>6</td>
<td>0.02</td>
<td>22</td>
<td>12.63</td>
<td>0.0003794433</td>
<td></td>
</tr>
</tbody>
</table>

2.2.3 Collocation and Cluster

Once a particular search word or phrase is entered into the search box in an online corpus or concordancer, concordances, which are lists of all the occurrences of a particular search term in a corpus (e.g. Baker et al., 2006), can be obtained. As one of the methods of examining and analysing concordances, collocations can be obtained. Collocation is the statistical tendency of certain words to occur adjacent to or near given words, either frequently or exclusively (e.g. Hunston, 2002; Baker et al., 2006). Collocation strength is measured with a range of statistics, such as the Z-score, log-log, Mutual Information, or log-likelihood (e.g. Hunston, 2002; Baker et al., 2006). The span of distance between the node word and the collocate to the left or right can be flexibly chosen and adjusted for research purposes.

Table 3 shows the sample’s top 10 collocates for *time* in the Brown Corpus, within a −5 to +5 span. In Table 3, the article *the* is by far the strongest collocates of *time*, occurring 753 and 514 times on the left and right side, respectively, in the Brown Corpus, extracted from Baker et al. (2006).
Another type of collocation available in WordSmith Tools is called cluster. A cluster presents the most frequent patterns of repeated fixed phrases that are either contained or occur near the search word (e.g. Ishikawa, 2012).

Table 4 shows the sample three- or four-word clusters of great in part of the Brown Corpus. In Table 4, the cluster a great deal occurs most frequently in part of the Brown Corpus, extracted from Ishikawa (2012).
2.2.4 Dispersion Plot

Once concordances are obtained, they can be examined further with a dispersion plot, which is available in WordSmith Tools. A dispersion plot shows where the search word or phrase occurs across a particular file or corpus, with the left edge of the plot representing the beginning and the right edge the end (e.g. Baker et al., 2006; Scott, 2010). This allows researchers to examine whether a particular word or phrase is equally spread throughout the file or corpus or occurs as a central theme in one or more parts of the file or corpus.

Figure 1 shows a sample dispersion plot of joy from a small corpus of newsletters produced by a Catholic church, which is extracted from Baker et al. (2006). According to the dispersion plot, the term joy is fairly evenly dispersed throughout the corpus.

![Sample dispersion plot of joy](image)

**Figure 1. Sample dispersion plot of joy (extracted from Baker et al., 2006: 60)**

### 3. Research Questions

As reviewed in the literature, different kinds of corpora have been applied to language testing and assessment in various ways: compiling corpora, creating and analysing wordlists and keyword lists, analysing existing question items, and writing question items. In addition, corpora and texts can be analysed using corpus analytical techniques such as frequency lists, keyword lists, collocations and clusters, and dispersion plots available in online corpora or concordancers. However, these analytical techniques have not been adequately discussed in language testing and assessment. Therefore, the aim of this article is to illustrate and discuss the various ways that corpus analytical techniques such as wordlists, keyword lists, collocations and clusters, and dispersion plots available in online corpora such as BNCweb and concordancers such as WordSmith Tools and #LancsBox can be applied to language testing and assessment. In this study, the following research questions (RQs) are addressed:
RQ1: How can frequency lists be utilised to identify the authentic English in general corpora and frequent target vocabulary question items?

RQ2: How can keyword lists be utilised to identify the English used in specific English?

RQ3: How can collocations and clusters be utilised to examine the authenticity of the English used in the stems of the vocabulary and grammar questions?

RQ4: How can dispersion plots be utilised to identify the parts tested in grammar questions?

4. Data

4.1 The British National Corpus (BNC) on BNCweb

In this study, an online corpus, the British National Corpus (BNC) is examined to refer to authentic British English. The BNC is composed of approximately 100 million words of British written (90%) and spoken (10%) texts collected around the 1990s. In this study, the BNC is analysed on the BNCweb, where analytical functions such as concordance, frequency lists, and collocation can be utilised.

4.2 The Exam Corpus

Besides the above mentioned existing and ready-made corpus available online, a specialised corpus constructed by the author, the Exam Corpus, is used in this research. The Exam Corpus is utilised to identify frequent vocabulary and grammar question items and examine the English used in the stems of grammar questions presented in English proficiency tests. The Exam Corpus (Ver. 1.3) contains 23,834 multiple-choice vocabulary and grammar questions from four kinds of English proficiency tests, obtained from only the official test books published after 2000 by authorised examination boards or publishers: 1) University Entrance Examinations in Japan (UEEJ) for 2001–2022, 2) English proficiency examinations held in Japan (Test of English for Academic Purposes (TEAP) and EIKEN – Pre-1st, 2nd, pre-2nd, and 3rd grades for 2011–2019), 3) English proficiency examinations created by the Educational Testing Service (ETS) in the U.S. (Test of English as a Foreign Language (TOEFL) in 2012, Test of English for International Communication (TOEIC) for 2005–2020), and 4) English proficiency examinations created by Cambridge Assessment English in the U.K. (Cambridge English
Table 5 shows the number of files (i.e. questions) of vocabulary and grammar questions across English proficiency tests contained in the Exam Corpus (Ver. 1.3).

<table>
<thead>
<tr>
<th>English proficiency tests</th>
<th>UEEJ</th>
<th>TEAP</th>
<th>EIKEN</th>
<th>GTEC</th>
<th>TOEIC</th>
<th>TOEFL</th>
<th>CMB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td># of vocabulary questions</td>
<td>9,124</td>
<td>60</td>
<td>1,883</td>
<td>92</td>
<td>463</td>
<td>0</td>
<td>380</td>
<td>12,002</td>
</tr>
<tr>
<td># of grammar questions</td>
<td>10,476</td>
<td>0</td>
<td>277</td>
<td>0</td>
<td>903</td>
<td>176</td>
<td>0</td>
<td>11,832</td>
</tr>
</tbody>
</table>

Note. CMB = Cambridge English

The Exam Corpus was analysed with the following concordancers, WordSmith Tools and #LancsBox.

4.3 WordSmith Tools

To analyse the above Exam Corpus, a concordancer, WordSmith Tools Ver. 8 (https://lexically.net/wordsmith/) was used. WordSmith Tools has many analytical functions, some of which (i.e. cluster and dispersion plot) were used in this research.

4.4 #LancsBox

In addition to WordSmith Tools, another concordancer, #LancsBox (http://corpora.lancs.ac.uk/lancsbox/), developed at Lancaster University, was used to analyse the Exam Corpus. Among the functions available in #LancsBox, the function *Words* (for wordlists) was used in this research.
5. Analysis

5.1 Frequency List

First, in this section, RQ 1 (i.e. How can frequency lists be utilised to identify the authentic English in general corpora and frequent target vocabulary question items?) was analysed as to whether the adverbs frequently tested in the Exam Corpus are actually frequently used in authentic English. Table 6 shows the adverb frequency list for the whole BNC (i.e. including written and spoken texts) and the adverb list frequently tested in multiple-choice vocabulary questions in the Exam Corpus obtained with the BNCweb and #LancsBox, respectively.

As shown in Table 6, the adverbs *not* and *n’t* that indicate negation are by far the most frequently presented in the BNC, and the adverb *so* is the third most frequent in the BNC.

However, the adverb *still* is tested most frequently, and the adverbs *nearly*, *already*, *immediately*, and *lately* are relatively frequently tested in English proficiency tests. However, the adverb *still* is not as frequently presented in the BNC as in the tests; it ranked 20th with 68,994 occurrences in the BNC. Furthermore, the adverb *nearly* is tested second most frequently in English proficiency tests but is not within the top 20 in the BNC; it actually ranked 93rd with 11,147 occurrences.

Item writers might think that these adverbs are frequently tested because they are salient, important, and worth testing. However, they are not so frequently used in authentic English.
Table 6. Adverb frequency list in the BNC and Exam Corpus

<table>
<thead>
<tr>
<th>Rank</th>
<th>Word</th>
<th>BNC</th>
<th>Rank</th>
<th>Word</th>
<th>Exam Corpus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>not</td>
<td>451,282</td>
<td>1</td>
<td>still</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>n’t</td>
<td>316,187</td>
<td>2</td>
<td>nearly</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>so</td>
<td>214,145</td>
<td>3</td>
<td>already</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>up</td>
<td>199,216</td>
<td>4</td>
<td>immediately</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>out</td>
<td>195,872</td>
<td>5</td>
<td>lately</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>then</td>
<td>153,317</td>
<td>6</td>
<td>approximately</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>more</td>
<td>141,365</td>
<td>6</td>
<td>currently</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>now</td>
<td>138,932</td>
<td>6</td>
<td>deliberately</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>well</td>
<td>137,378</td>
<td>6</td>
<td>eventually</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td>only</td>
<td>126,124</td>
<td>6</td>
<td>occasionally</td>
<td>6</td>
</tr>
<tr>
<td>11</td>
<td>just</td>
<td>124,414</td>
<td>6</td>
<td>recently</td>
<td>6</td>
</tr>
<tr>
<td>12</td>
<td>also</td>
<td>123,348</td>
<td>6</td>
<td>respectively</td>
<td>6</td>
</tr>
<tr>
<td>13</td>
<td>very</td>
<td>113,109</td>
<td>7</td>
<td>carefully</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>how</td>
<td>98,967</td>
<td>7</td>
<td>enough</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>even</td>
<td>86,902</td>
<td>7</td>
<td>ever</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>on</td>
<td>86,714</td>
<td>7</td>
<td>gradually</td>
<td>5</td>
</tr>
<tr>
<td>17</td>
<td>down</td>
<td>81,125</td>
<td>7</td>
<td>properly</td>
<td>5</td>
</tr>
<tr>
<td>18</td>
<td>back</td>
<td>75,059</td>
<td>7</td>
<td>yet</td>
<td>5</td>
</tr>
<tr>
<td>19</td>
<td>there</td>
<td>73,443</td>
<td>19</td>
<td>abroad</td>
<td>4</td>
</tr>
<tr>
<td>20</td>
<td>still</td>
<td>68,994</td>
<td>19</td>
<td>accordingly</td>
<td>4</td>
</tr>
</tbody>
</table>

5.2 Keyword List

Second, in this section, RQ 2 (i.e. How can keyword lists be utilised to identify the English used in specific English?) was addressed to determine whether there are differences in the English presented in the TOEIC and UEEJ questions. A keyword list illustrates a word or word cluster that is statistically significantly more frequent by comparing two corpora. The Exam Corpus contains vocabulary and grammar questions tested in TOEIC and UEEJ. The target English used in both exams should be different: TOEIC is predominantly for business communication English, whereas UEEJ tests non-
specific or academic English. Table 7 shows a keyword list of all TOEIC questions (28,067 tokens) and some of the UEEJ questions (just those tested in 2021 and 2022, 29,487 tokens) in the Exam Corpus.

Table 7. Keyword lists of TOEIC and UEEJ in the Exam Corpus

<table>
<thead>
<tr>
<th>Rank</th>
<th>TOEIC</th>
<th>UEEJ</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Word</td>
<td>Statistics</td>
</tr>
<tr>
<td>1</td>
<td>ms.</td>
<td>19.277</td>
</tr>
<tr>
<td>2</td>
<td>customer</td>
<td>10.619</td>
</tr>
<tr>
<td>3</td>
<td>inc.</td>
<td>10.263</td>
</tr>
<tr>
<td>4</td>
<td>web</td>
<td>9.194</td>
</tr>
<tr>
<td>5</td>
<td>sales</td>
<td>8.796</td>
</tr>
<tr>
<td>6</td>
<td>marketing</td>
<td>8.728</td>
</tr>
<tr>
<td>7</td>
<td>customers</td>
<td>8.238</td>
</tr>
<tr>
<td>8</td>
<td>clients</td>
<td>7.413</td>
</tr>
<tr>
<td>9</td>
<td>corporation</td>
<td>7.056</td>
</tr>
<tr>
<td>10</td>
<td>mr.</td>
<td>6.994</td>
</tr>
<tr>
<td>11</td>
<td>survey</td>
<td>6.866</td>
</tr>
<tr>
<td>12</td>
<td>completed</td>
<td>6.700</td>
</tr>
<tr>
<td>13</td>
<td>quarter</td>
<td>6.700</td>
</tr>
<tr>
<td>14</td>
<td>employees</td>
<td>6.669</td>
</tr>
<tr>
<td>15</td>
<td>electronics</td>
<td>6.344</td>
</tr>
<tr>
<td>16</td>
<td>center</td>
<td>6.334</td>
</tr>
<tr>
<td>17</td>
<td>a.m.</td>
<td>5.988</td>
</tr>
<tr>
<td>18</td>
<td>ensure</td>
<td>5.988</td>
</tr>
<tr>
<td>19</td>
<td>training</td>
<td>5.903</td>
</tr>
<tr>
<td>20</td>
<td>staff</td>
<td>5.793</td>
</tr>
</tbody>
</table>

As shown in Table 7, there are large and clear differences in English presented between the TOEIC and UEEJ questions. First, words indicating forms of address (e.g. ms., mr.) are presented in the TOEIC, whereas words indicating the first personal pronoun (e.g. I, my, me, I’m) are used in the UEEJ. In addition, the words that people used in
business or office contexts are frequently used in the TOEIC (e.g. customer, customers, clients, employees, staff). Second, other nouns used in business and office contexts are presented in the TOEIC (e.g. inc., web, sales, marketing, corporation, survey, quarter, electronics, training), whereas only school is presented in the UEEJ. Third, relatively difficult verbs used in business and office are used in the TOEIC (e.g. completed, ensure), whereas relatively easy and basic words are used in the UEEJ (e.g. don’t, go, think, get, say, going, know, didn’t, got, can’t, told, went).

Therefore, item writers might want to obtain the keyword list of specific English that is suitable for the exam and use the list to write question items specific to the English to be tested.

**5.3 Collocation and Cluster**

Third, in this section, RQ 3 (i.e. How can collocations and clusters be utilised to examine the authenticity of the English used in the stems of the vocabulary and grammar questions?) was addressed to determine whether the phrases frequently presented in authentic English were used or tested in the exams. Table 8 shows the verb collocates of the noun *reception* with different spans: a wider span of both sides for 3 left to 3 right, a span focusing on the left side for 3 left to 1 left, and a span focusing on the right side for 1 right to 3 right, which were obtained from the BNC.

<table>
<thead>
<tr>
<th>Rank</th>
<th>3 left – 3 right</th>
<th>3 left – 1 left</th>
<th>1 right – 3 right</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>held</td>
<td>hosted</td>
<td>held</td>
</tr>
<tr>
<td>2</td>
<td>hosted</td>
<td>received</td>
<td>hosted</td>
</tr>
<tr>
<td>3</td>
<td>given</td>
<td>attend</td>
<td>given</td>
</tr>
<tr>
<td>4</td>
<td>received</td>
<td>attends</td>
<td>accorded</td>
</tr>
<tr>
<td>5</td>
<td>rang</td>
<td>given</td>
<td>was</td>
</tr>
<tr>
<td>6</td>
<td>attended</td>
<td>attended</td>
<td>rang</td>
</tr>
<tr>
<td>7</td>
<td>accorded</td>
<td>rang</td>
<td>received</td>
</tr>
<tr>
<td>8</td>
<td>attends</td>
<td>expect</td>
<td>limited</td>
</tr>
<tr>
<td>9</td>
<td>attend</td>
<td>standing</td>
<td>gave</td>
</tr>
<tr>
<td>10</td>
<td>expect</td>
<td>invited</td>
<td>expect</td>
</tr>
</tbody>
</table>
According to Table 8, in a broader span of 3 left to 3 right, a greater variety of verbs with various verb tenses and forms are collocated with the noun *reception* (e.g. a past form, *rang*; a past participle form, *given*; past or past participle forms, *held, hosted, received, attended,* and *accorded*; present forms *attends, attend,* and *expect*) in the BNC. However, in the span restricted to the left side of *reception*, i.e. 3 left to 1 left, various verbs with various verb tenses and forms are also collocated with *reception* (e.g. a past form, *rang*; a participle form, *given*; past or past participle forms, *hosted, received, attended,* and *invited*; present forms, *attend, attends,* and *expect*; an -ing form, *standing*), though the verbs *standing* and *invited* are not presented in the span of 3 left to 3 right. Generally, the verbs collocated in the span of 3 left to 1 left tend to be used in an active voice structure; that is, a verb + *a reception* such as (1) and (2) or be verb + passive voice + *at/in reception* as in (3) as follows:

(1) Later they hosted a reception for 75 guests in idyllic surroundings. (HJ4 1551)
(2) ‘We have to attend a reception at the Ambassador’s.’ (GV8 692)
(3) The Tenders list is held at reception and all tenders which arrive should be ticked off in pencil on the list at reception. (HPL 1263)

If the span focused on the right side of collocates of *reception*, the verb *held* is the most frequent, which is a relatively low rank (17th) with just eight occurrences in the span of 3 left to 1 left. Generally, the verbs collocated in the span of 3 right to 1 right tend to be used as in a passive voice structure, *the/a reception + be* verb + passive voice as follows:

(4) The reception was held in the Redcastle Hotel. (K34 219)
(5) A reception will be held for the runners and their supporters at the English Wine Centre. (B03 1326)

On the other hand, in the following question taken from TOEIC in the Exam Corpus, an active voice structure, *hold a reception*, occurs. In fact, the verb *hold* does not appear in the span of 3 left to 1 left in Table 8 and has a low frequency in the BNC.
The accounting department will ( ) a retirement reception for Mr. Jiles next Wednesday at 4:00 P.M.

(A) hold  (B) raise  (C) happen  (D) regard

Therefore, collocations presented in authentic English are not used in the stems of vocabulary questions in the Exam Corpus.

For another example, clusters, the most frequent patterns of repeated fixed phrases containing or co-occurring with the search word, can show us how this analytical technique can be applied to language testing. In this study, we examine which stem is used when the modal perfect, must have done, is tested in the exams. Thirty-four modal perfect questions testing must have done are analysed, the symbol zzz, indicating a bracket put into the search box, and 2-, 3-, and 4-gram clusters of must have done are obtained.

Table 9. 2-, 3-, and 4-grams in must have done in the Exam Corpus

<table>
<thead>
<tr>
<th>Rank</th>
<th>2-gram</th>
<th>Freq.</th>
<th>3-gram</th>
<th>Freq.</th>
<th>4-gram</th>
<th>Freq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>zzz it</td>
<td>7</td>
<td>zzz last night</td>
<td>3</td>
<td>zzz last night must</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>he zzz</td>
<td>6</td>
<td>she zzz it</td>
<td>2</td>
<td>zzz it on the</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>must zzz</td>
<td>5</td>
<td>someone zzz it</td>
<td>2</td>
<td>so he must zzz</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>it zzz</td>
<td>4</td>
<td>zzz it already</td>
<td>2</td>
<td>she zzz it on</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>she zzz</td>
<td>4</td>
<td>zzz it on</td>
<td>2</td>
<td>it zzz last night</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>zzz last</td>
<td>3</td>
<td>he must zzz</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>zzz in</td>
<td>2</td>
<td>it zzz last</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>someone zzz</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>zzz the</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>John zzz</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to Table 9, personal pronouns (e.g. he, she, someone, John) or the pronoun it appears before zzz, whereas the words it, last, in, the, last night, already, and on appear after zzz, as shown in the 2- and 3-grams. In fact, the phrases in the 4-gram indicate that questions with the modal perfect must have done seem to largely involve the phrases last night or it on; here are the actual questions:
(7) The road is wet. It zzz last night.
   A) must have rained          B) must be raining
   C) had to be rained          D) had to rain

(8) Kate lost her purse yesterday. She zzz it on the train.
   A) must drop                  B) must have dropped
   C) must be dropping           D) must have been dropping

(9) Katherine lost her purse yesterday. She zzz it on the bus.
   A) must drop                  B) must be dropping
   C) must have dropped          D) must have been dropping

Therefore, relatively the same or specific English is repeatedly used in the stems of the modal perfect questions must have done.

5.4 Dispersion Plot in WordSmith Tools

Lastly, in this section, RQ 4 (i.e. How can a dispersion plot be utilised to identify the parts tested in grammar questions?) was addressed to determine the part of a sentence that is frequently tested in the exams. In this study, subjunctive sentences including an if-clause or inverted sentences without if-clauses are both examined. In subjunctive sentences, an if-clause can be placed in the subordinate clause, normally placed at the beginning of a sentence. One hundred subjunctive questions are analysed. The symbol zzz indicates a bracket put into the search box. The following dispersion plot is obtained:

Figure 2. Dispersion plot of the stems in subjunctive questions

The dispersion plot shows where the search word occurs across a particular file, with the left edge of the plot representing the beginning and the right edge the end. As
Figure 2 illustrates, the symbol zzz indicating a bracket frequently occurs with the left edge of the plot, indicating the beginning of the sentences, such as (10) and (11), but not (12).

(10) zzz you been there, I would have told you.
(11) If it zzz for your help, I could not have finished this work in time.
(12) If you have come thirty minutes earlier, you could zzz your old friend.

Therefore, the dispersion plot could indicate the part and verb form in an _if_-clause, but not main clauses, that tend to be tested in the Exam Corpus frequently.

4. Conclusion and Future Research

This study demonstrates how corpus analytical techniques such as wordlists, keyword lists, collocations and clusters, and dispersion plots available in online corpora and concordancers can be utilised in language testing and assessment, using the information of frequency and authenticity in corpora.

First, the frequency list obtained from the Exam Corpus indicated the words that were frequently tested in the exam. However, the frequency list for the BNC revealed that these were not so frequently used in authentic English.

Second, the keyword list for the TOEIC and UEEJ questions in the Exam Corpus showed a clear difference in the English used in questions in the two exams. Therefore, item writers could utilise the keyword list when writing question items for specific English.

Third, the collocations obtained from the BNC revealed that the English used in the stems of multiple-choice questions did not reflect authentic English in the BNC. In addition, the clusters obtained from the Exam Corpus implied that relatively the same or specific English was repeatedly used in the stems of modal perfect questions on _must have done_.

Fourth, the dispersion plot obtained from the Exam Corpus could tell item writers the part and verb form of subjunctive _if_-clause that tend to be frequently tested in the exam questions.
In this study, some corpus analytical functions included in certain online corpora and concordancers were introduced to demonstrate how analytical functions can be utilised in language testing and assessment. However, in the future, other types of corpus analytical techniques that are available in other online corpora and concodancers are worth examining for application to language testing.

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Pan-Africanism and Africanisms Among People with a Gullah Geechee Heritage: Lessons for Young People and Future Generations in Africa and the Diaspora

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ABSTRACT

This paper examines Pan-Africanism and Africanisms as social forces among people of Black African descent with a Gullah Geechee heritage. It also proposes some lessons for young people and future generations in Africa and the Diaspora with special reference to Pan-Africanism and Africanisms. The lessons focus on the way tangible actions and outcomes have resulted because of Pan-Africanism and Africanisms among people of Black African descent with a Gullah Geechee heritage. People of Black African descent with a Gullah Geechee heritage who are exemplified in the lessons include Denmark Vesey, Gullah Jack, Abraham, John Horse, Cornelia Walker Bailey, Emory S. Campbell, and Jimmie C. Douglas. As used in this paper, Pan-Africanism refers to an international form of Black nationalism that involves racial solidarity and collective action around economic nationalism, political nationalism, and cultural nationalism. Africanisms refer to survivals from African cultures that can be found among the Gullah Geechee people and other groups of Black African descent in the USA, including the Creoles of Louisiana.

INTRODUCTION

Pan-Africanism and Africanisms are social forces that could be found during slavery and after slavery inside and outside what is now called the Gullah Geechee Cultural Heritage Corridor. Denmark Vesey and Gullah Jack Pritchard advocated what is now called Pan-Africanism when they called for Black people to engage in tangible action and outcomes by conspiring to organize an insurrection against slavery in South Carolina through racial solidarity and collective behavior. James Hamilton (1822), the White mayor of Charleston, and referred to Denmark Vesey, Gullah Jack, and their comrades as “insurgents” and their actions as “an intended insurrection” (p. 5). As Hamilton (1822) has shown that the City Council, which was composed of White people only, also referred to the actions of Denmark Vesey, Gullah Jack, and their comrades as “an intended insurrection” (p. 1). In addition, Lionel H. Kennedy and Thomas Parker, the two trial court magistrates did the same. Kennedy and Parker (1822) referred to the actions of Denmark Vesey, Gullah Jack, and their comrades as “an intended insurrection” (pp. iv, 17). As the main leaders of the intended insurrection, Denmark Vesey and Gullah Jack Pritchard convinced their followers to unify around the mission of economic, political, and cultural freedom despite being natives of different parts of Africa or the Diaspora. Whereas it is believed
by some that Denmark Vesey came from St. Thomas or another Caribbean Island, the record is relatively clear that Gullah Jack Pritchard came from Angola.² The trial records show that groups of people from Angola and Nigeria were involved with the insurrection (Hamilton, 1822; Kennedy & Parker, 1822).

On the periphery or outside of the present-day Gullah Geechee Cultural Heritage Corridor, Abraham and John Horse advocated Pan-Africanism when they called for Black people to engage in tangible action and outcomes by revolting against slavery in Georgia and Florida through racial solidarity and collective behavior. Those two leaders convinced their followers to unify around the mission of economic, political, and cultural freedom despite being natives of different parts of Africa or the Diaspora. Although most Maroons in the Seminole Nation came directly from parts of the United States of America (USA) such as Georgia and South Carolina, there were some who escaped from enslavement in Florida. Inside of the present-day Gullah Geechee Cultural Heritage Corridor, Cornelia Walker Bailey and Emory S. Campbell advocated what is now called now called Africanisms when they when they called for Black people to engage in tangible action and outcomes by participating in a cultural expedition to Sierra Leone. Bailey and Campbell also wrote books wherein they shared certain Africanisms they engaged in as participant observers. Likewise, Jimmie C. Douglas engaged in tangible outcomes by establishing the J.C. Douglas Scholarship Endowment at Savannah State University.

The purpose of this paper was to examine Pan-Africanism and Africanisms as social forces among people of Black African descent with a Gullah Geechee heritage. This paper will also propose some lessons for young people and future generations in Africa and the Diaspora with special reference to Pan-Africanism and Africanisms. The lessons will focus on the way tangible actions and outcomes have resulted because of Pan-Africanism and Africanisms among people of Black African descent with a Gullah Geechee heritage. People of Black African descent with a Gullah Geechee heritage who will be exemplified in the lessons include Denmark Vesey, Gullah Jack, Abraham, John Horse, Cornelia Walker Bailey, Emory S. Campbell, and Jimmie C. Douglas. As used in this paper, Pan-Africanism refers to an international form of Black nationalism that involves racial solidarity and collective action around economic nationalism, political nationalism, and cultural nationalism. Africanisms refer to survivals from African cultures that can be found among the Gullah Geechee people and other groups of Black African descent in the USA, including the Creoles of Louisiana.³

The methodology used in this paper was mixed method approach. It consisted of the case study method and the observation method. The research techniques included content analysis of primary and secondary source documents. They also included digital photographs of historical sites related to the Gullah Geechee cultural heritage.

**REVIEW OF THE LITERATURE**

The concept of Pan-Africanism has been covered in a wide range of publications, including books (e.g., autobiographies, biographies, edited compilations, etc.) and articles. This review will focus on some autobiographies by some of the key Pan-Africanists from around the world. Those Pan-Africanists include W.E.B. Du Bois, Kwame Nkrumah, Paul Robeson, Malcolm X, Nnamdi Azikiwe, John Henrik Clarke, and Kwame Ture. This review will cover each of these authors and one or more autobiographies they wrote.

A fifth Pan-African Congress was proposed for Tunis, Africa, in 1929, but the French government vetoed the project. Then we tried to charter a boat and hold the congress in the West Indies. There was no boat available. No further efforts have been made, yet the idea is not entirely dead. (pp. 279-280)

The Fifth Pan-African Congress did not take place until 1945. It was one of the best, if the best, and brought together Pan-Africanists who later played a role in liberating their countries from colonialism.

A key problem that confronted Du Bois (1940) and his Pan-African Congresses was finance. The Board of the NAACP refused to provide funds for the Pan-African Congresses. Du Bois recalled:

After I had gone to Europe and held the first Pan-African Congress and begin to advocate Pan Africanism, the board quite decidedly refused to accept this new activity as part of its program; bit it did not for a moment object to my further advocacy of Pan Africanism so long as I was responsible for any costs. (pp. 294-295)

This problem was compounded when the Great Depression hit in 1929. The effects of the Great Depression hindered any Pan-African Congresses to be held during the 1930s.

According to Du Bois (1940), another key problem for the Pan-African Congresses that he organized were often confused with the Garvey Movement. He stated that, “Often the Pan-African Congress was confounded with the Garvey movement with consequent suspicion and attack” (p. 278). Du Bois added:

My first effort was to explain away the Garvey movement and ignore it; but it was a mass movement that could not be ignored. I noted this movement from time to time on the *Crisis* and said in 1920 that Garvey was “an extraordinary leader of men” and declared that he had “with singular success capitalized and made vocal the great and long-suffering grievances and spirit of protest among the West Indian peasantry.” Later when he began to collect money for his steamship line, I characterized him as a hard-working idealist, but called his methods bombastic, wasteful, illogical, and almost illegal. I begged his friends not to allow him foolishly to overwhelm with bankruptcy and disaster “one of the most interesting spiritual movements if the modern world.” But he went ahead, wasted his money, got in trouble with the authorities and was deported from the United States. He made a few abortive efforts later, but finally died in London in 1940, poor and neglected. (p. 278)
If Du Bois and Garvey had been able to unite under the banner of Pan-Africanism and Black nationalism, it would have been a great benefit for Black people in the USA and throughout the world. For example, Du Bois might have been able to influence Garvey to spend the funds on better ships for the fleet of the Universal Negro Improvement Association (UNIA). Those ships could have been used to transport people from the USA and elsewhere to the proposed Fifth Pan-African Congress in 1929.

Whereas his first autobiography covered Pan Africanism from 1919 to 1940, the final one of Du Bois (1968) titled *The Autobiography of W.E.B. Du Bois* covered Pan Africanism from 1900 to 1963. Unlike the first autobiography, the last one addressed the First Pan-African Conference, which was organized by H. Sylvester Williams and held on London, England during 1900. At that conference, Du Bois served as its secretary and he wrote the conference resolutions. During his own presentation, Du Bois declared the Blank of the 20th century is going to be the colorline.

As was the case with the first autobiography, the last one covered the status and role of Du Bois (1968) in the first four Pan-African Congresses. However, the last autobiography made addition, namely a report on the Fifth Pan-African Congress. Du Bois provided details about his status and role at the Fifth Pan-African Congress held during October 1945 in Manchester, England. At that conference, the official position of Du Bois was chairman. Du Bois helped prepare the resolutions for the congress just like he did for the previous four. He also prepared an important history of Pan Africanism for the proceedings that were edited by George Padmore (1947). In addition to Du Bois and Padmore, another important individual at this gathering of Pan Africanists included Kwame Nkrumah, who would become a valuable mentee.

Du Bois (1968) also used his last autobiography to detail his status and role with the Council on African Affairs. It was organization founded by Paul Robeson and Max Yergan in 1939. Those two were later joined in the leadership by Alphaeus Hunton in 1943. Some five years later, Du Bois joined the organization in 1948 after he left the NAACP for second and last time. By the time Du Bois joined the Council on African Affairs, a split had taken place in the leadership. On one side of the split, there were Paul Robeson and Alphaeus Hunton. On the other side of the split, there was Max Yergan. Upon his entrance into the organization, Du Bois sided with Paul Robeson and Alphaeus Hunton. Although the three continued to try to carryout the mission of the Council on African Affairs, Max Yergan did all he could to try and destroy the organization. Max Yergan even became a government informer against Paul Robeson, Alphaeus Hunton, Du Bois, and others in the Council on African Affairs.

Nkrumah (1957/2002) covered life story in his book *Ghana: The Autobiography of Kwame Nkrumah*. One of the many topics Nkrumah covered was his status and role in the Fifth Pan-African Congress. Nkrumah informed us that he worked closely with George Padmore, T. Ras Makonnen, and Peter Abrahams to plan the Fifth Pan-African Congress, which was held in Manchester, England during October 1945. He and George Padmore served as joint secretaries of the Organization Committee. Nkrumah also addressed the status and role of W.E.B. Du Bois in the Fifth Pan-African Congress and explained that:

The Congress took as planned in October under the joint chairmanship of Dr W.E.B. Du Bois, an Afro-American scholar and one of the founders of the National Association for the Advancement of Coloured Peoples, and Dr Peter Milliard, a Negro physician from British Guiana, practicing in Manchester. The Congress was a tremendous success and was attended by over 200 delegates from all over the world. We
listened to reports of conditions in the colonial territories and both capitalist and reformist solutions to the African colonial problems were rejected. Instead the Congress unanimously endorsed the doctrine if African socialism based upon the tactics of positive action without violence. It also endorsed the principles enunciated in the Declaration of Human Rights and advised Africans and those of African descent wherever they might be to organise themselves into political parties, trade unions, co-operative societies and farmers’ organisations in support of their struggle for political freedom and economic advancement. (pp. 52-53)

According to Nkrumah, “The important declarations addressed to the imperialist powers of the world were adopted by the Congress, one written by Dr Du Bois and the other written by myself” (p. 53). Nkrumah pointed out that African people had a right to be free from the colonizers, free from capitalism as an economic system, and imperialism.

As he looked back at his youth, Nkrumah (1957/2002) touched some of the writers he read. Nkrumah wrote:

I read Hegel, Karl Marx, Engels, Lenin and Mazzini. The writings of these men did much to influence me in my revolutionary ideas and activities, and Karl Marx and Lenin particularly impressed me as I felt sure that their philosophy was capable if solving these problems. But I think that of all the literature that I studied, the book that did more than any other to fire my enthusiasm was Philosophy and Opinions if Marcus Garvey published in 1923. Garvey, with his philosophy of ‘Africa for the Africans’ and his ‘Back to Africa’ movement, did much to inspire the Negroes of America in the 1920’s. It is somewhat ironical that the white Americans in the South supported Garvey in these movements of his. They did this not because they were interested in the emancipation of the Negro as such, but because they wanted to get rid of the black man from the South and felt that this would solve the Negro problem. It was unfortunate that I was never able to meet Garvey as he had been deported from the country before I arrived, in connection with some kind of alleged fraud that he had got involved in. He eventually went to England where he died in 1940. (p 45)

Thus, during the 1920s, Nkrumah was influenced by Garvey. Later, during the 1940s, Nkrumah was influenced by Du Bois who he got to know during the Fifth Pan African Congress.

Nkrumah (1957/2002) asserted that the Fifth Pan-African Congress played a major role in the movement to free African countries from colonialism. In the view of Nkrumah, the Fifth Pan-African Congress played a major role in fueling racial solidarity and collective behavior among Africans. He wrote:

Like Garveyism, the first four conferences were not born of indigenous African consciousness. Garvey’s ideology was concerned with black nationalism as opposed to African nationalism. And it was this Fifth Pan African Congress that provided the outlet for African nationalism and brought about the awakening of African political consciousness. It became, in fact, a mass movement of Africa for the Africans. (pp. 53-54)
For Nkrumah, it was not Garveyism that fueled the African nationalism in Africa that mounted the struggle to free Black people from the colonizers, free Black people from capitalism as an economic system, and imperialism. Instead, it was the Fifth Pan-African Congress led by George Padmore, Kwame Nkrumah, W.E.B. Du Bois, T. Ras Makonnen, Peter Abrahams, and their comrades that fueled the African nationalism in Africa and mounted the struggle to free Black people from the colonizers, free Black people from capitalism as an economic system, and imperialism. Nkrumah credited the Fifth Pan-African Congress with inspiring indigenous Africans to return home and create social movements of the revolutionary type.

Robeson (1958/1988) offered a discussion of his life and times in his book *Here I Stand*. He informed us that he “discovered” Africa while working on some projects as a concert singer and actor in England away from his home in “Jim Crow America” (p. 33). Robeson said, “That discovery, which has influenced my life ever since, made it clear that I would not live out my life as an adopted Englishman, and I came to consider that I was an African” (p. 33). While working in England, Robeson had social interaction and developed social relationships with many continental Africans. He wrote:

> Like most Africa’s children in America, I had known little about the land of our fathers, but in England I came to know many Africans. Some of their names are now known to the world—Nkrumah and Azikiwe, and Kenyatta who is imprisoned in Kenya. Many of the Africans were students, and I spent long hours talking with them and taking part in their activities at the West African Students Union building. Somehow they came to look upon me as one of them; they took pride on my successes; and they made Mrs. Robinson and me honorary members of the Union. Besides these students, who were mostly of princely origin, I also came to know another class of Africans—the seamen in the ports of London, Liverpool and Cardiff. They too had their organizations, and had much to teach me about their lives and their various peoples. (pp. 33-34)

Robeson related that his “first interest in Africa was cultural” (p. 34). At the London School of Oriental Languages and other places, Robeson studied several African languages including Yoruba, Twi, Ga, Efik, and others. He also published articles on the cultures of people of African descent.

In addition to covering his own life, Robeson (1958/1988) covered some of the contributions of W.E.B. Du Bois. Robeson credited Du Bois with being one of the “foremost scholar and sage among us” (p. 72). Robeson also credited Du Bois with possessing “wisdom of mind, integrity of character and selfless dedication to humanity” (p. 72). In addition, Robeson credited Du Bois with being “the father of our freedom movement today” (p. 72). To place his statements in context, Robeson addressed some of the Pan-African activities of Du Bois. He said:

> Dr. Du Bois was invited to attend the celebration of the independence if Ghana, and the State Department barred his way, but of all the Americans who traveled to the Ghana celebration there was not one man by far who was worthy of being there as was Du Bois. For over forty years he has championed the cause of African freedom, and his books were the first to reveal the truth about the relationship of Africa with the modern world. He was the founder and architect of the Pan-African movement, and under his pioneering leadership the first Pan-African Congress was assembled at Paris in 1919. Du
Bois presided over the fifth Pan-African Congress in Manchester, England, in 1945, that was attended by Kwame Nkrumah, who later became the first prime minister of free Ghana, by Jomo Kenyatta and two hundred other leaders from every section of Africa, the West Indies, British Guiana, British Honduras, Brazil and the United States. (pp. 72-73)

For Robeson, it was Du Bois who was a “founder and architect of the Pan-African movement” (p. 73). Furthermore, Robeson argued that the traveling of Du Bois was “in the best interests not only of the people of the United States but in the best interests of the of the people of the world” (p. 73).

Malcolm X (1965) united with Alex Haley to publish his autobiography titled *The Autobiography of Malcolm X*. He dealt with his activities by pointing to some social relationships he developed with other Pan-Africanists in around the world. During the final two years of his life, Malcolm X made two important trips to Africa. While on Africa, Malcolm X interacted with Pan-African leaders of several African countries, including Ghana, Nigeria, and Egypt. One of those Pan-African leaders he met with was Kwame Nkrumah. Looking back at that meeting, Malcolm X stated:

In Ghana—or in all of black Africa—my highest single honor was an audience at the Castle with Osagyefo Dr. Kwame Nkrumah.

Before seeing him, I was searched most thoroughly. I respected the type of security the Ghanaians erect around their leader. It gave me that much more respect for independent black men. Then, as I entered Dr. Nkrumah’s ling office, he came out from behind his desk at the far end. Dr. Nkrumah wore ordinary dress, his hand was extended and a smile was on his sensitive face. I pumped his hand. We sat on a couch and talked. I knew that he was particularly well-informed on the Afro-American’s plight, as for years he had lived and peoples of African descent. We agreed that Pan-Africanism was the key also to the problems of those if African heritage. I could feel the warm, likeable and very down-to-earth qualities of Dr. Nkrumah. My time with him was up all too soon. I promised faithfully that when I returned to the United States, I would relay to Afro-Americans his personal warm regards. (pp. 356-357)

Just one year after Malcolm X was the victim of assassination in the USA by reactionaries, Kwame Nkrumah was the victim of coup by reactionaries in Ghana.

According to Malcolm X (1965), he met with many other Pan-Africanists while in Ghana, including Shirley Graham Du Bois, Ras Makonnen, and Nana Nketsia. Regarding his meeting with Shirley Graham Du Bois, Malcolm X said:

. . . Mrs. Shirley Graham Du Bois drove me to her home, so that I could see and photograph the home where her famed late husband, Dr. W.E.B. Du Bois, had spent his last days. Mrs. Du Bois, a writer, was the Director of Ghanaian television, which was planned for educational purposes. When Dr. Du Bois had come to Ghana, she told me, Dr. Nkrumah had set up the aging great militant Afro-American scholar like a king, giving to Dr. Du Bois everything he could wish for. Mrs. Du Bois told me that when Dr. Du Bois was falling fast, Dr. Nkrumah had visited, and the two men had said good-bye,
both knowing that one’s death was near—and Dr. Nkrumah had gone away in tears. (p. 359)

After Malcolm X was hosted at a party by the Ghanaian government, he related that, “I was told that this was the first time such an honor was accorded to a foreigner since Dr. W.E.B. Du Bois had come to Ghana” (p. 356). As for Ras Makonnen, Malcolm X stated, “I breakfasted with Dr. Makonnen of British Guiana. We discussed the need for the type of Pan-African unity that would also include the Afro-Americans” (p 355). In terms of Nana Nketsia, Malcolm X reported that “I had a talk in depth about Afro-American problems with Nana Nketsia, the Ghanaian Minister of Culture” (p. 355).

Azikiwe (1970) provided the story of his life and times in his book My Odyssey: An Autobiography. He covered his boyhood days in Nigeria and his pursuit of higher education in the USA. While in the USA, Azikiwe excelled as an undergraduate student at Storer College Howard University. He also excelled as a graduate student at Lincoln University, University of Pennsylvania, and Columbia University. During his Howard University stint, Azikiwe studied political science and sociology. Some of the professors he took classes with were Ralph Bunche, Willian Leo Hansberry, Abraham L. Harris, Alain LeRoy Locke, and Kelly Miller. Regarding Hansberry, Azikiwe said:

... this humble teacher linked his researches in anthropology with the origins of African history. He offered courses to show the role of persons of African descent in ancient, medieval and modern history. He delved into the depths of Egyptology to appreciate what such names as Piankhi and Tirhaka meant to the xxvth dynasty of ancient Egypt. He emphasised the humanitarian influence of Egyptian warriors, and demonstrated how it might have affected the development of the international law of war. Then he opened a new world to us in medieval history, pinpointing the role of Ghana, Mali, Melle and Songhay in the history of Africa. (p. 118)

Azikiwe lamented the treatment Hansberry received at Howard University. He thought that Hansberry should have been lauded for his pioneering scholarship in African studies instead of snubbed and ridiculed for not having a doctoral degree. Whereas Kwame Nkrumah hired W.E.B. Du Bois to head the Secretariat for Encyclopedia Africana after he took power in Ghana, Hansberry was hired, after Azikiwe took power in Nigeria, to be the non-resident director of the Hansberry Institute of African Studies.3

At Howard University, Azikiwe (1970) got to know George Padmore, a student from Trinidad, when he was still using his birth name, Malcolm Nurse. As Malcolm Nurse, Padmore organized a protest demonstration of a presentation by a White British official. Although he did not mention it in his autobiography, Azikiwe was present at the Fifth Pan-African Congress. However, he did mention the influence of W.E.B. Du Bois on his life and others. Azikiwe said that, “Du Bois concentrated among intellectuals and started the Pan-African Movement in the attempt to co-ordinate the nationalist crusade for freedom in Africa” (p. 137). In contrast, Azikiwe stated that, “Garvey founded the Universal Negro Improvement Association determined to rouse the racial consciousness of black people everywhere” (p. 137). In the view of Azikiwe, Du Bois, Garvey, Robert T. Kerlin, Alain Locke, Kelly Miller, Robert Moton.

Clarke (1999) presented his autobiography in his book My Life in Search of Africa. He made clear his commitment to Pan Africanism, Black nationalism, and socialism. Clarke stated:
I am a Nationalist, and a Pan-Africanist, first and foremost. Nothing takes precedent over my commitment to my people. While I realized that Karl Marx had some interesting things to say, my study of African communalism and African social living taught me that Karl Marx was a Johnny-come-lately and a political opportunist. He had warned over and was serving the world some political hash that was already old before Europe and Karl Marx were born. Africans had their form of socialism before Europeans had shoes or lived in a house that had a window and did not have to wait for Europe to bring socialism to the world. I’m not knocking their socialism; for them it may be good. As for us, we’ve got to dig a little deeper and find out what we did. The roots of our socialism must be rooted in the best things that we have done. (p. 24)

He further stated:

I mean to say that you can be loyal to African people, while acknowledging that other people have done some good and preserved some things for you that are useful. I’m a Pan-Africanist, an African world Nationalist, and a Socialist. I see no contradiction in being all three simultaneously. My commitment to Africa is not diminished by the fact that I acknowledge that a lot of the records that helped me see African history in a broader dimension beyond Blackness came from White writers. (p. 90)

For Clarke, one can be a Pan Africanist, Black nationalist, and socialist. He took the position of a both/and approach rather than an either/or approach.

According to Clarke (1999), he knew other Pan Africanists that included Kwame Nkrumah and Nnamdi Azikiwe. Clarke first met Kwame Nkrumah and Nnamdi Azikiwe when all three were members of the Harlem History Club, which was led by Willis Huggins. Through Willis Huggins, Arthur Schomburg, William Leo Hansberry, and others, a Great Books Education was acquired by Clarke, Nkrumah, and Azikiwe that supplemented any formal education they had attained. Clarke said he saw Nkrumah in Ghana after he became the leader of the country. Nkrumah gave him a job writing for his newspaper. Clarke credited a book titled A Tropical Dependency by Flora Shaw Lugard, a White woman who suggested the name Nigeria to the colonial authorities, with helping to inspire Nkrumah and Azikiwe to rise up and take power from the colonizers in Ghana and Nigeria.

Stokely Carmichael (aka Kwame Ture) addressed his autobiography in his book Ready for Revolution: he Life and Struggles of Stokely Carmichael (Kwame Ture) (Carmichael & Thelwell, 2003). He reported that Pan-Africanism became a major social force in his life shortly after he became a young adult. Carmichael remembered that he was introduced to one of the classic works in Pan-Africanism by Lewis Micheaux, the owner of the National Memorial African Bookstore in Harlem, New York. He said:

One of the great political and cultural resources for me at this time was Micheaux’s famous African Bookstore on 125th Street, which I would visit every chance I got. Mr. Micheaux saw that I liked to read about people and took an interest in me. One day I asked Mr. Micheaux about Padmore. He showed me a copy of Padmore’s Pan-Africanism or Communism and explained Padmore was a great Pan-Africanist thinker who was an adviser or mentor to Kwame Nkrumah. I was fascinated. I did not have the
money at the time to buy the book, but I skimmed through it eagerly. Later I would study Padmore and become one of his greatest supporters. Even today I always refer to Padmore as a seminal Pan-Africanist and encourage all Pan-Africanists to study and learn from him. (pp. 104-105)

He later found out that George Padmore was a native of Trinidad like him. Carmichael also found out that George Padmore’s original surname was Nurse and one of his childhood playmates was C.L.R. James (aka Cyril James). After living for awhile in the USA, Padmore headed to England wherein he later helped to plan the Fifth Pan-African Congress (Carmichael & Thelwell, 2003).

As he grew older, Carmichael (Carmichael & Thelwell, 2003) became more committed to Pan-Africanism rather than less. When he was a member of SNCC and a member of the Black Panther Party, Carmichael made it clear to his comrades that Pan-Africanism was an ideology to be embraced rather than scorned. Eventually, Carmichael headed to Africa where he became a mentor to Sekou Toure and Kwame Nkrumah. Carmichael chose to move to Guinea where Toure and Nkrumah shared power for six years. Although Nkrumah was listed as the honorary prime minister, he was much more than that. Looking back at Nkrumah’s stint in Guinea and his own observations of the social relationship between the two men, Carmichael said:

Well, once I spent time in Guinea, I could see for myself that it was anything but horrific. Of course President Toure and his advisers ran the government and party day to day. But President Nkrumah wasn’t President Nkrumah wasn’t simply trotted out for ceremonial occasions. He, first of all, was very much the senior adviser to President Toure, seriously consulted on matters of policy and national direction. He was also offered specific areas of responsibility according to his inclinations and interests. It was a truly inspiring relationship between these two African patriots, like nothing I’ve seen, read, or heard about in history or contemporary politics. (Quoted in Carmichael & Thelwell, 2003, p. 610)

For Carmichael, the social relationship between Nkrumah and Toure was the epitome of Pan-African. When Nkrumah was the head of state of Ghana in 1958, Toure badly needed his help and received it after Guinea was liberated from France. Likewise, when Nkrumah badly needed help after the coup in Ghana, Toure gave him the help he needed.

While living in Guinea, Carmichael (Carmichael & Thelwell, 2003) developed strong relationships with Nkrumah and Toure. Carmichael was so impressed by both men that he changed his name to Kwame Ture. He took on Nkrumah’s first name and Toure’s last although he left out the letter “o.” Eventually, Nkrumah gave Carmichael permission to create units of the All-African People’s Revolutionary Party. Nkrumah told Carmichael that, “I’ll give you the permission/mission to begin organizing the basis for the All-African People’s Revolutionary Party among our people in the diaspora” (Quoted in Carmichael & Thelwell, 2003, p. 623). Carmichael recalled he tried to do just his that.
LESONS FOR YOUTH AND FUTURE GENERATIONS REGARDING TANGIBLE ACTIONS AND OUTCOMES BECAUSE OF PAN-AFRICANISMS AMONG GEECHEES AND OTHER GULLAHS: THE EXAMPLES OF DENMARK VESEY, GULLAH JACK PRITCHARD, ABRAHAM, AND JOHN HORSE

Denmark Vesey, Gullah Jack Pritchard, Abraham, and John Horse have provided exemplary examples of Pan-Africanism among Geechees and other Gullahs. Denmark Vesey distinguished himself as a leader during an 1822 rebellion against slavery in South Carolina. Gullah Jack distinguished himself as a leader during that same 1822 rebellion against slavery in South Carolina. Abraham distinguished himself during the Second Seminole War in Florida. John Horse distinguished himself as a leader during that same Second War in Florida.

Denmark Vesey and Gullah Jack Pritchard in the 1822 South Carolina Insurrection

In the case of Denmark Vesey, he is considered one of the big three rebellion leaders in the USA. The other two are Gabriel Prosser and Nat Turner. Denmark Vesey, a Gullah, was probably born into slavery on St. Thomas in 1767 and died on July 2, 1822. He was hanged for organizing a rebellion against slavery on the Charleston, South Carolina area.

The record shows that Denmark Vesey spent his early years in St. Thomas before he was purchased by Captain Joseph Vesey, a White slaveholder and trader. Captain Joseph Vesey aimed to sell Denmark Vesey in Haiti, but the deal was unsuccessful. Subsequently, Denmark Vesey was made an enslaved cabin boy by Captain Vesey who named him Telemaque. In 1781, Captain Joseph Vesey took Denmark Vesey to Charleston, South Carolina. Denmark Vesey spent the next 17 years working for Captain Vesey’s trade company (Simpson, 2008; Egerton, 1999; Lofton, 1983; Pearson, 1999; Robertson, 1999).^5

In 1800, Denmark Vesey managed to purchase his freedom from Captain Vesey after he won a lottery of $1,500. That event marked a major turning point in his life. Instead of leaving Charleston and heading for another place where Black people were freer, Denmark Vesey chose to remain in that city and work as a carpenter. He also changed his name from Telemaque to Denmark Vesey. In addition, Denmark became involved with two Christian churches. He spent a short stint in the Second Presbyterian Church before moving on to the African Church (aka African Methodist Church and later Quinn Chapel African Methodist Church) (Kennedy & Parker, 1822; Hamilton, 1822).

While participating as a member of the African Church, Denmark Vesey began to plan a rebellion against slavery in 1817 or 1818. His co-conspirators included the following group of trusted lieutenants: Gullah Jack Pritchard, Ned Bennett, Rolla Bennett, Monday Gell, and Peter Poyas. Each one was a fellow member of the African Methodist Church. They developed a plan to assassinate South Carolina’s governor (Thomas Bennett) and assassinate Charleston’s mayor (James Hamilton, Jr.). The plan also included the taking over of the militia arsenal, burning the city, taking over the ships in the harbor, and killing more White people. To implement the plan,
Denmark Vesey and his core group had meetings at his home, at Monday Gell’s shop, and at Bulkley’s farm. In addition to the core group, other key co-conspirators were William Palmer, William Garner, Charles Drayton, Peirault Strohecker, and Batteau Bennett (Kennedy & Parker, 1822; Hamilton, 1822).

A key goal of Denmark Vesey and his group was to get Black people from the countryside to participate in the rebellion. Another key goal was to have a mass exodus to Haiti after taking over Charleston. One report stated that the plan included the participation of 9,000 Black people. A second report said that the plan included the participation of 6,000 Black. A third report related that the plan included 600 Black people (Kennedy & Parker, 1822; Hamilton, 1822).

According to the court proceedings published by Kennedy and Parker (1822), Denmark Vesey directed each member of his group to refrain from revealing the plan to enslaved Black people who accepted gifts from White slaveholders. However, William Paul tried to recruit Peter Prioleau, a Black person who was an enslaved house servant, and told him about the planned rebellion. Peter Prioleau went and told his White slaveholder, John Prioleau, about the plan. John Prioleau immediately reported the plan to other White slaveholders, including Mayor John Hamilton. As part of the reaction to the discovery, 131 Black people were arrested. In the case of Denmark Vesey, he was arrested on June 22, 1822 (Kennedy & Parker, 1822; Hamilton, 1822).

A series of trials were held involving those arrested, including Denmark Vesey and Gullah Jack Pritchard. Regarding the outcome of the trials, Kennedy and Parker (1822) said:

The whole number arrested were one hundred and thirty one, of whom sixty-seven were convicted.—From amongst those convicted, thirty-five were executed; the remainder will be sent beyond the limits of the United States, as well as some of those, who though not convicted, are morally guilty; and of those who suffered death, twenty-two were executed at the same time, on the same gallows. The object of punishment being effectually attained by these examples, and the ring-leaders being convicted, the arrests stopped here. (pp. 47-48)

Thus, the report stated that 67 of the 131 Black people who were arrested got convicted. Of the 67 who got convicted, 35 were hanged and the others were transported out of South Carolina (Kennedy & Parker, 1822; Hamilton, 1822).

According to the court proceedings published by Kennedy and Parker (1822), Denmark Vesey was identified as the chief organizer of the rebellion. Those court proceedings show that Lionel H. Kennedy, the presiding magistrate, said the following to Denmark Vesey during the sentencing phase:

The Court, on mature consideration, have pronounced you Guilty—You have enjoyed the advantage of able Counsel, and were also heard in your own defence, in which you endeavored, with great art and plausibility, to impress a belief in your innocence. After the most patient deliberation, however, the Court were not only satisfied of your guilt, but that you were the author, and original instigator if this diabolical plot. Your professed
design was to trample on all laws, human and divine; to riot in blood, outrage, rapine pine and conflagration, and to introduce anarchy and confusion in their most horrid forms. Your life has become, therefore, a just and necessary sacrifice, at the shrine of indignant Justice. It is difficult to imagine what infatuation could have prompted you to attempt an enterprise so wild and visionary. You were a free man; were comparatively wealthy; and enjoyed every comfort, compatible with your situation. You, had, therefore, much to risk, and little to gain. From your age and experience, you ought to have known, that success was impracticable. (p. 177)

During his trial, it was revealed that Denmark Vesey was promoting a liberation theology similarly to what Gabriel Proser advocated before him and what Nat Turner advocated after him. In contrast, Kennedy told Denmark Vesey that he should have embraced an anti-liberation theology and abided by the following teaching of the Apostle Paul in the Bible: “Servants’ (says Saint Paul) obey in all things your masters’, according to the flesh, not with eye-service, as men-pleasers, but in singleness of heart, fearing God” (p. 178). He also told Denmark that he should have abided by the following teaching of the Apostle Paul in the Bible: “Servants’ (says Saint Paul) be subject to your masters’ with all fear, not only to the good and gentle, but also to the froward” (p. 178). As the magistrate over the trial court, Kennedy expressed anger that Denmark Vesey would dare to wage struggle and dare to win against slavery.

Some five days after his trial ended, Denmark Vesey was one of the six who got hanged on July 2, 1822. Before his death in Charleston, Denmark Vesey had at least three wives, namely Beck, an enslaved Black woman; Polly, an enslaved Black woman; and Susan, a free Black woman. Denmark Vesey also had at least three sons and a daughter. The names of his sons were Sandy Vesey, Polydore Vesey, and Robert Vesey. His daughter’s name was Charlotte Vesey. The court records indicate that one of his sons may have been involved in the rebellion his father led against slavery (Kennedy & Parker, 1822; Hamilton, 1822; Simpson, 2008; Egerton, 1999).

Gullah Jack Pritchard, a Gullah as his name suggests, was probably born in Angola sometimes during the 1770s. He died on July 12, 1822 along with other members who planned an rebellion against slavery. At some point, during his youth, Gullah Jack Pritchard was captured in Africa and shipped as an enslaved person from Zanzibar to the Americas. By 1806, Gullah Jack Pritchard found himself held in bondage on Florida’s Fort King George Island by Zephaniah Kingsley, a White slaveholder. According to one source, Zephaniah Kingsley reported that Gullah Jack Pritchard was a priest in Africa and always kept a conjure bag with him. Gullah Jack Pritchard was sold as property by Zephaniah Kingsley to another White slaveholder named Paul Pritchard, who was based in Charleston, South Carolina (Kennedy & Parker, 1822; Hamilton, 1822).

Among the enslaved Black people of Charleston and the surrounding areas, Gullah Jack Pritchard was also known as Cooter Jack. Gullah Jack Pritchard was widely respected and feared by other Black people because of his knowledge of roots, which was an African spiritual system. Although he held on to his African spiritual system, Gullah Jack Pritchard became involved with the African Methodist Church, which was also attended by Denmark Vesey, Ned Bennett, Rolla Bennett, Monday Gell, and Peter Poyas. Gullah Jack Pritchard joined in a
conspiracy headed by Denmark Vesey to mount a rebellion against slavery. During the planning stages for the insurrection, Gullah Jack Pritchard issued a special concoction to other insurrectionists that was supposed to keep them from being killed by Buckras (Kennedy & Parker, 1822; Hamilton, 1822).

As Kennedy and Parker (1822) as well as Hamilton (1822) have noted, Gullah Jack Pritchard was captured, tried, and sentenced to death after the plan was betrayed by Peter Prioleau and other informers. On July 12, 1822, Gullah Jack Pritchard was executed by hanging for his role in the planned rebellion. According to the court proceedings, the presiding magistrate, Lionel H. Kennedy, told Gullah Jack Pritchard that:

The Court after deliberately considering all the circumstances of your case, are perfectly satisfied of your guilt. In the prosecution of your wicked designs, you were not satisfied with resorting to natural and ordinary means, but endeavored to enlist on your behalf, all the powers of darkness, and employed for that purpose, the most disgusting mummary and superstition. You represented yourself as invulnerable; that you could neither be taken nor destroyed, and that all who fought under your banners would be invincible. While such wretched expedients are calculated to inspire the confidence, or to alarm the fears of the ignorant and credulous, they produce no other emotion in the mind of the intelligent and enlightened, but contempt and disgust. Your boasted charms have not preserved yourself, and of course could not protect others.—“Your Altars and your Gods have sunk together in the dust. The airy spectres, conjured by you, have been chased away by the superior light of Truth, and you stand exposed, the miserable and deluded victim of offended Justice. Your days are literally numbered. You will shortly be consigned to the cold and silent grave; and all the Powers of Darkness cannot rescue you from your approaching Fate!—Let me then, conjure you to devote the remnant of your miserable existence, in fleeing from the “wrath to come.” This can only be done by a full disclosure of the truth. The Court are willing to afford you all the aid in their power, and to permit any Minister of the Gospel, whom you may select to have free access to you. To him you may unburthen your guilty conscience. Neglect not the opportunity, for there is “no device nor art in the grave,” to which you must shortly be consigned. (p. 179)

Like he did in the trial of Denmark Vesey, Kennedy expressed anger that Gullah Jack Pritchard would dare to wage struggle and dare to win against slavery.

**Abraham and John Horse in the Second Seminole War**

As Cornelia Walker Bailey and Emory S. Campbell have pointed out, many Gullahs and Geechees fled from slavery in Georgia and South Carolina, and then headed to Florida. In Florida, they lived as Maroons in the swamps and forests. A critical mass of those Geechees and other Gullahs joined the Seminole Nation and fought alongside American Indians in all three Seminole Wars. Cornelia Walker Bailey has informed us that she learned on a trip to Africa that:
... instead of using the Underground Railroad and going North, a lot of Geechee/Gullah people who escaped from slavery went down to Florida and joined the Native Americans there, the Seminoles. That some of them intermarried with the Seminoles and over time came to see themselves as part of the Seminole tribe. That after the Second Seminole War, when most of the Seminoles were forcibly removed to Indian Territory, to Oklahoma, that people of Geechee/Gullah ancestry went too and that some of their descendants still live in Oklahoma. (Bailey & Bledsoe, 2000, p. 311)

In her discussion of Geechees in the Seminole Nation, Bailey noted that Lawrence Cudjoe and Lance Cudjoe, who were chiefs in the Caesar Bruner Band of the Seminole Nation in Oklahoma, were part of the delegation with her in 1989 when they went to Africa. She wrote: “As a matter of fact, there were two people from Oklahoma in our delegation” (p. 311). Campbell (2008) made a similar statement to Bailey when he said that “slaves of the Sea Islands had run away to Florida and joined forces with the Seminoles against the US government. Thus, the reason for the Black Seminoles of Oklahoma who still speak Gullah” (p. 156).7

The First Seminole War started when troops from the USA attacked Negro Fort on the Apalachicola River. That war lasted from 1816-1818. Two key Geeche leaders in that war were Garcon and King Nero. The Second Seminole War took place from 1835-1842. It lasted for seven years. Three key Geeche leaders in that war were Abraham, John Horse, John Caesar, and Toney Barnett. Abraham and John Horse will be discussed below. The Third Seminole War took place from 1855-1858. It was also known as the Billy Bowlegs War and lasted three years. During the Third Seminole War, the chief in charge of the Seminole Nation’s warriors was Billy Bowlegs (aka Holata Micco), who was of American Indian descent and African descent (Cromartie, 2011a, 2011b, 2013).

During the three Seminole Wars, the Seminole Nation had two main types of chiefs during the antebellum period. One type was the hereditary chief who got that position because of a matriarchal line of descent. The oldest nephew of the sitting hereditary chief always became the next one. The second type was a war chief. People became war chiefs on their ability to lead men in battle, including guerrilla warfare. A relatively famous hereditary chief was the American Indian Billy Bowlegs, who was a member of the royal family by blood. In contrast, a relatively famous war chief was the American Indian Osceola, who was not a member of the royal family (Porter, 1967a, 1967b).

During the Second Seminole War, Abraham was the leading Black war chief of the Gullah-speaking Black Maroons in the Seminole Nation. Abraham was also the chief adviser and right-hand man to Micanopy, an American Indian who was the hereditary chief over the whole Seminole Nation. Whenever the Seminole Nation had negotiations with White government officials from the USA and he was present, Abraham did the talking for the Seminole Nation. Some White historians have tried to reduce Abraham to a simple interpreter, but the White soldiers he fought against have provided evidence that he was much more than that and in fact a recognized war chief (Porter, 1946a; Foreman, 1955-1956).

According to Porter (1946a), Abraham was born sometime between 1787 and 1791. In addition to the name Abraham, the record shows that Abraham had several basket names or nicknames including “The Prophet” as well as “Abram,” “Abra’m,” “Yobly,” and “Souanaffe
Tustenukke. as Abram, Abra’m, Yobly, The Prophet, and Souanaffe Tustenukke. On the one hand, Giddings (1858) stated Abraham had Georgia roots, On the hand, Porter said that Abraham, at one point during his youth, was enslaved by a Dr. Eugenio Antonio Sierra in Pensacola, Florida. Porter also took the position that Abraham was one of the enslaved Black people who got liberated in Pensacola by the British in 1812 and were later allowed to occupy Fort Negro. During the aftermath of the War of 1812 between the USA and the British, the later built a fort in 1814 on the Apalachicola River under the leadership of Major Edward Nichols. The British later turned the fort over to the Seminole Nation after leaving the area in 1815.

The military forces of the USA were horrified by the presence of Negro Fort, which was a relatively short distance from Georgia. Negro Fort became a destination for many enslaved Black people from Georgia who managed to escape into Florida. In light of that development, Andrew Jackson, as a general, ordered military personnel to attack Fort Negro. Jackson’s goal was to have his men destroy the fort and return all survivors to slavery. He sent a combined force of Army personnel and Navy personnel to participate in the attack under the leadership of Duncan L. Clinch (Jackson, 1832).

As Boyd (1937) has pointed out, the attack on Negro Fort commenced on July 27, 1816. On the one hand, the Navy personnel coordinated by Jairus Loomis, a sailing master, took a position in a boat in the river near the fort. On the other hand, the Army personnel coordinated by Duncan L. Clinch, a colonel, took a position on land outside the fort. Regarding the attack on Negro Fort, Loomis (1834) stated that:

At 4 A.M., on the morning of the 27th, we began warping the gun-vessels to a proper position; at 5, getting within gunshot, the fort opened upon us, which we returned, and after ascertaining the first one of which, entering their magazine, blew up and completely destroyed the fort. The negroes fought under the English jack, accompanied with red or bloody flag. (p. 560)

Loomis continued:

This was a regularly constructed fortification, built under the immediate eye and direction of Colonel Nichols of the British army; there were mounted on the walls, and in a complete state of equipment for service, four long twenty-four-pounder cannon; four long six-pounder cannon; one four-pounder field-piece; and a five and a half inch brass howitzer, with three hundred negroes, men, women, and children, and about twenty Indian warriors of the renegade Choctaws; of these, two hundred and seventy were killed, and the greater part of the rest mortally wounded, but three escaped unhurt; among the prisoners were the two chiefs of the negroes and Indians. On examining the prisoners, they stated that Edward Daniels, the ordinary seamen, who was made the prisoner in the boat on the 17th July, was tarred and burnet alive. In consequence of this savage act, both the chiefs were executed by the friendly Indians. (p. 560)

Thus, in his report, Loomis provided details of the attack that destroyed Negro Fort. He also informed us that the flag of the Maroons in Negro Fort was red.
Some 11 days before Loomis submitted his report, another one was submitted by Clinch (1821) about the attack on Negro Fort. Clinch said that:

...we received a shot from a 32 pounder, which was returned in a gallant manner. The contest was momentary. The fifth discharge (a hot shot) from gun vessel No. 154, commanded by sailingmaster Basset, entered the magazine, and blew up the fort. (p. 203)

He further related:

The American negroes had principally settled on the river, and a number of them had left their fields and gone over to the Seminoles, on hearing our approach. Their corn fields extended nearly fifty miles up the river, and their numbers were daily increasing. The chiefs passed sentence of death on the outlawed Choctaw chief and the black commandant, (Garson,) for the murder of the four Americans, and the sentence was immediately carried into execution. (p. 204)

In terms of the other survivors, Clinch reported that, “The Spanish negroes were delivered to Mr. Hambly, agent for the house of Messrs. Forbes & Co. and the American negroes are confined at this post” (p. 204). The captives Clinch referred to as American Negroes were enslaved in Georgia. Those Clinch referred to as American Negroes ended up in Florida on the Suwanee River under the leadership of Nero, a Gullah-speaking Black Maroon and war chief in the Seminole Nation. If the speculation of Porter is correct, Abraham was one of those people who fled from Negro Fort to a Maroon community of the Seminole Nation near the Suwanee River wherein the leadership included King Bowlegs, a hereditary Indian chief, and Nero, a Black war chief.

By 1826, Abraham had become a powerful figure in the Seminole Nation. He had become the chief adviser to Micanopy, a hereditary chief, and a war chief. When a delegation of Seminoles went to Washington, DC to negotiate directly with government officials of the USA, Abraham did all of the talking for the Seminoles. Abraham could speak Mucogee, Miccosukee, Gullah, Spanish, and Standard English (Porter, 1946a).

In 1826, McCall (1868), a White officer in the U.S. Army, saw the Maroon village where Abraham lived known as Pelahlikaha. McCall shared his observations in a September 25, 1826 letter to a relative. He wrote:

On the third day we reached “Pelahlikaha,”—in English, “Many Ponds.” In the midst of these ponds, on a ridge of high “shell-hummock” land—one, when old ocean’s waves rolled over it—a vast bed of small shell-fish or mollusks which for centuries had probably been accumulating, there now flourishes one of the most prosperous negro towns in the Indian territory. We found these negroes in possession of large fields of the finest land, producing large crops of corn, beans, melons, pumpkins, and other esculent vegetables. They are chiefly runaway slaves from Georgia, who have put themselves under the protection of Micanopy, or some other chief, whom they call master; and to whom, for this consideration, they render a tribute of a one-third of the produce of the land, and one-third of the horses, cattle, and fowls they may raise.
Otherwise they are free to go and come at pleasure, and in some cases are elevated to the position of equality with their masters. I saw, while riding along the borders of the ponds, fine rice growing; and in the village large corn-cribs well filled, while the houses were larger and more comfortable than those of the Indians themselves. The three principal men bear the distinguished names of July, August, and Abraham. We found these men to be shrewd, intelligent fellows, and to the highest degree obsequious.

(p. 160)

McCall told his relative that he observed to be Abraham to be very intelligent and shrewd as a leader. He also said that he observed July and August to be very intelligent and shrewd as leaders. McCall stated that the Maroons were chiefly runaway enslaved Black people from Georgia. The letter by McCall indicates that, despite being in a swamp, Abraham and the other Geechees worked together with the Indian comrades-in-arms to transform the land into an independent crop-raising community.

During the Second Seminole War, it cost the federal government an estimated $20,000,000-$40,000,000 and the lives of approximately 1,500 members of the armed forces of the U.S.A., including marines and sailors as well as soldiers. Throughout the long and costly war, Gullah-speaking Black Maroons known as Geechees played significant and often decisive roles not only as warriors, but as advisors, spies, and interpreters as well (Cohen, 1836; Marryat, 1839; Sprague, 1848; Giddings, 1858). Some Geechees entered the battlefields as chiefs or captains of their own warriors. Other Geechees served as lieutenants and warriors under Indian hereditary chiefs and war leaders.

Both before and after the start of the Second Seminole War, Abraham spoke for the Seminole Nation at major negotiations between it and White government officials from the USA. For example, Abraham spoke for the Seminole Nation at the Treaty of Payne’s Landing before the Second Seminole War. Abraham also spoke for the Seminole Nation at the Camp Dade meeting on March 6, 1837. He remained very active representing the Seminole Nation in Florida until 1839. On February 25, 1839, Abraham left Florida headed to Oklahoma via New Orleans on the steamboat Buckeye. His negotiations with White government authorized him 195 warriors, women, and children (including the formerly enslaved) to accompany him to Oklahoma (Porter, 1946a; Franks, 2008).

As Porter (1946a) and Franks (2008) pointed out, Abraham continuing to play a leading role in the Seminole Nation after his arrival in Oklahoma. On November 28, 1841, for instance, Abraham was one of the two people who spoke for Coacoochee at a meeting between the latter and Captain Ethan Allen Hitchcock, a White official in the Army of the USA. Looking back at that meeting in his autobiography, Hitchcock (1909) referred to Abraham as “the celebrated negro Abram” (p. 138). He also functioned in his role as a father to several children. An April 13, 1839 muster roll at Fort Gibson indicates that he was accompanied by two unnamed males. They may have been his children. Documents from Fort Gibson indicate that Abraham had a son named Washington, a son named Renty, and a daughter. The mother of his children was probably Hagar (aka Hagan) (Porter, 1946).

For the next 30 years, Abraham lived a relatively quiet life in Oklahoma. He spent most of his time in the Little River area raising cattle. However, there were a few occasions wherein he handled some negotiations between the Seminole Nation and White government officials as a speaker. He probably died in or around 1870 of natural causes. Abraham is believed to be buried in Brunerton, which is near Hazel and near the Little River (Porter, 1946a).
When Jesup (1861) completed a registry of Geechees his forces had captured during the latter part of the 1830s, he included Abraham’s name. In that registry of Geechees his forces had captured, Jesup listed Abraham as “Abram” and referred to him as the “principal negro” (p. 852). Jesup also stated that Abraham was “supposed to be friendly to the whites; said to be a good soldier and an intrepid leader; he is the most cunning and intelligent negro we have seen; he is married to the widow of the former chief of the nation” (p. 852). During the year before the registry completion of Jesup’s registry, the *Army and Navy Chronicle* published on June 15, 1837 the following extract of a letter received from a White officer fighting against the Seminole Nation:

> We have a perfect Talleyrand of the Savage Court in Florida, in the person of a Seminole negro, called Abraham, who is sometimes dignified with the title of “Prophet.” He is the Prime Minister, and privy councillor of Micanopy; and has, through his master, who is somewhat imbecile, ruled all the councils and actions of the Indians in this region.

> Abraham is a non-committal man, with a countenance which none can read, a person erect and active, and in stature over six feet. He was a principal agent in bringing about the peace, having been a commander of the negroes during the war, and an enemy by no means to be despised.

> While we lay on the border of Lake To-hop-to-la-ga, and the Big Cypress Swamp, a negro, Ben, was captured by our horse, and, after detaining him for a day, he was sent out to bring in Abraham, who he said was desirous of peace, and was concealed in the neighborhood.

> Abraham made his appearance, bearing a white flag on a small stick which he had cut in the woods, and walked up to the tent of Gen. Jesup with perfect dignity and composure.

> He stuck the staff of his flag in the ground, made a salute or bow with his hand, without bending his body, and then waited for the advance of the General, with the most complete self-possession. He has since stated that he was expected to be hung, but concluded to die, if he must, like a man, but that he would make one effort to save his people. (Quoted in “Seminole War,” 1837, p. 378)

Hence, the record shows that Abraham was a very intelligent and brave leader in the Seminole Nation with the status of a war chief. The record also shows that Abraham had several basket names or nicknames, including “The Prophet” as well as “Abram,” “Abra’m,” “Yobly,” and “Souanaffe Tustenukke. Abraham is listed as Abram in Jesup’s registry. In addition, the record shows that it was Abraham who often spoke on behalf of the Seminole Nation during negotiation with White officers in the U.S. military (Jesp, 1861; Sprague, 1848; McCall, 1868; Porter, 1946b).

In their accounts of the Second Seminole War, three other White officers in the U.S. Army who also discussed Abraham were Cohen (1836), Potter (1836), and (1848). Cohen said the following statement about Abraham as a leader in the Seminole Nation:

> Abram, or Yobly, as the Indians call him, is the chief Interpreter, and latterly succeeded Jumper as “sense carrier” to Miconope. This high chancellor and keeper of the king’s conscience, also heads about five hundred negroes, of whom he is
legislator, judge, and executioner, through his influence with the Governor. Yobly ran away from the whites at Pensacola while a lad, and like many of his blacks, dreads peace which would restore them as property. He is forty-five years of age, his figure is large, his face broad and square, having the thick lips of a full blooded negro. He is plausible, pliant and deceitful; and, under an exterior of profound meekness, cloaks deep, dark, and bloody purposes. He has at once the crouch and the spring of the panther, and certain traits of his character like him to Cardinal De Retz. (p. 239)

Potter made a reference to “an influential black chief named Abraham” (p. 26). Sprague published a July 6, 1838 letter written by Thomas S. Jesup wherein Abraham was twice referred to as a “negro chief” (pp. 195-196). Additionally, Sprague published visual images of Abraham and another Black war chief named John Horse.

John Horse (aka Gopher John, John Cavallo, Juan Caballo, Cowaya, Cowaiya, Cowayee, Cawiga, Cowia, and Coheia) was the second leading Black war chief of the Gullah-speaking Black Maroons in the Seminole Nation. Whereas Abraham was the chief adviser to Micanopy, John Horse was the right-hand man to Coacoochee. The latter was also known as Wild Cat. As a member of the Seminole Nation, John Horse distinguished himself in Florida, Oklahoma, Texas, and Mexico (Porter, 1943, 1944, 1947, 1960).

According to Porter (1944), John Horse was born during or around 1812 in Florida in a settlement of the Seminole Nation. His father was an American Indian and his mother was of African descent. In 1826, John Horse first gained notice by an outsider. That outsider was McCall (1868), who wrote about his observation years later in his memoirs. McCall said:

. . . a long-legged, lathy negro boy of some fourteen years, belonging to one of the Thlono-sasa Indians, called at this officer’s quarters and offered for sale a brace of gophers. He received his quarter of a dollar. . . . The next day the boy, John, brought another pair of gophers to the same office, and received his quarter. The next day it was the same, and the next. The officer was delighted with his good fortune. . . . (p. 164)

Eventually, the officer learned, through a cook, that he was buying the same gophers again and again. Regarding this matter, McCall further explained:

. . . he was first disappointed, then vexed, and finally enraged at the cheat he began to suspect had been played upon him. He at one sent out his Orderly to look for Master John, who was soon brought before him, looking as pale as a negro can look. Under the fear of being well flogged if he did not confess, John let out the truth; which of course was, that he had ledale the paling every night and captured the gophers he had sold during the day before. The joke took. John was let off without flogging, but with the *nomme de guerre* of “Gopher John” tacked to his life. (p. 165)

Thus, the White officer witnessed first-hand the tactics John Horse would later use as adult when dealing with people. John Horse took the position that he should get that which was best for him and his people. After reaching adulthood, John Horse became a skilled negotiator who was able to get outcomes that benefitted him and his people.
By the time of the Second Seminole War, John Horse had become a full-grown man. As the war unfolded, John Horse became known for his daring deeds. As Porter (1944) has indicated, one of John Horse’s major daring deeds was an escape from Fort Marion he managed to pull off with 19 other people on the night of November 28-29, 1837. The other 19 people who escaped from Fort Marion included (1) Coacoochee (aka Wild Cat and King Philip’s son); (2) Ispikokay; (3) Oktaiochee; (4) Tacosa Tustennukkee (aka King Philip’s brother); (5) Halpatah Hajo; (6) Apaahkee Moccochee (aka a sub chief); (7) Nocose Hajo; (8) Holata Tustenukkee; (9) Hotulke Hajo; (10) Hokepissee Emathlachee (aka King Philip’s son); (11) Neehathlokkee Emathla (aka King Philip’s son); (12) Emathla Tustenukkee; (13) Holat’ Tustenukkee; (14) Holata Tustunukkee; (15) Aha Micco chee; (16) AhalakHachee; (17) Echo Emathla; (18) Nokoshoay (aka Holata Tustunukkee’s sister); and (19) Apeeeay (aka one of the two woman who escaped). In a letter to Acting Quarter Master General T. Cross dated December 3, 1837, Thomas S. Jesup wrote about the escape and stated: “Coacoochee, John Cavallo, and sixteen other chiefs and warriors . . . could have escaped without aid from without. There are too many who would be ready to aid them particularly among the blacks” (Quoted in Porter, 1944, p. 121). Porter, in his discussion, of the escapees reported that Holata Tustenuggee meant chief warrior in the Seminole nomenclature.

A second major daring deed of John Horse was his participation in the Battle of Lake Okeechobee on December 25, 1837. On that date, warriors of the Seminole Nation defeated military forces under command of Zachary Taylor, a future president of the USA. John Horse and Coacoochee joined forces with fellow chiefs Alligator and Sam Jones to lead the Seminole warriors in that victory. Because of his performance in battles, John Horse attained the status of being a war chief. He also gained the responsibility which came along with the title (Porter, 1944).

During April 1838, John Horse and Alligator negotiated with White military officials from the Army of the USA and agreed to be shipped to Oklahoma. Upon his arrival in Oklahoma, John Horse became a spokesperson for the Seminole Nation. However, John Horse returned to Florida in 1839 to handle the negotiations between Seminoles like Coacoochee. John Horse returned to Oklahoma in 1842, which was the year that the Second Seminole War came to an end (Porter, 1944).

When he got back to Oklahoma, John Horse reassumed his leadership as a spokesperson for the Seminole Nation. John Horse went to Washington twice to negotiate with White government officials on behalf of the Seminole Nation. In 1849, John Horse founded Wewoka, Oklahoma as a place of refuge for Black Seminoles. After renegade Creeks and renegade Cherokees began to raid areas inhabited by Black Seminoles in Oklahoma seeking people to reenslave, John Horse and Coacoochee decided to head to Mexico with 300 followers (Porter, 1944, 1947).

According to Porter (1944), John Horse and Coacoochee negotiated a deal with the Mexican government upon their arrival in that country. The deal called for the Seminoles to receive land in southern Coahuila’s Nacimiento in exchange for patrol duties against Apache Indians, Comanche Indians, and Texas filibusters. The Mexicans referred to the Seminoles as Mascogas. Porter (1951) explained that, “The Seminole Negroes in Mexico, whom the
Mexicans called ‘Mascogas,’ probably because many of them spoke the Muskogee or Creek language, were probably as numerous as the Indians, or more so” (p. 162).

As Porter (1944) noted, the Mascogas continued their activities for some 20 years under the leadership of John Horse and/or Coacoochee. In 1857, Coacoochee died suddenly from smallpox.8 During 1870, John Horse and some of the Mascogas headed back to the USA and went to the Bracketville, Texas and Eagle Pass, Texas areas. Some of the Black Seminoles decided to join what became known as the Seminole Indian Scouts.9 Regarding John Horse, Porter reported that:

. . . he seems to have divided his time between the communities of Seminole Negroes settled on the military reservations of Ft. Duncan and Ft. Clark, and the colony of Nacimieto, to which many of the band, dissatisfied with the United States, shortly returned. (p. 133).

In his article on the Seminoles in Mexico, Porter (1944) said that John Horse probably died in 1882 either during or returning from a mission to see President Porfirio Diaz. The purpose of the trip was to engage in a “a mission to Prest. Diaz, to whom he had successfully appealed for protection against the governor of Coahuila, who was endeavoring to dispossess the Negroes of their land grant” (p. 133).10 Porter related that there are two accounts regarding the death of John Horse. One account holds that John Horse died in Mexico City from a sudden illness during the negotiations with President Porfirio Diaz. The second account holds that John Horse died when he got murdered at a cantina on his return trip to Nacimieneto. In an article published one year before the other one, Porter (1943) remarked: “John Horse’s burial-place no one knows—he died in mysterious circumstances, ca. 1885, while on a mission to Porfirio Diaz” (p. 43). Porter remarked that people of Mascogas descent remembered that John Horse and his comrade Coacoochee with gratitude and affection in Nacimiento, Mexico and Bracketville, Texas. In an article published three years after his article on Seminoles in Mexico, Porter (1947) related that a Mexican official document known as Archivo de Coahulia, Saltillo, Numero 3148, Legajo 88, pp. 17-26 suggest that 1882 was the year John Horse went to Mexico City and the year of his death. He also noted that John Horse was listed as dead in 1884 by a document known as Archivo de Coahulia, Saltillo, Numero 3148, Legajo 88, pp. 13-17, 39-40. It includes another document known as “Lista de las primitivas Gefes de familia de la tribu Mascogue.”

LESSONS FOR YOUTH AND FUTURE GENERATIONS REGARDING TANGIBLE ACTIONS AND OUTCOMES BECAUSE OF AFRICANISMS: THE EXAMPLES OF CORNELIA WALKER BAILEY, EMORY S. CAMPBELL, AND JIMMIE C. DOUGLAS

Cornelia Walker Bailey, Emory S. Campbell, and Jimmie C. Douglas have provided some lessons for youth and future generations. Those lessons offer tangible actions and outcomes and cover important aspects of Africanisms that are found inside and outside of the Gullah Geechee Cultural Heritage Corridor. Both Cornelia Walker Bailey and Emory S.
Campbell wrote that preserving Africanisms is a tangible action and outcome. They also both wrote that back to Africa cultural expeditions are a tangible action and outcome. Jimmie C. Douglas was a paragon who believed in philanthropy and the preservation of Black institutions through cooperative economics.

**Preserving Africanisms as a Tangible Action and Outcome Lesson**

In her book *God, Dr. Buzzard, and the Bolito Man*, Cornelia Walker (Bailey & Bledsoe, 2000) explained that she observed Africanisms on Sapelo Island as a child and an adult. Regarding the Black people who survived the Middle Passage, Bailey recalled that:

> They were expected to conform to the ways of the European slaveholders and they did just enough of that to get by, but they didn’t want to lose all of their African selves. They hung onto their customs and beliefs as much as they could and in doing so they kept a good bit of their pride. Then they passed their traditions down so successfully that many of the Geechee ways I learned as a child can be traced directly back to Africa. (pp. 2-3)

Bailey added:

> Even “dayclean” came from Africa. In Africa, you can still hear people speak of it today. Our word for dayclean is a little different from theirs, that’s all, because like almost everything my ancestors brought with them to this new shore, our version changed some over time. (p. 3)

In the case of Bailey, she spent most of her living on Sapelo Island and St. Simons Island. Looking at her life, Bailey remarked that, “At age fifty-five, I am of the last generation to grow up with all of the old Geechee ways. Our customs and traditions started fading in the mid-1950s when the outside world began crashing in” (p. 7).

During her childhood on Sapelo Island, Bailey (Bailey & Bledsoe, 2000) recalled that “we watched the animals for good- and bad-luck signs, we believed in the healing properties of the earth and all forms of the supernatural, and we believed in God, Dr. Buzzard and the Bolito Man” (p. 7). For Bailey, God was the supreme being in the universe who should be praised by Geechees. Dr. Buzzard was a root doctor who some people called a voodoo man. The Bolito Man was a man who controlled the numbers racket. Bailey explained that, “Everything we kids knew we learned from our parents. That’s how the old ways got passed down, including our beliefs about the spirits” (p. 30). She related that, “At planting time on Sapelo, we relied on signs from nature that the soil was ready to receive new seed and our beliefs about our bonds to the earth” (p. 36).

One belief Bailey (Bailey & Bledsoe, 2000) reported that was passed down to her was that, “A shooting star was a sign of birth over here and the old people would see one in the sky and go, ‘Aahn there’s gonna be a new addition in someone’s family soon” (p. 72). A second belief that Bailey said was passed down to her was the healing power of a herb called Life Everlasting. A third belief that Bailey said was passed down to her was the Brer Rabbit exemplified the “trickster” in the animal tales (p. 87). A fourth belief that Bailey stated was
passed down to her was White people were Buckras. Bailey explained that Buckra “came from a West African word used to describe a white man who surrounds or governs” (p. 92). A fifth belief that Bailey related was passed down to her was she was to pray facing the East because “God resides in the East and the devil resides in the West” (p. 157). A sixth belief that Bailey related was passed down to her was that it was important to sing the Negro Spirituals like “We are Climbing Jacob’s Ladder” (p. 160). A seventh belief that Bailey related was passed down to her was that it was important to for family to have a wake or set-up for members who died.

From her family, Bailey (Bailey & Bledsoe, 2000) said that she learned the story of her ancestor Bilali, an African Muslim who served as the “head driver” for Thomas Spalding during slavery (p. 134). Bailey also reported that she learned the story of Ebo Landing wherein some Egbo enslaved people committed mass suicide rather than submit to slavery. She stated that:

Not all the Ibos walked into the water, just some of them. There were others that were still alive. Some of them came to Sapelo, because Thomas Spaulding was one of three men who bought that shipload of slaves, along with John Couper, who owned the plantation Cannon’s Point on St. Simons, and Pierce Butler of St. Simons and Butler’s Island. (p. 281)

In addition, reported that she learned to use boil blackberry root and make a tea to treat diarrhea; use sassafras tea for measles; use Pennyroyal tea for women’s problems; and use a tea made from Spanish moss to treat asthma. “We used those teas for remedies, and you could use Life Everlasting as a remedy too, for a bad cold,” Bailey said (p. 203).

In his book *Gullah Cultural Legacies*, Campbell (2008) explained that he observed Africanisms on St. Helena Island as a child and an adult. He posed that Africanisms could be found in Gullah traditions, customary beliefs, art forms, and speech on Hilton Head Island. Campbell also posed that Gullah traditions, customary beliefs, art forms, and speech on other Sea Islands in South Carolina and Georgia. He explained that the Gullah culture comprises “a system of beliefs, customs, artforms, foodways, and language practiced among descendants of west Africans who settled along the coasts of North Africa, South Carolina, Georgia and Florida from slavery to the present” (p. 5). It was further related by Campbell that, “The culture is a carry-over from that which thrives in parts of West Africa. Today, it is estimated by some that more than a quarter million people fit the description of Gullah in the Gullah Corridor” (p. 5). Campbell also told us that Gullah culture is “distinguished by a rice diet, close family ties, spirituality, folktales, lore, and beliefs” (p. 33).

Several specific Africanisms were identified by Campbell (2008). One Africanism identified by Campbell was the eating of a Gullah cuisine which included rice dishes (e.g., red rice, peas and rice), okra, yams, etc. A second Africanism was the passing down from one generation to another of specific African derived proverbs. A third Africanism was the passing down from one generation to another of specific African derived folktales. A fourth Africanism was the passing down from one generation to another of a language system known as Gullah. A fifth Africanism was the passing down from one generation to another of specific African derived songs known as the Negro Spirituals. A sixth Africanism was the passing down from one generation to another of a specific African derived religious ritual known as the shout or ring
shout. A seventh Africanism was the passing down from one generation to another of specific African derived concepts of spirituality. Campbell related that, “Gullah Spirituality is reflective of traditional African and the subsequent adopted Christian heritage” (p. 81). Campbell added: “Practiced in insolation of mainstream culture within a dominant Gullah population, the spiritual beliefs of traditional Africa dominated for more than a century in coastal communities between North Carolina and Florida” (p. 81). An eighth Africanism was the passing down from one generation to another of specific African derived boats known as bateau.

Campbell (2008) suggested some key strategies for he termed “cultural preservation” (p. 159). He grouped his suggestions around family, community, and public policy. Campbell took the positions that it was imperative for Black people to take a course of action that will be positive and not negative. Regarding family, Campbell suggested that Black families take action to (1) preserve family land for residential use and economic ventures; (2) conduct regular family gatherings and extended family reunions to maintain connection of kinship and family assets through learning workshops and genealogy estate planning; (3) instill traditional family principles of work ethics, academicism, education, morals and behavior in children; (4) teach traditional art forms to children; (5) prepare traditional recipes regularly for family meals; (6) maintain residential and surrounding property in good repair and decently landscaped; (7) keep property tax current; and (8) organize family members for the purpose of investing in land and other property.

In terms of community, Campbell (2008) suggested that Black communities take action to (1) define Gullah cultural assets including art forms, food ways, and educational, spiritual and cultural institutions in sustaining communities; (2) organize and sponsor regular celebrations of cultural traditions, and art forms and food ways; (3) maintain vibrant institutions of education, spirituality and language and cultural arts; (4) organize and maintain property owners associations to regularly address issues and problems of common interest, including maintenance of neighborhood landscape; (5) provide opportunities for schooling public policy makers 9o.e. county council, town councils, planning boards, etc.) and community members on Gullah preservation issues; (6) promote Gullah culturally based economic ventures, such as restaurants, art galleries, etc.; (7) conduct community land use planning sessions in collaboration with public policy making bodies when appropriate; and (8) organize and maintain an active Community Land Trust to acquire land for community use. Regarding public policy, Campbell (2008) suggested that public policy people (1) recognize the Gullah culture as one that contains unique assets that promote sound family principles and livable communities; (2) [recognize that the] Gullah Heritage Corridor Commission (est. 2007) should collaborate with appropriate governments to achieve the provisions of the legislation; (3) promote opportunities for members to learn lessons on specific cultural features; (4) develop political and physical infrastructure that allows and encourages Gullah participation in the democratic and economic development process, i.e. create voting and public service districts, etc.; (5) in collaboration with financial institutions and members of the culture, develop and implement strategic financing plans for enhancing economic and community development; and (6) devise a system that would allow [property] owners to pay annual property taxes in installments. Campbell thought that his last suggestion “would lessen the burden that one-time payments present on the family budget and reduce the number of parcels lost for delinquent taxes” (p. 161). To further improve the
situation, Campbell suggested that Black families “encourage family villages, and long-term leasing in preventing transfer of land ownership” (p. 160).

**Back to Africa Cultural Expeditions as a Tangible Action and Outcome Lesson**

In 1988, Joseph Momoh, president of Sierra Leone, made a State visit to Washington to meet with Ronald Reagan, president of the USA. While in the USA, Momoh and his entourage made a visit to the Penn Center. Momoh’s visit to the Penn Center was arranged by Blank Smith, resident of South Carolina State College. During his visit to Penn Center on January 1988, Momoh acknowledged that the Gullah had a great similarity to the Krio spoken in Sierra Leone (Campbell, 2008; Bailey & Bledsoe, 2000).

During 1989, a total of 14 people, most with Gullah roots, visited Sierra Leone on a cultural expedition. Those 14 people came from various states, including Georgia, South Carolina, Florida, and Oklahoma. The people from Georgia were Cornelia Walker Bailey of St. Simons Island; Lauretta Sams of Darien; and Doug Quimby and Frankie Quimby of St. Simons Island. From South Carolina, the people were Emory S. Campbell and Earnestine Atkins of St. Helena Island; Myrtle Glascoe of Avery Research Center at the College of Charleston and Professor Alpha Bah of the College of Charleston; Elaine Jenkins of Johns Island; and Senator John Matthews of Orangeburg. The people from Oklahoma were Lawrence Cudjoe, Lance Cudjoe, and Freddie Cudjoe. There was one person from Florida, namely Senator Arnett Girardeau. Doug Quimby and Frankie Quimby were married as were Lance Cudjoe, and Freddie Cudjoe. Bah, a native of Sierra Leone, served as the escort to the other 13 people in the group (Campbell, 2008; Bailey & Bledsoe, 2000).

Campbell (2008) played a major role in recruiting Gullahs to go on cultural expedition in Sierra Leone. He said that the group of Gullahs were greeted by some of the cabinet members of that country upon their arrival in Sierra Leone. Campbell said that he saw several historical sites, including Bunce Island. During the enslavement period, Bunce Island was a major embarkation point that Henry Laurens and others used to “human cargoes” to South Carolina, Georgia, and elsewhere. Campbell observed that a Creole language known as Gullah and spoken on his St. Helena Island was very similar to a Creole language known as Krio and spoken in Sierra Leone. He also stated that both places had similar recipes and food, including rice dishes. When the group visited a church in Sierra Leone, Campbell observed the Sierra Leone people singing Negro Spirituals from the USA like *Steal Away, Swing Low Sweet Chariot*, and *Old Time Religion*.

Cornelia Bailey Walker reported that Emory S. Campbell recruited her to be a member of the 1989 cultural expedition to Sierra Leone. She in turn recruited three other people with a Gullah heritage to go on the trip. Those three people included Frankie Quimby, Doug Quimby, and Lauretta Sams. In Sierra Leone, Walker said she observed similarities in Sierra Leone to Sapelo Island’s faces of people, food, and some old traditions. Walker said she saw people who looked like her grandmother, mother, father, brothers, sisters, and herself. She observed that rice was a key part of the cuisine just like Sapelo Island. Walker stated that she saw the ring shout being performed in Sierra Leone just like Sapelo Island. She related that she observed people making baskets just like Sapelo Island. She pointed out that a basket used to process rice on Sapelo Island is called a fanner. In Sierra Leone, a similar basket is called a fanta (Bailey & Bledsoe, 2000).
Jimmie C. Douglas was a member of the Morgan-Frazier family clan, a Black family with a Geechee Gullah cultural heritage. During 1940, Douglas received his B.A. degree from Savannah State College (later Savannah State University) in agriculture. He was one of the first men, if not the first, to receive a B.A. degree in his family clan. Douglas proceeded to become a successful farmer. He also worked as a worked as a county extension agent in Jenkins County, Georgia for 28 years from 1957 to 1985. His job was to help farmers utilize best practices in raising their crops. In addition, Douglas served on the Jenkins County Board of Commissioners for 12 years from 1995-2006 and served as a member of the Board of Directors of Swainsboro Technical College (“J.C. Douglas,” 2016).11

During 2013, Douglas practiced as an outstanding act of Africanisms in the form of cooperative economics and catching sense when he donated $50,000 to establish the J.C. Douglas Scholarship Endowment at Savannah State University to assist students who exemplify the qualities of leadership, sportsmanship, and community service.12 He died on February 7, 2016. During 2017, the Jimmie C. Douglas Agriculture Center located in Millen, Georgia was renamed in his honor. The award was based on the services he provided as a Jenkins County extension agent and as a county commissioner. It is also a fitting acknowledgment of a job well done (“Jimmie Douglas,” 2022; “Jimmie C. Douglas,” 2023).

**IMPLICATIONS OF THIS RESEARCH**

This research, in terms of implications, has at least four significant consequences. One significant consequence is that it sheds light on Pan-Africanism and Africanisms as social forces among people of Black African descent with a Gullah Geechee heritage. The two social forces have helped Geechees and other Gullahs to survive and thrive at times. A second significant consequence is that it sheds light on Pan-Africanism as an international form of Black nationalism that involves racial solidarity and collective action around economic nationalism, political nationalism, and cultural nationalism. The intersection of economics, politics, and culture have been dynamic elements impacting Geechees and other Gullahs.

A third significant consequence is that it sheds light on Africanisms as survivals from African cultures that can be found among the Gullah Geechee people and other groups of Black African descent in the USA, including the Creoles of Louisiana. Africanisms, as a social force, consists of both nonmaterial culture and material culture. Key Africanisms that can be found in the Gullah Geechee cultural heritage are the Negro Spirituals; the ring shout ritual; the animal tales; a rice-based cuisine; the Gullah language; making sweetgrass baskets; patchwork quilting; and folk sayings.

A fourth significant consequence is that it sheds light on some lessons for young people and future generations in Africa and the Diaspora with special reference to Pan-Africanism and Africanisms. The lessons include what young people and future generations should know about the past, present, and future. As for the past, young people and future generations need to be able to answer these three questions: (1) Who am I? (2) Am I really who I am? (3) Am I all I ought to be? They also need to know the history of their cultural heritage and the history of their family clans.

Regarding the present, young people and future generations need to emphasize education and the development of stable careers for males and females; need to embrace spirituality versus religiosity (i.e., be a spiritual person versus a religious person); need to develop short range and long range goals. In terms of the future, young people and future generations need to never forget
the history of the Black race before and after 1482; need to give up self-hatred and contempt for our history and culture; need to give up the N-word as a term of endearment; need to strive to develop unity as a family and race; need to learn to stick together as a family and race; and need to build new institutions and save old institutions (e.g., strive to repeat the donation of $50,000 by Cousin Jimmie C. Douglas to Savannah State). As a body, the lessons focused on the way tangible outcomes have resulted because of Pan-Africanism and Africanisms among people of Black African descent with a Gullah Geechee heritage. Towards this end, the lessons exemplified people of Black African descent with a Gullah Geechee heritage like Denmark Vesey, Gullah Jack, Abraham, John Horse, Cornelia Walker Bailey, Emory S. Campbell, and Jimmie C. Douglas.

SUMMARY AND CONCLUSION

This paper has examined Pan-Africanism and Africanisms as social forces among people of Black African descent with a Gullah Geechee heritage. This paper has also proposed some lessons for young people and future generations in Africa and the Diaspora with special reference to Pan-Africanism and Africanisms. The lessons focused on the way tangible actions and outcomes have resulted because of Pan-Africanism and Africanisms among people of Black African descent with a Gullah Geechee heritage. People of Black African descent with a Gullah Geechee heritage who were exemplified in the lessons include Denmark Vesey, Gullah Jack, Abraham, John Horse, Cornelia Walker Bailey, Emory S. Campbell, and Jimmie C. Douglas.

In the view of the present writer, a key lesson for Black people to learn in the Diaspora and Africa is that Pan-Africanism and Africanisms are social forces that could be found during slavery and after slavery in what is now called the Gullah Geechee Cultural Heritage Corridor. The present writer has also argued that Denmark Vesey and Gullah Jack Pritchard were advocates of Pan-Africanism when they called for Black people to take tangible action and engage in a rebellion against slavery in South Carolina by engaging in racial solidarity and collective behavior. The two leaders convinced their followers to unify around the mission of economic, political, and cultural freedom despite being natives of different parts of Africa. Likewise, the present writer has argued that Abraham and John Horse convinced their followers to unify around the mission of economic, political, and cultural freedom despite being natives of different parts of Africa. In the case of Abraham and John Horse, they engaged in racial solidarity and collective behavior by encouraging Black people to take tangible action and flee from slavery, become Maroons, and participate in the three Seminoles Wars alongside American Indians as partisans. It is imperative that all Black people become aware of the tangible actions and Pan-African deeds of Denmark Vesey, Gullah Jack, Abraham, and John Horse.

Likewise, it is imperative that all Black people become aware of the tangible actions and Africanisms of Cornelia Walker Bailey, Emory S. Campbell, and Jimmie C. Douglas. In the view of the present writer, a key lesson for Black people to learn in the Diaspora and Africa is that Cornelia Walker Bailey, Emory S. Campbell, and Jimmie C. Douglas possessed important Africanisms that have been passed down from one generation to another. The Africanisms were manifested by certain ideas, norms, and material culture. Whereas Bailey and Campbell both have taken tangible actions and published books important lessons about Africanisms, Jimmie C. Douglas merged theory with practice by establishing the J.C. Douglas Scholarship Endowment at
Savannah State University to help other Black people. On the one hand, Greg Carr (2021) has said that, “We must not only honor our ancestors, we must learn from our ancestors.” On the other hand, James Smalls (2021) has stated that, “We must read the books our elders wrote.” Although Demark Vesey, Gullah Jack, Abraham, John Horse, and Jimmie C. Douglas never wrote a book, the same is not true of Cornelia Walker Bailey and Emory S. Campbell. It is imperative that Black people read the books of Cornelia Walker Bailey and Emory S. Campbell to learn about Africanisms. Similarly, to learn about Pan-Africanism, it is imperative that Black people read the autobiographies of W.E.B. Du Bois, Kwame Nkrumah, Paul Robeson, Malcolm X, Nnamdi Azikiwe, John Henrik Clarke, and Kwame Ture. By taking this action, Black people will be better off, instead of worst off, as they continue the struggle for freedom, justice, and equality in the Diaspora and Africa.

NOTES

1. The Gullah Geechee Cultural Heritage Corridor refers to a strip of coastline designated by the National Park Service stretching from Wilmington, North Carolina down to St. Augustine, Florida and 30 miles inland. It includes parts of North Carolina, South Carolina, Florida, and Georgia. James Clyburn, a Black member of the House of Representatives from South Carolina, played a major role in creating the Gullah Geechee Cultural Heritage Corridor by writing the authorization bill which was signed into law during 2006 (National Park Service, 2005; U.S. House of Representatives, 2006; U.S. Senate, 2006). However, Black migration patterns in the state of Georgia played a major role in the spread of the Gullah Geechee cultural heritage beyond 30 miles both before and after the Civil War. Turner (1948) stated that:

   The Gullahs are and have been continually moving westward and northward. Since in doing so they carry their speech patterns with them, persons investigating Negro speech in Alabama, Mississippi, or elsewhere may find it to their advantage to be acquainted with the Negro’s African background and to know the Negro informant so well that there will be no occasion for him to use the language which he commonly reserves for strangers. (p. 84)

Some 30 years later, Campbell (2008) said that:

   . . . as a direct link to the African continent, an almost lost culture that exists in the Sea Islands of the United States, along a corridor stretching from the northeast coast of Florida along the Georgia and South Carolina coastal shores to the Wilmington, North Carolina area, and little more than 50 miles inland at any point.” (p. vii)

Thus, Turner and Campbell have both convincing statements that the Gullah Geechee cultural heritage extends beyond the corridor because of migration patterns.

2. For more discussions of Denmark Vesey and the insurrection of 1822, see Higginson (1861); Lofton (1948, 1958, 1983); Pearson (1999); Walker and Silverman (2001); Egerton (2004); and Simpson (2008). On the one hand, scholars and writers who have taken the position the Denmark Vesey was involved with an actual plot to revolt include Higginson (1861); Grimke (1901);
Lofton (1983); Freehling (1965); Pearson (1999); Robertson (1999); Egerton (2004); and Spady (2011). On the other hand, scholars and writers who have taken the position that Denmark Vesey was not involved with an actual plot to revolt include Wade (1964); Johnson (2001); and von Frank (2001).

3. My definition of Pan-Africanism draws on the ideas of Du Bois (1903b); Blake and Cleaver (1969); Pinkney (1976); and Cromartie (2005a, 2005b, 2010a, 2010b, 2021c, 2021d). As I define Pan-Africanism, it involves that notion that it is Black nationalism on a multinational or global scale and includes economic nationalism, political nationalism, and cultural nationalism. My definition of Africanisms draws on the ideas of Du Bois (1903b); Turner (1949); Bailey and Bledsoe (2000); Campbell (2008); and Cromartie (2013, 2021a, 2021b, 2022a, 2022b). Africanisms include both nonmaterial culture and material culture. Some nine key Africanisms found in the Gullah Geechee cultural heritage are (1) the Negro Spirituals; (2) the ring shout ritual; (3) the animal tales; (4) a rice-based cuisine; (5) the Gullah language; (7) making sweetgrass baskets; (8) patchwork quilting; and (9) folk sayings.


5. Egerton (2004) said that Denmark Vesey was most likely born on St. Thomas in 1767. Robertson (1999) stated that Denmark Vesey was “probably” born on a Caribbean Island (p. 31).

6. The second Black band in the Seminole Nation is the Dosar Barkus Band. For more information about both bands, see Seminole Nation, I.T. (2001, 2015) and Seminole Nation (2023a, 2023b).

7. For some information on the status and role of people of African descent in the Seminole Nation during its three wars with the USA, see Simmons (1822/1973); Cohen (1836); Potter (1836); Williams (1837); Sprague (1848); Giddings (1858); Coe (1898); Porter (1971, 1996); J. L. Wright (1986); Mulroy (1993); Twyman (1999); and Cromartie (2013). In the case of Simmons (1822/1973), he informed us that:

   The Yemasees, as we have seen, were driven, in 1715, within the limits of Florida; and there are persons, now alive in that Province, who remember, in their youth, having seen some of the descendants of these people, who were in the condition of slaves to the Seminoles.

   They relate, that the former were remarkably black Indians; and it is thought, the Ocklewahaw tribe, who are marked by a deeper shade than any of the Seminoles, are, probably, descendants of the conquered race.

   From the best accounts I could obtain in Florida, it appears, that it was under King Payne, grandfather of Micconope, the present Chief, that the Seminoles invaded and achieved the conquest of the territories they now occupy. He is said to have lived to near an hundred years of age, and, late in life, married a Yemasse woman, his slave; by
whom he had the late Chief Payne, who bore, in the darkness of his complexion, an unequivocal mark of his Yemassee descent.

I have been informed, that his people, when offended with him, or over their cups, were accustomed to question the legitimacy of his authority, from the circumstance of being the son of a slave. (p. 57)

Thus, according to Simmons, Black blood entered the royal family of the Seminoles through Chief Payne, Old Bowlegs, and Billy Bowlegs. In addition to the book by Simmons and the others, see the articles on the founder of the Seminole Nation and presence of Maroons in the Seminole Nation by Porter (1949, 1950). Porter (1949) stated:

The Seminole Negroes were basically runaway slaves from Georgia, South Carolina, Florida, etc., who had taken refuge with the Seminole Indians and put themselves under the protection of certain of the chiefs to whom the paid a tribute in agricultural products, but were otherwise as free as the Indians themselves, living in separate villages, having their own fields, flocks, and herds, and carrying arms, and going into battle under their own captains, subject, of course to the orders of the Indian chief to who they own allegiance. Though referred to as “slaves” by certain observers, it is obvious, from all descriptions, that they were actually, as General Gaines called them, rather “vassals and allies”—some said, through their greater knowledge of the English language and the white man’s ways, actually the rulers of the nation. In Florida, Indian blood to some extent, inevitably entered their racial make-up. (p. 272)

Also, Porter made it clear that the Maroons in the Seminole Nation had developed, independent crop-raising communities. Porter also made it clear that the relationship between the Maroons and the American Indians was characterized by the two groups being allies.

8. For a detailed discussion of the death of Coacoochee, see Kenneth Wiggins Porter (1943).

9. See Porter (1946b) for some information about the Mascogas who joined the Seminole Indian Scouts.

10. For a detailed discussion of the activities of the Mascogas to keep their land in Coahuila’s Nacimiento, Mexico, see Porter (1947). Porter covered how the governor of Coahuila collaborated with the Sanchez Navarro family, the former owner, to sell the land of the Mascogas to a White man from England named John Willett. However, their actions were blocked by President Porfirio Diaz and the Mascogas managed to hold on to their land. Porter said that Jose Maria Garza Galan was another governor of Coahuila who “persistently endeavored to give trouble to the Seminole Negroes from 1865 until as late as 1891” (p. 272). In addition to covering John Horse, Porter also used his article to provide a description of the life and times of many other Mascogas.

11. For more information about the Morgan-Frazier family clan, see Cromartie (2013).
12. For more information about the concept of catching sense, see Cromartie (2021).

13. In addition to his statement regarding honoring our ancestors, Carr (2021) posed that the function of education includes these three elements: course content, skill development, and socialization.

14. In addition to his statement regarding reading the books of our ancestors, Small (2021) described himself as a Pan-Africanist and a Gullah.

REFERENCES


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Geechees and Other Gullahs in Georgia: Remembering Their Alliance with Muscogee People During Enslavement Before and After the 1821 First Treaty of Indian Springs

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ABSTRACT

This paper examines the alliance between Gullah Geechee people and the Muscogee people during the enslavement period before and after the 1821 First Treaty of Indian Springs. It also examines how a subgroup of the Gullahs became known as Geechees and united with some Muscogee people to create the Seminole Nation. In addition, this paper details how the Okefenokee Swamp and other areas of southern Georgia became battle zones in the Seminole Wars. Furthermore, it examines the impact of the alliance between Geechees and Muscogees in the Seminole Nation on White slaveholders in northern Georgia, including the present-day Emory University area.

INTRODUCTION

During the colonial and antebellum periods in the United States of America (USA), the White colonizers and settlers made many agreements with American Indian people that were broken. One of those American Indians groups who experienced such deceitful behavior were the Muscogee people. Virtually, each time the Muskogee people made a treaty with the White colonizers and settlers in Georgia, the latter broke it before the ink was dry. That practice included the 1821 First Treaty of Indian Springs (Monroe, 1834; Armistead, 1957).1

On the one hand, the White colonizers and settlers were taking the lands of the Muscogee people by force. On the other hand, the White colonizers and settlers were taking the labor of Black people by force and making them work for free. This social condition created a natural alliance between the Muscogee people and Black people with a Gullah Geechee heritage. As used here, the term Gullah Geechee heritage refers to the norms, values, and material products passed down intergenerationally among Gullah Geechee because of African retentions. That heritage includes language, quilting, food preparation (especially canning), folklore, spirituality, and the like (Ogunleye, 2006; Bailey & Bledsoe, 2000; Campbell, 2008; Cross, 2008; Cromartie, 2013; 2021a, 2021b).
Gullah, as a term, refers to a social group of antebellum people of Black African descent (and their descendants) who experienced chattel slavery primarily in the southeastern part of the USA. Gullah also refers to their language they spoke as a Lingua Franca.\textsuperscript{2} Eventually, that language made the transition from a pidgin language to a creole language. Prior to the Civil War, the term Gullah was used in the USA to refer to enslaved Africans who were born on the African continent or elsewhere in the Diaspora and faced bondage in this country. It also refers to their descendants. Additionally, Gullah was used to refer to the language they brought with them to the USA (Savannah Unit, 1940/1972, 1940/1986; Turner, 1949; Cromartie, 2011a, 2011b, 2013, 2020a, 2020b, 2021a, 2021b).

As used here, the term Geechee refers to a social group of Gullahs (and their descendants) who escaped from slavery, joined the Seminole Nation as Maroons, and fought in the three Seminole Wars as partisans.\textsuperscript{3} Many Gullahs ran away from slavery in the 18th and 19th centuries, became part of the Seminole Nation wherein they united with Muscogee people, and helped to fight three wars against the USA.\textsuperscript{4} The wars included the First Seminole War from 1816-1818; the Second Seminole War from 1835-1842; and the Third Seminole War from 1855-1858.\textsuperscript{5} A stronghold of the Seminole Nation was the Okefenokee Swamp located in southeast Georgia (Cromartie, 2011a, 2011b, 2013, 2020a, 2020b).\textsuperscript{6}

During the 21st century, some writers and scholars began to combine the terms and use Gullah Geechee. In the case of Georgia, some people inside the culture have used the terms Saltwater Geechee and Freshwater. The term Saltwater Geechee refers to Gullah Geeche people who come from the Golden Isles and coastal counties of Georgia. In contrast, Freshwater Geechee refers to Gullah Geechee people from the inland counties of Georgia (Walker, 2006; Cromartie, 2013, 2021a, 2021b).

This paper will examine the alliance between Gullah Geechee people and the Muscogee Nation during the enslavement period before and after the 1821 First Treaty of Indian Springs. It will also examine how a subgroup of the Gullahs became known as Geechees and united with some Muscogee people to create the Seminole Nation. In addition, this paper will detail how the Okefenokee Swamp and other areas of southern Georgia became battle zones in the Seminole Wars. Furthermore, this paper will examine some ways wherein the alliance between Geechees and Muscogees in the Seminole Nation impacted White slaveholders in northern Georgia, including the present-day Emory University area.

In this paper, the methodology involved a case study approach. Content analysis of the of primary and secondary source documents was the research technique utilized. On the one hand, the primary source documents include government documents, including reports from U.S. Army and U.S. Navy personnel. On the other hand, secondary source documents include scholarly books and articles by researchers.

\textbf{THE ALLIANCE BETWEEN GULLAH GEECHEE PEOPLE AND MUSCOGEE PEOPLE BEFORE THE 1821 FIRST TREATY OF INDIAN SPRINGS}

The 1821 First Treaty of Indian Springs, or more formally the Treaty with the Creeks, 1821, led the Muscogee Nation (aka Creek Confederacy) to cede land to the White colonizers
and settlers. The signing of the treaty took place on January 8, 1821 at Indian Springs, Georgia. It forced the Muscogee Nation to give up all land in Georgia east of the Flint River. That area totaled more than 4.3 million acres (6,700 square miles) of land (Monroe, 1825a; Armistead, 1957).

William McIntosh (aka Tustunnuggee Hutkee and White Warrior), the half-White American Indian, signed on behalf of the Muscogee Nation. He had been given a bribe that would allow him to be a token and continue to have a plantation east of the Flint River. The treaty also stipulated that the Muscogee Nation would receive $200,000 and agree to give up fugitive enslaved Gullahs or not give them refuge. Because of his nefarious action related to the 1825 Treaty of Indian Springs, William McIntosh was executed by the Muscogee Nation (Armistead, 1957).7

Prior to the 1821 First Treaty of Indian Springs, William McIntosh had taken other actions to support White colonizers. For example, William McIntosh joined forces with White colonizers to attack Negro Fort. During the joint attack on Negro Fort, William McIntosh headed 500 American Indians who fought side by side against the inhabitants. Following the end of the battle at Negro Fort, William McIntosh executed a Choctaw chief who was comrade of the Maroons in Negro Fort. Prior to the assault, William McIntosh was made a general in the U.S. Army (Armistead, 1957).

**Key Events in the Alliance Before the 1821 Treaty of Indian Springs**

The alliance between Gullahs and Muscogees in present-day Georgia date back to 1526. During that year, White colonizers from Spain, under the leadership of Lucas Vasquez de Ayllon, attempted to establish a permanent settlement in the Sapelo Sound area of coastal Georgia. Ayllon arrived there in October with a party of 600 people, which included around 100 enslaved Africans. The Africans were brought there to build the settlement and raise crops. An early winter led to hardship in the colony and its quick failure. After mistreatment by the White colonizers, the Africans rebelled by burning down the settlement, fled to the local American Indians, and became Maroons (Aptheker, 1943/1974).

Between the 1500s and the 1800s, Black people and Muscogee people continued to establish and maintain alliances. During 1670, White colonizers from England arrived in South Carolina to establish a permanent settlement. Those White colonizers from England found Yamassee Indians with Black blood. It is possible that the descendants of the 100 Maroons who fled from the White Spanish colonizers were migrating back and forth between Georgia and South Carolina. The White colonizers from England move to South Carolina angered the Spanish White colonizers who had settlements in St. Augustine and Pensacola. The Spanish White colonizers countered the move by passing an edict that said enslaved Black people who fled from South Carolina would be free in Florida if they accepted these three conditions: (1) they had to convert to Catholicism; (2) they had to adopt a Spanish name; and (3) they had to fight under the Spanish flag against the English military when called upon (Aptheker, 1943/1974; Wood, 1974; Deagan & Landers, 1999; Ogunleye, 1996, 2006).

Between 1670 and 1739, many Gullahs from South Carolina continued to liberate themselves by fleeing to Florida (Martyn, 1905; Oglethorpe, 1913).8 After Georgia was
established as a colony in 1733, many Gullahs liberated themselves by fleeing to the Okefenokee Swamp in southeast Georgia and northeast Florida; to the Apalachicola River area of southwest Georgia and northwest Florida; and the Fort Mose area near St. Augustine. The Spanish White colonizers in the St. Augustine area encouraged the Gullahs to flee there and promised them freedom under these three conditions: (1) Gullahs had to convert to Catholicism; (2) Gullahs had to adopt a Spanish name; and (3) Gullahs had to take up arms when ordered to do so by the Spanish White colonizers. Some Gullahs took them up on that offer, went to the St. Augustine area, and became part of the Fort Mose contingent. Other Gullahs headed to the Okefenokee Swamp area and the Apalachicola River area where they became Maroons. By 1736, Gullahs had established Maroon communities south of the Okefenokee Swamp and named them (1) King Hejah; (2) Big Hammock; and (3) Mulatto Girl (Foster, 1935/1978; Anderson, 1963; Ogunleye, 1996).

Before Georgia became a colony in 1733, enslaved Black people would often escape from South Carolina by taking a route near Palachacolas Fort on the Savannah River. On the one hand, some headed South to the Okefenokee Swamp and nearby forests. On the other hand, some headed to forests near the Apalachicola River in western Georgia. Others headed to Florida to live in its swamps and forests. In all three areas, it was not uncommon for Black Maroons to establish alliances with groups of Muscogee Indians. Black Maroons and Muscogee Indians were natural allies in that the White colonizers were trying to take the land of the Muscogee Indians and making Black people engage in forced labor. However, there were some Muscogee Indians who sought to enslave Black people, especially the “half-breeds” like William McIntosh (Foster, 1935/1978; Wood, 1974; Cromartie, 2011a, 2011b; 2013).

Eventually, there was a critical mass of Black people in Florida who had escaped from slavery in South Carolina. The Spanish White colonizers responded to the situation by allowing Gullahs to build Fort Mose in St. Augustine near Castillo San Marcos. During 1738, a group of Gullahs established Fort Mose as a Maroon community and military base with help from Spanish soldiers and Muscogees from the Yamasee band. James Edward Oglethorpe led an attack by his British White colonizers based at Fort Frederica in Georgia against Fort Mose and Castillo San Marcos in 1740. A Spanish force counterattacked against Fort Frederica in 1742 at the Battle of Bloody Marsh. In both instances, Gullah people fought alongside the White Spaniards and Yamasee against Oglethorpe and his forces (Oglethorpe, 1913; Cohen, 1836; Williams, 1837; Wood, 1974; Deagan & Landers, 1999; Ogunleye, 2006).

During 1739 in the Stono River area of South Carolina, a group of enslaved Gullahs rebelled in South Carolina and created an insurrection under their leader Jemmy. Their aim was to kill as many White people as possible before heading to Fort Mose. Between 1750 and 1812, the alliance between Geechees and Muscogees developed rapidly. The alliance led to the emergence of the Seminole Nation and the royal family of the American Indians in it quickly acquired Black blood. To promote unity among the two races, it became the norm for people in leadership to practice polygamy and have at least one wife from the other group (Sprague, 1848; Montiano, 1909; “An Account” 1913; I.A. Wright, 1924; Ivers, 1967).

In 1776 and 1787, Georgia complained to the Congress and sought its help about enslaved Black people fleeing to Florida. During 1812, the Georgia militia invaded Florida and fought battles against Geechees and Muscogees. A key leader of the Georgia militia was John
Floyd. In 1816, the US military attacked Negro Fort to try to destroy a key military base of Gullahs in West Florida. The US military forces included Army and Navy personnel led by General Duncan L. Clinch (Giddings, 1858; Coe, 1898; Patrick, 1954).

On July 27, 1816, Negro Fort, flying its bloody red war flag, was blown up by one of two Naval gunships under the command of sailing master J. Loomis and started the First Seminole War. Geechees played roles as warriors, war chiefs, interpreters, and spies. Three major war chiefs during the First Seminole War were Garcon of the Maroon community at Negro Fort; King Nero of the Maroon community at the Suwanee River and a war chief under King Bowlegs; and John Caesar of the Maroon community at the St. Johns River and a war chief under King Philip (Clinch, 1821; Boyd, 1937; Porter, 1946a, 1950). On May 5, 1818, Andrew Jackson (1832) sent a letter to Secretary of War John C. Calhoun wherein he referred to the First Seminole War as “this savage and negro war” (p. 702).

When a lucky cannonball shot from a Naval gunship hit the ammunition magazine in Negro Fort, an estimated 320 people were inside fortification and 1,000 were outside. Of the 320 people inside Negro Fort, 50 survived, including the Maroon leader Garcon in charge of Negro Fort and a Choctaw chief. Eventually, 20 of the survivors died from their injuries or were killed by the opposition. The other 30 were taken to Camp Crawford before being placed in chattel slavery in Georgia. Garcon and a Choctaw chief were executed. The White men killed Garcon. In contrast, William McIntosh and his men killed the Choctaw chief (Clinch, 1821; Loomis, 1834; Boyd, 1937).

Following the destruction of Negro Fort, Gullahs from that location headed to the Okefenokee Swamp’s Suwanee River. The migration increased the number of Gullahs in the Seminole Nation. By 1828, there were many Gullahs involved with the Seminole as warriors, war chiefs, interpreters, and spies. On the one hand, this social condition led to Gullah people in the Seminole Nation continuing to be seen as a critical mass and partisans who had to be attacked by the U.S. military. On the other hand, the Gullahs in Seminole Nation were given the war name Geechees to honor the Ogeechee Indians from Georgia and distinguish them from other Estelusti. Thus, every original Geechee was a Gullah, but every Gullah was not a Geechee (Cromartie, 2013, 2020a, 2020b, 2021a, 2021b, 2022a, 2022b).

After Georgia became an English colony in 1733, enslaved Black people continued to rebel and become Maroons after escaping from White slaveholders. Some headed to Florida to live in its swamps and forests. Two important places were Fort Mose in eastern Florida and Negro Fort in western Florida. Others headed to the Okefenokee Swamp in Georgia and the Apalachicola River where they established Maroon communities. By 1775, some of those Maroon communities established military alliances with a breakaway group of Muscogee Indians who formed the foundation of the Seminole Nation (Simmons, 1822/1973; Cohen, 1836; Sprague, 1848; Giddings, 1858; Porter, 1951, 1971, 1996; Boyd, 1937, 1951; Katz, 1986; Ogunleye, 2006).

As the wars unfolded, the alliance between stronger and stronger instead of weaker and weaker. The government of the USA used divide and conquer strategy to try to destroy the alliance. One tactic in that strategy was to try and to stir up mistrust and paranoia with a misinformation and disinformation campaign about who could be trusted and who could not be trusted. At times, the government used a 19th century version of a “snitch jacket” to make
Seminole warriors mistrust one another. A second tactic in that strategy was to use Seminole warriors they had “flipped” as guides and recruiters (Katz, 1986; Porter, 1996).12

To address their needs and the challenges they faced during the three wars, the warriors in the Seminole Nation developed a command structure with different types of chiefs. Among the types were principal hereditary chiefs, subchiefs, and war chiefs. Also, all principal hereditary chiefs had several war chiefs as their assistants, including at least one who was a Geechee. In addition to leading Seminole warriors into battle, war chiefs had the function of serving as counselors, advisers, and sense bearers to the principal hereditary chiefs and other war-chiefs who ranked higher. The Seminole Nation had the norm of using war names and war titles for individuals and groups (Cohen, 1836; Sprague, 1848; Porter, 1951, 1964, 1996; Rivers, 2000).13

As part of the norms in the Seminole Nation, the American Indian King Bowlegs (aka Eneha Micco), who was partly Black, developed a hereditary chief and war chief relationship with Nero, a Geechee, in the Suwannee River area during the First Seminole War. The American Indian Micanopy developed a hereditary chief and war chief relationship with Abraham, a Geechee, in the Peliklakaha area during the Second Seminole War.14 The American Indian Billy Bowlegs, who was partly Black, developed a hereditary chief and war chief relationship with the Cudjo (aka Cudjoe), a Geechee, in the Okefenokee Swamp area and elsewhere during the Second Seminole War. In the case of Billy Bowlegs, he also developed a hereditary chief and war chief relationship with the Geechee Ben Bruner (aka Ben Bruno) during the Third Seminole War in northern and middle Florida (Sprague, 1848; Porter, 1951, 1964, 1996; Rivers, 2000).

A second norm was that some war-chiefs also had their own assistants in the form of a war-chief. For example, an unnamed American Indian chief and developed that type of relationship at Fort Negro with Garcon, a Geechee. In the east Florida area, the American Indian King Philip (aka Emathla) developed that type of relationship with John Caesar, a Geechee. King Philip also developed that type of relationship with John Philip. In the middle Florida area, the American Indian Osceola (aka Oceola, Asi Yahola, and Powell) developed that type of relationship with John Horse, a Geechee. The American Indian Coacoochee (aka Wildcat) later developed that type of relationship in the Oklahoma and Mexico area with the Geechee John Horse.15 In Peliklakaha, Abraham, a Geechee, developed that type of relationship with the Geechees July and August (Sprague, 1848; Porter, 1964, 1996; Rivers, 2000).

THE ALLIANCE BETWEEN GULLAH GEECHEE PEOPLE AND MUSCOGEE PEOPLE AFTER THE 1821 FIRST TREATY OF INDIAN SPRINGS

Both before and after the 1821 First Treaty of Indian Springs, there were many treaties. Before the First Treaty of Indian Springs, there were the following nine: (1) Treaty of Savannah in 1739; (2) Treaty of Augusta in 1773; (3) Treaty of Augusta in 1783; (4) Treaty of New York in 1790; (5) Treaty of Colerain in 1796; (6) Treaty of Fort Wilkinson in 1802; (7) Treaty of Washington in 1805; (8) Treaty of Fort Jackson in 1814; and (9) Treaty of Fort Mitchell in 1818. After the First Treaty of Indian Springs, there were the following four: (1) Treaty of Indian Springs in 1825; (2) Treaty of Washington in 1826; (3) Treaty of Indian Agency in 1827; and (4) Treaty of Washington in 1832. Thus, there were two treaties at Indian Springs—one in 1821 and
one in 1825. Each of those treaties were forced upon the American Indians and led to their loss of land (National Park Service, 2021).

In the case of the 1825 Second Treaty of Indian Springs, it was the result of a meeting held on February 12, 1825. At the meeting, participants included White colonizers and Muscogee chiefs. On the one hand, there were Muscogee chiefs like William McIntosh who wanted to acquiesce and surrender almost all Muscogee land to the White colonizers. On the other hand, there were Muscogee chiefs like Big Warrior who objected to that action. Despite the objection of Big Warrior and others, William McIntosh signed the treaty. It was an action that eventually cost him his life (Monroe, 1834b; Armistead, 1957).

**Key Events in the Alliance After the 1821 First Treaty of Indian Springs**

Starting in 1750, many Muscogees fled to Florida to get away from the invasion and incursions of British White colonizers. Eventually, they created the Seminole Nation as a new confederation. It was composed of American Indians and Gullahs from Georgia and South Carolina. By 1813, there were so many Gullahs from Georgia living as Maroons in Florida that the White colonizers in that state developed a plan to attack and capture as many as possible. Spurred on by White slaveholders, Georgia militia forces and Federal military personnel attacked and created warfare campaigns in 1813, 1816, 1835, and 1855 (Sprague, 1848; Coe, 1898).

As Coe (1898) noted, Georgia attacked Maroon settlements, American Indian settlements, and Spanish settlements in 1812 and started the so-called Patriot War. During 1816, Federal forces attacked Negro Fort and started a war that lasted until 1818. This is known as the First Seminole War. In 1835, Federal forces entered in a war against the Seminole Nation that lasted until 1842. This is known as the Second Seminole War. During 1855, Federal forces attacked Seminole warriors in a conflict that lasted until 1858. This is known as the Third Seminole War. On December 9, 1836, General Thomas S. Jesup (1861) sent a letter to Secretary of War Benjamin F. Butler wherein he referred to the Second Seminole War in the following words, “This, you may be assured, is a negro, not an Indian war” (pp. 820-821).

The relationship between the Geechees and the Muscogees developed into a viable alliance between the two groups. A key aspect of the alliance between the Muscogees and the Geechees is that it led to 500 Geechees migrating with American Indians as part of the Seminole Nation to Oklahoma where they became known as Seminole Freedmen. Some of them migrated to Mexico where they became known as Mascogas. However, the alliance was tested when Seminole Freedmen fought under Billy Bowlegs in the Union Army against Jim Jumper and the Confederate Army during the Civil War. The alliance was also tested when American Indians in the Seminole Nation of Oklahoma was pressured other American Indians to practice racism against Seminole Freedmen. In addition, the alliance was tested when American Indians in the Seminole Nation of Oklahoma stripped the Seminole Freedmen of their votes in the National Council during the year 2000 after the money came (Littlefield, 1977; “Black Seminoles,” 1995).
THE OKEFENOKEE SWAMP AND OTHER AREAS OF SOUTHERN GEORGIA AS BATTLE ZONES IN THE SEMINOLE WARS

During all three Seminole Wars, battle zones included the Okefenokee Swamp and other areas of southern Georgia. As the First Seminole War progressed, in April 1817, Andrew Jackson led his troops in a march against Seminole Nation villages in the Suwannee River area. After the Seminoles retreated into the Okefenokee Swamp, Jackson departed from Georgia with his troops through a part of east Florida. The military forces under Jackson destroyed a few Seminole towns, Spanish forts, and British plantations. The First Seminole War resulted in a conflict between the Seminole Nation and Georgia settlers over Maroons from Georgia and land. An important outcome of the First Seminole War was the USA’s acquiring Florida from Spain during 1819 (Moore-Wilson, 1914; Nelson, 2013).

After Florida became an official territory of the USA in 1821, the Seminole Nation continued to have at least 35 relatively large identifiable villages. Those 35 villages included one in the Okefenokee Swamp. According to a government report issued that year by John H. Bell, the Seminole village in the Okefenokee Swamp was populated by a band of the Muscogee Indians known as Cowetas. Some writers and scholars also believe that Osceola once lived or was born in the Okefenokee Swamp (Swanton, 1922; Walker, 1933; Laumer, 1995).

Between 1821 and 1835, there was a lot of disdain held in the Seminole Nation by Muscogee Indians towards the White slaveholders and settlers. Likewise, there was a lot of disdain held in the Seminole Nation by their Geechee allies towards the White slaveholders and settlers. Both groups fled southward into Florida and its vast territory. Some ended up in Seminole settlements in the northern part of Florida. Others headed to the southern part of the state and even Andros Island in the Bahamas. Some of the key Maroon communities created in the northern Florida by Geechees were Pilacklihaha and Boggy Swamp in the north. Key Maroon communities created in southern Florida by Geechees were Sarrazota and Angola (Sprague, 1848; Brown, 1990, 2005; Bazam, 2015, 2016).

On May 2, 1828, Brooke (1848a), the commanding officer in the Tampa Bay area, wrote a letter to George Humphreys. The latter was a colonel serving as the official government agent for the Seminoles some nine years after the First Seminole War. Brooke reported the presence of four Maroons from Camden County, Georgia in Florida. He acknowledged they had escaped from a White slaveholder named Mrs. Hannay of St. Mary’s. In his letter, Brooke wrote:

I have ascertained that the negroes claimed by a person in Georgia are not at Peas Creek, but probably on the Withlacoochee, or in the neighborhood of Pilacklichaha, and it would be useless for me to send a command after them, because they would be hid by the Indians from the most careful search. (p. 52)

Brooke successfully managed to get the head chief, Micanopy, to surrender the four Maroons to him. However, Brooke (1848b) made the following statement in a second letter four days later: “I really pity those Indians, and although negroes are of little value to the Indians, being rather masters than slaves, still they view them as property” (p. 52). The capture of those four Maroons did not curtail relations between Maroons from Camden County and the Seminole Nation.

Although Geechees developed other options further south to flee to, the Okefenokee Swamp continued to be a haven for Muscogee people and their Geechee allies between the time that Florida became a territory in the USA in 1821 and the beginning of the Second Seminole
War in 1835. As the Second Seminole War raged from 1835-1842, its theater continued to range in southern Georgia as well as Florida. During the war, Seminoles sought to confuse the military forces of the USA by traveling back and forth between Georgia and Florida. Their destinations included the Okefenokee Swamp as well as Peliklakaha, Boggy Swamp, and Angola (Sprague, 1848; Brown, 1990, 2005; Bazam, 2015, 2016).

Nelson (2013) has reported that the area north of the Okefenokee Swamp had a Georgia militia commander named Thomas Hilliard during the period of the Second Seminole War. In August 1836, Hilliard wrote a letter to his superiors and complained that the Seminoles “go concealed as much as possible, and are committing depredations continually, robbing our corn fields and killing our stock” (Quoted in Nelson, 2013, p. 1). Hilliard felt duty bound to let his superiors know about social conditions faced by White people from the Seminoles in the Okefenokee Swamp area.

During December 1836, Motte (1953), a surgeon in the Army, was a participant in a military expedition on patrol near the Okefenokee Swamp. Motte kept a journal in which he wrote, “We were now in the extreme South East corner of Lowndes County near the great Okefinokee swamp, and in the very tracks of the hostile Indians, passing from Alabama to Florida . . .” (p. 71). Although the patrol helped to break-up the monotony and routine of camp life, Motte remembered that they had to take precautions when they entered the eternal pine-barrens of Georgia. Motte also recalled the difficulty of having to plod “through mud and water and saw-palmettoe” once the scouting got 20 miles into north Florida near the Suwanee River.

As Porter (1971) pointed out, on June 15, 1837, the Army and Navy Chronicle published the following extract of a letter received by an unnamed White man living in Savannah from another White man writing from Camden County, Georgia:

You will be surprised to hear that I have not long returned from an excursion after Indians. Three of them were captured about two miles from my house, and it is believed that some hundreds are in the Oakafanoke. The Indians were conducted to this neighborhood by a runaway negro from this section. The negro is well known to me, and a great villain he is—he is fled to the Oakafanoke, or in that direction, and fears are entertained that he may conduct, the next time, a much greater number. (“Extract,” 1837, p. 379)

The letter was dated May 31, 1837 and reported that Geechees from Camden County were active as warriors in the Seminole Nation. It also reported that White people in Camden County were concerned about that hundreds of Geechees and Muscogee warriors in the Seminole Nation had united and prepared to wage guerrilla warfare from the Okefenokee Swamp.

On June 4, 1838, Hilliard (1933a), the Georgia militia commander, wrote a letter from Wareboro, Georgia in Ware County to George R. Gilmer, the governor of Georgia. Hilliard stated:

I have Received information that a considerable Number of Indians have left Florida and are at this time on the limits of this county the Number I have not bin able to correctly ascertain but supposed to be one hundred warors by those who have been enganed with them it appears that thare are different ages of thare sign and it is believed other companys have come before them and have taken up thare Residence in
the Okafanoka Swamp two Battles have been fit by them and our citizens on the 27th and 28th May last the particulars of which I have not bin able to ascertain.

Two of the whites were wounded one supposed mortally no Indian kild or wounded as has been known the last battle are in the limits of this county on the Sawanna River.

The citizens are leaveing thare homes several familys have already left and many more will leave in a few days as they are hourly Expecting the Indians to fall on them they have reached those deep and dense Swamps of the Okafanoka and from my knowledge of those Swamps it will be almost impossible for them to be removed.

He also told Hilliard that, “I hope thare fore your Excellence will Grant us the authaurity to raise one company of monty men to continue in Service and to Guard our familys and property until such times as our citizens can remain at thare Homes in peace and Safety” (p. 201).

Taylor (1933), a general in the Army and future president of the USA, sent a letter on July 13, 1838 to Governor George R. Gilmer about the Seminoles in the Okefenokee Swamp. He reported:

A short time since while at Black Creek, I was informed that a party of Indians had taken refuge in the Okefanoke Swamp within the limits of the State of Georgia; that they had passed up through the settlements from the regions around the Ocklawaha, but without committing depredations of any sort on the persons or property of the inhabitants. I immediately despatched an officer to the neighborhood of the Swamp, where it was reported the Indians had entered it; and at the same time took measures to have a quantity of supplies sent to that vicinity; I learned that the volunteers had pursued the hostiles (no doubt refugee Creeks), and supposed to be 40 or 50 men with their families, that they came up with them on two occasions, in each of which after a slight skirmish, two or three white men wounded, the volunteers retired to their homes . . . (p. 204)

Taylor made it clear that he was aware of the situation in the Okefenokee Swamp. He acknowledged sending two companies of Dragoons and two companies of infantry to respond to Seminole warriors operating in the Okefenokee Swamp. Regarding his action, Taylor also stated that, “I flatter myself will afford ample protection to the inhabitants around the Swamp” (p. 204).

In addition, Taylor said: “. . . should however not be the case, Major Dearborn, who will locate the Post, is authorized to call into Service, such militia force as he may find requisite to effect that object” (p. 204). Taylor further related that a provisions depot had been established at Traders’s Hill or Camp Pinckney and that he ordered Captain Waite, an officer with the marines of the USA, to “ensure the regular supplies to the troops garrisoning the several posts around the Okefanoke, as well as to any others which may be called out” (p. 204).

Several days later, on July 22, 1838, the Seminoles attacked a family of White settlers whose patriarch was Maximillan Wildes. The attack took place in the present-day Waycross, Georgia area and led to the deaths of nine White people. The dead included Maximillan Wildes, his wife Mary Elizabeth Wilkerson Wildes, as well as six Wildes children and a young cousin with the surname Wilkerson. A total of five people managed to escape during the attack and they included Reuben Wildes, Jesse Wildes, James Wildes, John Wildes, and their cousin Alice.
Wilkerson. The four males who escaped were the sons of Maximillan Wildes and Mary Elizabeth Wilkerson Wildes (Walker, 1933; The Wildes Family, 2013).

Some three days after the attack on the Wildes family, Hilliard (1933b) sent a letter on July 25, 1838 to Governor George R. Gilmer Hilliard informing him about the situation. Hilliard said:

Last Sunday morning 22nd Inst between day break and sun rise the house of Maxey N Niles resident about seven miles from this place was attacked by a party of Indians supposed to be about fifty in number, and barbously murdered Niles, his wife, and six Children together with one of his neighbors Children who happened to be there at the time, four out of thirteen made their escape to tell the sad news. they plundered and burnt the House to the ground Immediately on the alarm being given by Niles oldest son who is one of the escaped Capt. Dade of the United States Dragoons who were stationed within three miles of the scene of depredation with about forty men went in pursuit of the indians and reached the place by one hour by sun the Indians were then gone but not more than half hour in advance but succeeded in reaching the swamp before the troops could overtake them. It was not considered advisable that so small a party of men would enter so dense a swamp where were so much sign. (p. 205)

Although he spelled the surname of Maximillan Wildes incorrectly, Hilliard did get it right about the basic facts regarding the attack. For example, Hilliard correct about the nine White people who died and the five White people who escaped.

During 1838, in the aftermath of the attack on the Wildes family, a military detachment of Army soldiers known as the Second United States Dragoons entered the Okefenokee Swamp in search of Seminole warriors. Several decades later, Rodenbough (1875), an officer with the Second Dragoons, published his observations of that sojourn. He wrote:

. . . Creeks had been harassing the settlers near the southern boundary-line of Georgia, and a detachment of troops, having too closely scrutinized their movements, saw the Indians melt away into the dim recesses of the Okefinokee. This swamp was of immense extent, more difficult to access than any previously mentioned, and had, up to this this time, never been penetrated by a white man. In the month of August Captain Beall, with his company (I), determined to attempt an exploration of this term incognita. Finding a fresh Indian trail, he soon discovered that it could not be followed mounted, as his horses mired the first step taken. Dismounting his men, he entered the swamp.

Rodenbough continued:

The heat soon became so oppressive as almost to impede respiration. It seemed like a spot where the breath of heaven was forbidden to enter, while the rays of the sun poured down, as through a convex glass, upon the aching heads of the party. After following the trail for about four miles, on a surface that trembled under foot and at last became entirely obliterated, the ground began to give way, the soldiers frequently sinking to the waist in black mud, the stench from which soon became so intolerable as to induce vomiting. Convinced himself, by sickness, of the impracticability of continuing the
route, Captain Beall directed a counter-march, and once more gained the open, where the grateful shade of the pine breezes from the north were hardly sufficient to revive the failing energies of his half-poisoned command. (p. 32)

For Rodenbough, the Okefenokee Swamp had a difficult terrain for White soldiers to traverse. He detailed the intense heat in the air and the strong stench from the mud.²¹

In November 1838, George R. Gilmer, the governor of Georgia, wrote a letter wherein he announced his creation of a Georgia militia regiment to fight against the Seminoles in the Okefenokee Swamp. Charles R. Floyd was assigned as the general in charge of the regiment. Upon his arrival at the southwest edge of the swamp, there were five companies waiting for him totaling 300 men. Floyd and his militia entered the swamp and after a few days saw an island that had housed almost 200 Seminole warriors. The militia named it Floyds Island in honor of their general. As they engaged in the Okefenokee Swamp campaign, which lasted three months, Floyd and his men saw very few Seminoles when they crossed through the swamp several times. However, Floyd and his men did have at least one battle with the Seminoles after emerging from the Okefenokee Swamp’s border (Walker, 1933; Nelson, 2013).

The Seminoles utilized the strategy of guerrilla warfare wherein they engaged in hit and run tactics. Their hit and run tactics included ambushes and small raids. To counter that Seminole strategy, Floyd had his men utilize a series of forts and blockhouses established on the perimeter of the Okefenokee Swamp in Ware County. The forts in Ware County included Fort Mudge on the north-eastern side of the swamp; Fort Dearborn on the north-eastern side of the swamp; Fort Floyd on the north-eastern side of the swamp; and Fort Gilmer on the western side of the swamp. Among the blockhouses located in Ware County were Fort Barnam, Fort Muse, Fort McClain, Fort Mills, Fort Smith, and Fort Walker. One of Floyd’s objectives was to force the Seminoles to leave Georgia and retreat into Florida. Nevertheless, the area of the Okefenokee Swamp was marked by instability and the threat of the Seminoles despite the presence of Army soldiers and the Georgia militia. This social condition remained until John Tyler, the president of the USA, issued a cease-fire directive on May 10, 1842 (Walker, 1933; White, 1995; Nelson, 2013).²²

During 1839, Thomas S. Jesup, a major general in the Army, wrote a letter to his superior officers regarding the Okefenokee Swamp activities of Geechees and Muscogee warriors in the Seminole Nation. Jesup stated:

. . . the Creek Indians have all left the Okefenokee & gone south, there were seven runaway negroes from Georgia among them, well armed & plenty of ammunition. . . . the negroes have done most of the mischief in that quarter; the negroes also have left & on their way south burned the houses in the vicinity. (Quoted in Porter, 1971, p. 282)

He made it clear that trouble for White people was caused in the Okefenokee Swamp region by Geechees and Muscogee warriors. Jesup also noted that Geechees in the Seminole Nation consisted of armed runaways from Georgia who had united with Muscogee Indians in the Seminole Nation.

In the Third Seminole War from 1855-1858, the theater ranged in southern Georgia as well as Florida. That theater included the Okefenokee Swamp. During the Third Seminole War, the warriors in the Seminole Nation continued to engage in guerrilla warfare. However, they also sought to avoid as much contact with White people as possible because their numbers had
been reduced due to emigration to the west and elsewhere. Also, some of the Geechees in the Seminole Nation had been captured and returned to slavery on Georgia plantations.

After the Third Seminole War ended in 1858, Muscogees were still seen in the Okefenokee Swamp. Walker (1933) reported that:

According to Mr. Alex. Eunice, a large body of Indians made camp some three miles southeast of Waycross in 1862. They were of the Creel tribe and were trying to make their way into the Okefenokee Swamp. Mr. Eunice went into their camp where he found them cooking terrapins which they had caught in the vicinity. Mr. Eunice offered them salt and such other supplies that he thought they needed, but they refused. They did inquire of him, however, the direction into the swamp and the following morning they broke camp and moved south. (p. 17)

During the Civil War, the Okefenokee Swamp was a haven for Muscogees, Gullah-speaking Maroons fleeing from slavery, and military deserters. It remained that way until 1865.

On the one hand, the Muscogees as refugees from their under-siege Muscogee Confederacy, were trying to escape being sent west. On the other hand, the Geechees, as Gullah-speaking Maroons, were trying to escape enslavement. Thus, instead of fleeing north like John “Fed” Brown, James Madison, William and Ellen Craft, Frederick Douglass, and others, many Gullah-speaking Maroons made the decision to join forces with American Indians to wage armed struggle against slaveholding White people. Subsequently, they carried on guerrilla warfare and encouraged other Black people to run away from slavery and become Maroons. The migration of Gullah-speaking Maroons from Georgia and their descendants to various points south and elsewhere took place from the 1700s up until the Emancipation Proclamation took full effect in 1865. In addition to Florida, some Gullah-speaking Maroons with Georgia roots migrated to places such as Oklahoma; Texas; Coahuila, Mexico; Andros Island, Bahamas; Nova Scotia, Canada; Cuba; Liberia; and Sierra Leone (Cohen, 1836; Sprague, 1848; “Extract,” 1837; Davis, 1930; Goggin, 1946; Porter, 1971, 1996; Dillard, 1972, 1980; Hancock, 1980; Opala, 1981; Mulroy, 1993; Twyman, 1999; Howard, 2002).

THE IMPACT OF THE ALLIANCE BETWEEN GEECHEES AND MUSCOGEES ON THE SEMINOLE NATION ON THE WHITE SLAVEHOLDERS IN NORTHERN GEORGIA, INCLUDING THE PRESENT-DAY EMORY UNIVERSITY AREA

The alliance between Geechees and Muscogees in the Seminole Nation had a profound impact on White slaveholders in northern Georgia, including the present-day Emory University area. To combat the Seminole Nation, White slaveholders activated militias from across Georgia and called them into service. One of those places militia personnel came from was the present-day Emory University area. After the White slaveholders forced the Muscogee people out of the area, they brought in other White people and gave them free land under an allotment system. Their goal was to increase the White presence in the area and decrease the Muscogee presence (“Florida in the Early Days,” 1900; Walker, 1933; Covington, 1982).

To implement the removal strategy, White slaveholders created social policy aimed at driving the Muscogee out of Georgia. At the same time, White slaveholders held on to the
strategy of holding Black people in bondage throughout the state. Muscogee people responded to the incursions of White slaveholders by fighting two wars against the USA. A key organizer of the Muscogee resistance movement against the removal strategy was Tecumseh, a Pan-Indian who urged all tribes, bands, and clans to unite against the White colonizers and settlers (G. Foreman, 1972; Horan, 1972; J.L. Wright, 1986; Littlefield & Parins, 2011a, 2011b).

Writers and scholars have referred to aspects of the Muscogee resistance movement as the First Creek War from 1813-1814 and the Second Creek War from 1836-1837. The First Creek War took place in Georgia and Alabama. A major incident during that war was an attack by Muscogee people on Fort Mims. According to one report published in the American State Papers, “Siras, a negro man, cut down the pickets” (Chiefs at Coweta, 1832, p. 853). Another report published in American State Papers reported that the Muscogee warriors who attacked Fort Mimms said that “the Master of Breadth has ordered us not to kill any but white people and half breeds” (Quoted in Hawkins, 1832, p. 853).

On the one hand, one report said that a Black opened a gateway so that Muscogee warriors could come in and kill the White people. On the other hand, the Muscogee warriors said that the God wanted them to kill all White people in Fort Mimms, but not any Black people. Thus, the White people in Fort Mimms were killed during the attack, but no Black people. The battlegrounds of the Second Creek War were in Georgia as well as Alabama. The Second Creek War erupted in 1836 when a force of Muscogee warriors, under the leadership of Neamathla and others, attacked Roanoke, Georgia, which was in present-day Stewart County (Chiefs at Coweta, 1832; Hawkins, 1832; Swanton, 1922; Ogunleye, 2006; Kane, 2017; Ellisor, 2010).

Neamathla had a long and lengthy career in leadership among the Muscogees in Georgia. After the First Creek War, Neamathla headed to Florida where he united Muscogees and others in the Seminole Nation. By 1820, Neamathla was the principal in the Seminole Nation. He held that position until 1825. Neamathla was succeeded by John Hicks who in turn was succeeded by Micanopy. Although he was no longer the principal chief, Neamathla was still a war chief as evidenced by his participation in the attack on Roanoke, Georgia. However, Neamathla was one of the Muscogee people who was captured in 1836 and forced to walk part of the way from the Georgia-Florida area to Oklahoma on the infamous “Trail of Tears” (Coe, 1898; Swanton, 1922).

In the case of White people in Georgia, many of the men served in Georgia militias that were activated from 1813 through 1836 and even afterwards. This caused those White men to be away from their parents, wives, children, other relatives, and friends as they engaged in armed conflict against the Muscogee people and Geechee people. Although most White people in Georgia were not slaveholders, powerful people in the White population created a system based on White skin privilege wherein all White people could receive land that previously belonged to the Muscogee Nation. Some of those less powerful White people even managed to gain a few enslaved Black people and hold them in bondage. Instead of accepting their plight with happiness, enslaved Black people, especially the Gullah Geechee people, resisted the so-called peculiar institution by malingering, breaking tools, becoming Maroons, becoming Outlyers, and killing White people with weapons and poison (Cohen, 1822; Coe, 1898).

In 1847, some five years after the end of the Second Seminole War, a list of Georgia militias was compiled by and published in the Augusta’s Daily Chronicle & Sentinel. The list identified major and brigadier generals of the various divisions and brigades. It also identified each the 13 divisions and 26 brigades. All 13 divisions were composed of 2 brigades. The
divisions and brigades were located both north and south of the present-day Emory University area (“Militia,” 1848).


**IMPLICATIONS OF THIS RESEARCH**

This paper has at least four implications. One significant consequence is that it sheds light on the alliance between Gullah Geechee people and the Muscogee people during the enslavement period before and after the 1821 First Treaty of Indian Springs. There is conclusive evidence that the people in the two groups developed viable relationships both before and after 1821. A second significant consequence is that it sheds light on how a subgroup of the Gullahs became known as Geechees and united with some Muscogee people to create the Seminole
Nation. During the three wars, Geechees served in the Seminole Nation as war chiefs, warriors, interpreters, and spies. Before the 1821 First Treaty of Indian Springs, King Bowlegs, a Muscogee, and Nero, a Geechee, developed a chief and war chief relationship in the Suwanee River area. Also, an unnamed Choctaw Indian chief and a Geechee named Garcon developed a chief and war chief relationship at Fort Negro. After the 1821 treaty, a Muscogee Indian named Micanopy and a Geeche named Abraham had a chief and war-chief relationship; a Muscogee Indian named King Philip and a Geechee named John Caesar had a chief and war-chief relationship; a Muscogee Indian named Osceola and a Geeche named John Horse had a chief and war-chief relationship; a Muscogee Indian named Emathla (Philip) and a Geechee named John Philip had a chief and war-chief relationship; and a Muscogee Indian named Coacoochee (Wildcat) and a Geechee named John Horse had a chief and war-chief relationship (Clinch, 1821; Boyd, 1937; Porter, 1946a, 1950).

A third significant consequence is that it sheds light on the how the Okefenokee Swamp and other areas of southern Georgia became battle zones in the Seminole Wars. The Okefenokee Swamp was used as a strategic base by Seminole warriors to wage attacks on White slaveholders and settlers. For example, a case in point is the attack on the Wildes family on July 22, 1838. As Walker (1933) and Reddick (1976) have noted, Seminole warriors made attacks from the Okefenokee Swamp both before and after July 22, 1838.

A fourth significant consequence is that this research sheds light on some ways wherein the alliance between Geechees and Muscogees in the Seminole Nation impacted White slaveholders in northern Georgia, including the present-day Emory University area. The alliance between Geechees and Muscogees in the Seminole Nation impacted White slaveholders in northern Georgia, including the present-day Emory University area, in several ways. To fight against the alliance between Geechees and Muscogees in the Seminole Nation, the Georgia governors felt compelled to station militia and regular troops at locations around the Okefenokee Swamp and elsewhere. A list compiled in 1847 shortly after the end of the Second War indicates that the Georgia militia was composed of men from across the states. The 1847 list of the Georgia militia included 13 divisions and 26 brigades. Thomas Hilliard was the officer in charge of a brigade stationed in Waresboro near the Okefenokee Swamp.

Like the state of Georgia, the Federal secretary of war felt compelled to station regular troops at locations around the Okefenokee Swamp and elsewhere. During the Second Seminole War, approximately 1,500 members of the U.S. Army, Navy, and Marine Corps lost their lives. Some six years after the end of the Second Seminole War, Sprague (1848) placed at the end of history of the war “a record of the officers, non-commissioned officers, musicians, and privates of the U.S. Army, Navy, and Marine Corps who got killed in battle or died from disease” (p. i). He also included the “names of officers who were distinguished by brevets, and the names of others recommended” (p. i). Whereas the list pertaining to the Georgia militia was composed of men from across the state, the list pertaining to the military of the USA consisted of men from across the country.

**SUMMARY AND CONCLUSION**

This paper has examined the alliance between Gullah Geechee people and the Muscogee people during the enslavement period before and after the 1821 First Treaty of Indian Springs. It has also examined how a subgroup of the Gullahs became known as Geechees and united with
some Muscogee people to create the Seminole Nation. In addition, this paper has detailed how the Okefenokee Swamp and other areas of southern Georgia became battle zones in the Seminole Wars. Furthermore, it has examined the impact of the alliance between Geechees and Muscogees on the Seminole Nation impacted White slaveholders in northern Georgia, including the present-day Emory University area.

In his penetrating analysis of the 1790 Treaty of New York, which he referred to as the Creek-American Treaty of 1790, J.L. Wright (1967) made a very accurate statement about the circumstances surrounding such treaties. J.L. Wright said that, “Without exception more that the usual amount of bribery and misrepresentation accompanied these treaties” (p. 383). He also pointed out that, McGillivray knew the tricks of treaty-making and that it was customary for whites to bribe the chiefs” (p. 385). J.L. Wright added: “He could expect to return from New York a richer man” (pp. 385-386).

Unfortunately, the 1821 Treaty of Indian Springs and the 1825 Treaty of Indian Springs were no exceptions. William McIntosh accepted a bribe as did his fellow half-breed Alexander McGillivray. He signed and accepted a deal regarding those two treaties that benefited the White race of his father instead of the American Indian race of his mother. For that deed, William McIntosh was executed by the people of his mother on April 30, 1825—just two months after he signed the 1825 Treaty of Indian Springs.

Further, During and after the Civil War, the Seminole Nation encountered two major challenges to the alliance between Black people and American Indian people. One challenge involved the fact that Seminole warriors in Oklahoma became divided under two chiefs and the situation created a bitter conflict and lasting animosity. On one side, there was John Jumper, an American Indian with an assimilationist attitude who chose to adopt the Christian faith and became a major in the Confederate Army. On the other hand, there was Billy Bowlegs, an American Indian with anti-assimilationist attitude who became a captain in the Union Army. In addition to John Chupco and Halleck Tustenuggee, he was joined by many Geechees in Oklahoma as soldiers in the Union Army. It should be noted that all Geechees in Oklahoma became known as Seminole Freedmen. Also, after the Civil War was over, some of the Seminole Freedmen and their descendants stayed in the military and became known as the legendary Buffalo Soldiers (Porter, 1967b, 1996).

A second major challenge was the receipt by the Seminole Nation of Oklahoma a large sum of money as compensation lands lost in Florida during 1823 and 1932. The money totaled $56 million in 2002. Between 1976 and 2002, there was a long legal battle within the Seminole Nation of Oklahoma. When the compensation money was approved in 1976, there were 12 “bands” in the Seminole Nation in Oklahoma with representation on the General Council. Of the 14 bands, 2 were headed by descendants of Seminole Freedmen, namely the Dosar Barkus band and the Caesar Bruner band. The other 12 were headed by descendants of American Indians and included the Tusekia Harjo band; Tallahassee band; Mekusukey band; Thomas Palmer band; Fushutche band; Rewalki band; Ceyvha band; Eufaula band; Hvteyicvlke band; Hecete band; Nurcup Harjo band; and the Oc ese band. The 12 bands headed by American Indians voted to eject the 2 bands of Seminole Freedmen from the Seminole Council and split the money among themselves (“Black Seminoles,” 1995; Robertson, 2002, 2006, 2008a, 2008b, 2009, 2011; J.L. Brown, 2002; CBS, 2002).
Based on a tradition over 100 years old, Seminole Freedmen and their descendants were entitled to 4 of the 28 seats. Thus, each band had two seats on the council. However, that policy changed during a meeting of the Seminole Council in the summer of 2000. The ejection effort was led by Jerry Haney, the head chief of the Seminole Nation in Oklahoma. The Haney faction took the position that only those whose ancestors were listed on the Dawes Rolls as American Indians should get any of the money. Thus, a battle over scarce resources caused a conflict that led to the exclusion of the Seminole Freedman (“Black Seminoles,” 1995; Robertson, 2002, 2006, 2008a, 2008b, 2009, 2011; J.L. Brown, 2002; CBS, 2002).

There is a notion in sociology that conflicts over scarce resources have been known to cause friction in and between groups when there is a perception that there is not enough to go around. Sadly, it happened inside the Seminole Nation of Oklahoma. When the American Indians kicked Black people out of the Seminole Council, that action represented a conflict over scarce resources. Hopefully, those American Indians in the Seminole Nation in Oklahoma who took that action will one day remember that Black people known as Geechees and Seminole Freedman were once their comrades-in-arms during the three Seminole Wars and treat them fair and square.

. NOTES

1. The term Muscogee people is synonymous with the terms Muscogee Nation, Creek Confederacy, and Muskogean Nation. Hodge (1910) has described the Muscogee Nation as:

   A confederacy forming the largest division of the Muskogean family. They received their name from the English on account of the numerous streams in their country. During earlier historic times the Creeks occupied the greater portion of Alabama and Georgia, residing chiefly on Coosa and Tallapoosa rs., the two largest tributaries of Alabama r., and on Flint and Chattahoochee rs. They claimed the territory on the e. from the Savannah to St. Johns r. and all the islands, thence to Apalache bay, and from this line northward to the mountains. The s. portion of this territory was held by dispossessment of the earlier Florida tribes. They sold to Great Britain at an early date their territory between Savannah and Ogeechee rs., all the coast to St. Johns r., and all the islands up to tidewater, reserving for themselves St Catherine, Sapelo, and Ossabaw ids., and from Pipemakers bluff to Savannah . . . (pp. 362-363).

Thus, the Muscogee people included many bands known as the Ogeechee, Yamacraw, Yamasee, Yuchi, Hitchiti, etc. Further, as used in this paper, as used in this paper, the term Seminole Nation refers to a political confederation established during the 18th century by American Indians consisting of bands known variously as Creeks, Muscogees, Miccosukkees, Yamasee, Yamacraw, Yuchi, Apalachicola, and Ogeechee. By 1816, the Seminole Nation included a critical mass of Gullah-speaking Maroons from South Carolina and Georgia. The Seminole Nation was composed of both Black war chiefs and American Indian war chiefs (Sprague, 1848; Cromartie, 2013, 2020a, 2020b). The connection between the Muscogee Nation and the
Seminole Nation has been covered by Mooney (1910b). Mooney said that the American Indians in the Seminole Nation were primarily an offshoot of the Muscogee Nation. He stated:

A Muskogean tribe of Florida, originally made up of immigrants from the Lower Creek towns on Chattahoochee r., who moved down into Florida following the destruction of the Apalachee (q. v.) and other native tribes. They were at first classed with the Lower Creeks, but began to be known under their present name about 1775. . . (p. 500)

Mooney added:

The Seminole, before the removal of the main body to Indian Ter., consisted chiefly of descendants of Muscogee (Creeks) and Hitchiti from the Lower Creeks town, with a considerable number of refugees from the Upper Creeks after the Creek war, together with remnants of Yamasee and other conquered tribes, Yuchi, and a large negro element from runaway slaves. When Hawkins wrote, in 1799, they had 7 towns, which increased to 20 or more as they overran the peninsula. (p. 500)

He made it clear that a large remnant in the Seminole Nation were Muscogees. Although Mooney did not use the term Geechee, it was made clear by him that they were a large remnant in the Seminole Nation who fled from the chattel slavery of White colonizers. For some information about various bands of Muscogee people who joined the Seminole Nation such as the Ogeechee, Yamacraw, and Yamasee, see Mooney (1910a, 1910c) as well as Mooney and Swanton (1910). Cf. Littlefield (1979) and J.L. Wright (1986).

2. For a description of how the term Gullah was used before the Civil War, see the statements of Tonie Houston in the Savannah Unit (1940/1972, 1940/1986).


4. Franklin and Higginbotham (2011) related that enslaved Black people engaged in many types of resistance including sabotage and destruction of tools; sabotage and destruction of plantation crops; sabotage and destruction of plantation buildings; sabotage and destruction of plantation animals; killing of White slaveholders and others; self-mutilation and suicide; becoming Outlyers; becoming Maroons; and participating in rebellions and revolts of the enslaved.

5. Of the three Seminole Wars, one started before 1821. Moore-Willson (1914) stated that the July 1816 attack by military forces from the USA on Fort Negro “marks the beginning of the First Seminole War” (p. 9). She said that, “In the attempts to recapture runaway slaves, is based the primeval cause of the Seminole wars” (p. 5). That included the First Seminole War. A lucky cannonball shot from a gunboat on July 27, 1816 hit a gunpowder magazine in Fort Negro (aka Blount’s Fort) and caused a massive explosion. Moore-Willson explained that, “History records that of 334 souls in the fort, 270 were instantly killed” (p. 9). The military forces from the USA in the attack were led by Duncan L. Clinch, a colonel in the Army at the time. At least 30 people
in Fort Negro managed to survive the explosion. Among the survivors who fought under a red flag was a Maroon chief named Garcon and an American Indian chief. Both were put to death by Clinch. Katz (1971/1987) said that the other survivors were “led back to the United States and slavery” (p. 18). He further pointed out that, “After the destruction of Fort Negro, Creek Indian mercenaries marched the survivors to Georgia and slavery” (p. 19). Maroons, who were inside the fort during the attack, headed to Seminole settlements on the Suwanee River. It should be noted that Clinch was a White slaveholder with a plantation in Camden County, Georgia named Refuge. According to Reddick (1976), during 1830, John Houston McIntosh “gave Refuge Plantation to his son-in-law General Duncan Lamont Clinch of Seminole War fame” (p. 53). Reddick also related that Clinch “acquired success as a rice planter” (p. 53). Katz (1986), Ogunleye (2006), and some other writers and scholars have joined Moore-Willson and listed the attack on Negro Fort as the beginning of the First Seminole War. In contrast, some other writers and scholars have ignored or overlooked the attack on Negro Fort and dated the beginning of the First Seminole War on November 17, 1817. They emphasize the event when Major David E. Twiggs, under orders from General Edmund P. Gaines, led some Army troops in an attack on Neamathla’s Fowlton settlement. It was located a few miles south of present-day Bainbridge, Georgia. Scholars and writers who take that position include Paine (1938), Porter (1951), Mahon (1998), Rivers (2000), Miller (2011), and Nelson (2013). In the case of Miller, he has admitted that there is a “link” between Fort Negro and the First Seminole War. Nevertheless, Miller has argued that, in 1816, “Seminoles did not exist as a tribe at this time” (p. 29). Although Porter (1951) listed 1817 as the first year of the Seminole War, he stated that, “By 1812 and probably earlier, the existence among the Seminole of Negro towns occupied by ‘several hundred fugitive [sic] slaves from the Carolinas & Georgia’ was a source of serious irritation to the slave-owners of the Deep South” (p. 253). Porter also said that, “The Negro Fort was a beacon light to restless slaves for miles around and to it flocked recruits from every quarter” (p. 261). He added: “The Negro Fort seems to have been garrisoned largely by the Negroes from Pensacola, and the American runaways settled along the river left their villages and fields at the approach of the besieging force and took refuge in the forest” (p. 261). Porter estimated that 1,000 Maroons from Negro Fort “found refuge on the Suwanee, built villages which extended down along the sea coast as far as Tampa Bay, and began to get reorganized” (p. 265). To the dismay of the USA’s government, they relocated to the territory of the Seminole Nation led by King Bowlegs, the principal chief, and Nero, the war chief. Rivers reported that the population of the Seminole town known as Angola by 1819 of “six or seven hundred” (p. 8). He also said that, “This large settlement of blacks, located on the Manatee River at present-day Bradenton, apparently was called Angola. One white party also referred to it as the ‘Sarrazota, or Runaway Negro plantations’” (p. 191). Further, see Sprague (1848), and Mahon (1967) for details about the Second Seminole War. For details about the Third Seminole War, see “Florida in the Early Days” (1900), Covington (1982) and Knetsch, Missall, and Missall (2018). Whereas Covington dates the Third Seminole War from 1855-1858, it is dated from 1849-1858 by Knetsch, Missall, and Missall (2018).

6. As indicated in my book *Morgan-Frazier Family Clan* (Cromartie, 2013), I was born and raised in the Okefenokee Swamp region and my great-great grandmother Bess Frazier (aka
Bessie Frazier) was a Black Seminole from Camden County, Georgia who lived from 1838 to 1906. For more information about Black people in the Seminole Nation before 1865, see Mooney (1910b); Littlefield (1977); Hancock (1980, 2014a, 2014b); Ogunleye (1996); Twyman, (1999); and Dixon (2014). Also, it should be noted that Sprague (1848) related that Osceola “belonged to the Red Stick tribe of Indians, a branch of the Creeks, and was born on the Chattahoochee river, Georgia, in the year 1804” (p. 98). Sprague also informed us that Osceola once lived as a child “in the vicinity of the Okefenokee Swamp” (p. 98).

7. Armistead (1957) has provided important details about the life and times of William McIntosh. She explained that, “William McIntosh was born at Cusseta in what is now Carroll County in 1778. His mother was a full-blooded Creek Indian, and his father was a Scotchman in the British Army” (p. 306). According to Armistead, William McIntosh’s father (William McIntosh) and George M. Troup’s mother (Catherine McIntosh Troup) were siblings. George M. Troup served as the governor of Georgia from 1823 to 1827. Whereas William McIntosh and Alexander McGillivray took the side of the people of their White fathers, William Weatherford (aka Red Eagle) took the side of his American Indian mother, as Armistead pointed out. Armistead also noted that the William signed the Treaty of First Indian Springs which gave the White colonizers:

... possession of all Creek lands east of the Flint River except for “1,000 acres laid off in a square, so as to include Indian Springs in the center” and 640 acres “to include the improvements at present in the possession of Indian chief General McIntosh.” (p. 311)

Thus, William McIntosh benefitted in a direct fashion in a treaty that benefitted the White colonizers and harmed the Muscogees facing colonization and forced removal.

8. To counter the flight of Gullahs from slavery, White colonizers urged Muscogee people to hold them in bondage and to return them in exchange for bounties. Searcy (1982) related that:

During the late colonial period the Creek Indians generally cooperated with the British in returning runaway slaves to their owners, although there is reason to suspect that they occasionally allowed such slaves to escape so that they would be paid more than once for capturing the fugitives. The American Revolution disrupted this system and interfered with traditional trade patterns. As British allies and auxiliaries, Creek warriors had unusual opportunities to fraternize with other Creeks from distant parts of the Nation and with British officers and agents who wished them well; also, they viewed the prosperity achieved by a plantation society based on Negro slave labor. Although the Creeks had continued their traditional agricultural practices, the British trade in deer skins had turned the Creek Nation into an acquisitive society; during the Revolution they learned that cattle and horses, and most especially black slaves, were even better ways to wealth. They were quick to take advantage of the opportunity. (p. 30)
Although Searcy did not mention it, the half-breeds played a major role in encouraging some Muscogee people to adopt the chattel slavery of their White fathers and other White colonizers.

9. Wood (1974) stated that Palachacolas was a “fort which guarded the only point for almost one hundred miles where horses could swim the Savannah River and where Negro fugitives had previously crossed” (p. 319). In his book, Wood spells the colonial fort in the following two different ways: “Palachacolas” and “Palachicolas” (pp. 104, 319). Cobb (2009) and Elliott (2012) conducted research on the site and both spelled it as Palachacolas. For more information about the role of Palachacolas during the colonial period, see “An Account of the Negroes Insurrection in South Carolina” (1913). It should be noted that the index by the editors of the 1913 compilation suggest that Oglethorpe was the author of the account although it does not list him as such in the table of contents.

10. Regarding Negro Fort, Giddings (1858) stated that, “The negro force had been rapidly increasing from runaways; their fields extended fifty miles up the river. The Choctaw Chief, and the negro commandant, named Garcon, were put to death by the Indians” (p. 23).

11. Giddings (1858) said that, “After Georgia became a Slaveholding Colony, we are led to believe the practice of slave leaving their masters, which existed in South Carolina, became frequent in Georgia” (p. 4). He continued:

But we have no definite information on this subject until about the commencement of the Revolutionary War (1775), when the Council of Safety for that colony sent to Congress a communications setting forth, that a large force of Continental troops was necessary to prevent their slaves from deserting their masters. It was about the first communication sent to Congress after it met, in 1776, and shows that her people then sought to make the nations bear the burthens of their slavery, by furnishing a military force sufficient to hold her bondmen in fear; and if she adheres to that policy now, it merely illustrates the consistency of her people in relying upon the freemen of the North to uphold her system of oppression. General Lee, commanding the military forces in that colony, called the particular attention of Congress to the fact, that slaves belonging to the planters, fled from servitude and sought freedom among the “Exiles of Florida.” (p.4)

According to Giddings, the alliance between Maroons from Georgia and the Seminole Nation in Florida dates to at least 1776. The exiles of Florida referred to the warriors of the Seminole Nation.

12. Covington (1982) reported that, “Since it was most obvious that they were unable to conquer the Seminoles in combat, several commanders resorted to tactics in the field which could hardly be called honorable” (p. 2). He also related that, “Some Seminoles were captured under the so-called protection of a flag of truce. Other captives were threatened by hanging or by death of their children if they did not urge their friends in the field to surrender” (p. 2). As Armistead (1957) has related, to aid their invasion and incursions into the lands of the Muscogee people,
British White colonizers employed a divide and conquer strategy. The White colonizers coopted half-breeds with tribal rights like William McIntosh and Alexander McGillivray (aka Hoboi-Hili-Miko) and effectively used them. For example, William McIntosh became a powerful chief in the Muscogee Nation because of his trading post ties. William McIntosh was also made a general in the U.S. Army and used his position as a chief to have his Muscogee subjects fight against other Muscogee people and people in the Seminole Nation, as Armistead (1957) has related. In a similar manner to Armistead, it was pointed out by Willis (1963) that White colonizers often used a “divide and rule strategy” as a form of social control in relation to Black people and American Indian people.

13. Porter (1996) related that, “Just before the Second Seminole War began, and during its first two years, certain leaders were prominent. Although Micanopy was tacitly acknowledged as head chief, his position was more titular than personal, more nominal than actual” (p. 35). He added: “A number of able men surrounded him. They were primarily his kinsmen by blood or marriage and greatly surpassed him in ability. Their names included Jumper, Alligator, King Philip, Coacoochee, Arpeika, and Osceola” (p. 35). As Porter noted, Jumper (aka Ote Emathla), Alligator (aka Halpatter Tustenuggee), King Philip (aka Emathla), Coacoochee (aka Wild Cat), Arpeika (aka Sam Jones), and Osceola (aka Oceola, Asi Yahola, and Powell) were American Indians in the Seminole Nation who fell into the sub-chiefs and war-chiefs categories. Further, in 1812, the top leaders in the Seminole Nation were King Payne and King Bowlegs. The racial background of King Payne and King Bowlegs (aka Eneha Micco) have been addressed by Simmons (1822/1973) and Cohen (1836/1964). Simmons has related that:

The Yemasees, as we have seen, were driven, in 1715, within the limits of Florida; and there are persons, now alive in that Province, who remember, in their youth, having seen some of the descendants of these people, who were in the condition of slaves to the Seminoles.

They relate, that the former were remarkably black Indians; and it is thought, the Ocklewahaw tribe, who are marked by a deeper shade than any of the Seminoles, are, probably, descendants of the conquered race.

From the best account I could obtain in Florida, it appears, that it was under King Payne, grandfather of Micconope, the present Chief, that the Seminoles invaded and achieved the conquest of the territories they now occupy. He is said to have lived to be near an hundred years of age, and, late in life, married a Yemasee woman, his slave; by whom he had the late Chief Payne, who bore, in the darkness of his complexion, an unequivocal mark of his Yemasee descent.

I have been informed, that his people, when offended with him, or over their cups, were offended with him, or over their cups, were accustomed to question the legitimacy of his authority, from the circumstance of his being the son of a slave. . . . The Seminoles do not differ in complexion from the Creeks (p. 57)

Cohen followed Simmons very closely and reported that:
When in the year 1715, the Yemasees were driven within the limits of Florida, they became slaves to the Seminoles. Another account states, that the Yemasees left St. Augustine in a body in 1722; or rather were expelled by the Spaniards, who essayed in vain to compel them to labors which were regarded as degrading drudgeries by the warriors of the Yemasee.

The Yemasees were remarkably black people, and the Ocklewahaw tribe, who are of a deeper shade than the Seminoles, are descendants of the conquered race. The chief of the Ocklewahaws, Yaha Hadgo, who was killed by General Shelton in the campaign of ’36, was very dark; but generally, the Seminole’s complexion is like that of the Creeks.

Under King Payne, grandfather of Micconope, (the present Chief) the Seminoles invaded and achieved the conquest of the territories they now occupied. He lived to near 100 years of age, and married a Yemasee woman, his slave by whom he had the late chief Payne, who bore, in the darkness of his complexion, a proof of his Yemasee descent. (p. 33)

Both Simmons and Cohen agree that that the Yamassee were Black or at least partly Black. Thus, Black blood entered in the Seminole royal family at an early age.

14. I have followed Porter (1996) in the way “Peliklakahah” is spelled for the Maroon community in the Willacoochee River area. However, it has been spelled differently by various people. Simmons (1822/1973), a White government consultant and medical doctor, referred to the Maroon community as “Pulacklicaha” (p. 38). McCall (1868), a White officer in the Army fighting against the Seminole Nation, referred to the Maroon community “Pelahlikaha” in an 1826 letter he wrote to his brother (p. 160). In the case of the Maroons at Peliklakahah, McCall said that, “They are chiefly runaway slaves from Georgia” (p. 160). McCall also said that, “The three principal men bear the distinguished names of July, August, and Abram. We found these men to be shrewd, intelligent fellows, and to the highest degree obsequious” (p. 160). Brooke (1848a), a White commanding officer in the Tampa Bay area, referred to the Maroon community as “Pilacklichaha” in a May 2, 1828 official government report (p. 52). Scott (1861), a White general in the Army fighting against the Seminole Nation, referred to the Maroon community as “Pelaklikaha” during 1836 in an official government report (p. 257). Gadsen (1861), a White quartermaster-general in the Florida militia fighting against the Seminole Nation, referred to the Maroon community as “Pelaklikaha” in an 1836 official government report (p. 252). Potter (1836), a White with the militia and Army fighting against the Seminole Nation, referred to the Maroon community as “Pilaklahkah” in his history of the early days of the Second Seminole War (p. 9). Jesup (1837), a White general in the Army fighting against the Seminole Nation, referred to the Maroon community as “Palakikaha” in his diary after attacking it. Williams (1837), a White politician and government consultant, referred to the Maroon community as “Pilaklakahaha” in his history of the Florida territory (p. 272). Sprague (1848), a White medical officer in the Army fighting against the Seminole Nation, referred to the Maroon community as “Palaklikaha” in his history of the Second Seminole War (p. 180). Cf. Welk (2002, 2007).
15. In Oklahoma, John Horse was known as a Seminole Freedman and in Mexico as a Mascogo (Wright, 1986; Porter, 1996). The war title and war name Geechee faded from use in Oklahoma and Mexico, especially after 1858. The new names reflected their status in those areas. Robertson (2011) informed us that he conducted a qualitative survey of people descended from the Black Seminoles and reported, “The Black Seminoles go by several monikers. They are often referred to as Seminole Freedmen or the Estelusti (Muskogee Indian word for Black) . . .” (p. 103). He also related that people descended from the Black Seminoles are “dispersed throughout Oklahoma, Florida, Mexico, and the Caribbean” (p. 103). Robertson either overlooked or ignored the presence of people descended from the Black Seminoles who can be found in Georgia and South Carolina.

16. To aid their invasion and incursions into the lands of the Muscogee people, British White colonizers employed a divide and conquer strategy. The White colonizers coopted half-breeds with tribal rights like William McIntosh and Alexander McGillivray (aka Hoboi-Hili-Miko) and effectively used them. For example, William McIntosh became a powerful chief in the Muscogee Nation because of his trading post ties. William McIntosh was also made a general in the U.S. Army and used his position as a chief to have his Muscogee subjects fight against other Muscogee people and people in the Seminole Nation, as Armistead (1957) has related.

17. For some information on Geechees in the three Seminole Wars, see Simmons (1822/1973); Cohen (1836); Potter (1836); Williams (1837); Sprague (1848); Giddings (1858); McCall (1868); Coe (1898); Hodge (1907, 1910); Porter (1943, 1944, 1946a, 1946b, 1947, 1949, 1950, 1952, 1960, 1967a, 1967b, 1971, 1996); Motte (1953); Mahon (1967); Littlefield (1977); J.L. Wright (1986); Katz (1986); Mulroy (1993); Laumer (1995); Twyman (1999); Howard (2002); Knetsch (2003); Cromartie (2013); Cox and Conrad (2017); Knetsch, Missall, and Missall (2018); and Cox (2019).

18. For information on the migration of Geechees to Oklahoma where they became known as the Seminole Freedmen and to Mexico where they became known as the Mascogas, see Porter (1946b, 1946c, 1947, 1951) and Littlefield (1977). See Goggin (1946) and Howard (2002) and on the migration of Geechees to Andros Island in the Bahamas.

19. There are several reports available regarding the attack known locally as the Wildes Massacre. One report appeared in the form of a letter by Hilliard (1933a), a general in the Georgia militia who fought against the Seminoles. A second report also appeared in the form of a letter by Hilliard (1933b). His letters are discussed in the text. A third report by Darling (1838), a lieutenant with the Second Dragoons, appeared in the Niles’ National Register. A fourth report was titled “Indians in Ware County” (1838) and was published by the Macon Telegraph. A fifth report was titled “Last Massacre By the Seminoles” (1894) and was published by the Cincinnati Enquirer. A sixth report was titled “The Lees of Okefenokee” (1896) and was published by The Pittsburgh Press after initially appearing in the Atlanta Constitution. A seventh report was made by Walker (1933). An eighth report was made by Mancil (1984), a descendant of Maximillan Wildes through his son John Wildes. A ninth report was made by Johnson (2003), a descendant of Maximillan Wildes through his son John Wildes.
A 10th report was made by Reynolds (2003), a descendant of Maximillan Wildes Wildes through his son John Wildes. An 11th report was made by Cunningham (2018), a descendant of Maximillan Wildes through his son John Wildes. The 11 reports converge on some details and diverge on others.

20. Porter (1967a) has asserted that, “While Billy Bowlegs’ name is familiar, nothing definitive is known about him prior to 1839” (p. 220). In the case of Billy Bowlegs, who was also known as Halpatter Micco, Porter said he was as able and shrewd as his fellow Seminole war chief Osceola. Billy Bowlegs was an active participant in the Second Seminole War and the Third Seminole War. Some of the reports identified Billy Bowlegs as the leader of the Seminole attack in the Wildes family and some do not. Reports that took the position that Billy Bowlegs led the attack on the Wildes family include “Last Massacre By the Seminoles” (1894); “The Lees of Okefenokee” (1896); Reynolds (2003); and Cunningham (2018). Both Reynolds (2003); and Cunningham (2018) were descendants of Maximillan Wildes. There are also five reports that assert Billy’s Island in the Okefenokee Swamp was named after Billy Bowlegs or connected to him (“Last Massacre By the Seminoles,” 1894; “The Lees of Okefenokee,” 1896; Walker, 1933; Reynolds, 2003; Cunningham, 2018). In the case of Walker, she said: “...as late as 1840 Bowlegs was living on an island in the Okefenokee Swamp, and even years since 1840, an island in the Swamp has been called Billy’s Island” (p. 6). Further, 17. There are documents that show there were several American Indians of Muscogee descent in the Seminole Nation who was named Bowlegs or Billy Bowlegs. There was a Bowlegs in the Seminole Nation who was a chief and was killed during the First Seminole War. He was also known as King Bowlegs and Old Bowlegs. A second Billy Bowlegs is rumored to have died in 1859. That Billy Bowlegs was a chief in the Seminole Nation during the Second Seminole War and Third Seminole War. He probably did not die in 1859 and was the same Billy Bowlegs who served in the Civil War on the side of the Union Army. Government records list that Billy Bowlegs as Shoe-Knoc-Me-Koe, So-nuk-mek-ko, and So-nuk-mik-ko. During the Civil War, Billy Bowlegs fought against the Confederacy and served as a captain in the Union Army. He is buried at Fort Gibson National Cemetery in Section OC Site 2109. A fourth Billy Bowlegs lived in Florida after the Civil War and during the early part of the 20th century. He was one of the Seminoles whose ancestors never left Florida after the Second Seminole War ended. Cf. “Billy Bowlegs and Suite” (1853); Special Correspondent (1858); Moore-Willson (1914); Walker (1933); C.T. Foreman (1955-1956); Sturtevant (1955-1956); Peithmann (1956); and Porter (1967a, 1967b, 1971, 1996). It should be noted that Porter (1967b) said “Holata Micco” is a war-title that means “Chief Governor” (p. 401).

21. For some reports that cover the guerrilla warfare activities of Seminole warriors against other White families in the Okefenokee Swamp area, see Mounted Volunteer (1838), “Indians in Ware County” (1838), and “The War Nearly Ended” (1818). For instance, the Mounted Volunteer addressed an attack on a White family south of the Okefenokee Swamp on the Florida side only a couple days before that on the Wildes family. “The War Nearly Ended” article stated:
In relation to the fugitive Creeks, it is true several companies of regular troops have been in constant service since their escape; neither have they or their officers lacked energy or industry—they have scoured the country on foot, carrying their provisions on their backs, till they have worn out their clothing and almost their persons—and failed for nearly two months in discovering scarcely any trace of the runaways. Their recent discovery, on the banks of the Ocklocknee, prove, however, that the Indians have been in the country, from which nothing but a superior force to that now in the field will be successful in dislodging them. We conceive such policy to be most wretched and certainly more expensive. The war is protracted; the country laid waste—our citizens murdered, and their property scattered to the four winds of heaven—our national character disgraced at home and abroad, and our whole army successfully foiled in all its attempts to remove the most worthless of all the Indian tribes from one of her territories. How long will such a state of affairs continue, heaven only knows. (p. 387)

The article made it clear the Seminole warriors were engaged in a protracted war against the USA and that it was going to take a more superior force than that then in the field to defeat them. Both ideas were correct because the Second Seminole War lasted seven long years, cost $20,000,000-$40,000,000, and cost the lives of 1,500 soldiers, sailors, and marines. For more information about the money spent and lives lost, see Sprague (1848), Special Correspondent (1858), Moore-Willson (1914), Peithmann (1956), Mahon (1967), Porter (1964), and Cromartie (2011a, 2011b, 2013).

22. Regarding the Okefenokee Swamp, Bliss (1848), an assistant adjutant-general in the U.S. Army, reported in a December 1841 letter to the governor of Georgia that, “There are two routes by which marauding parties of Indians from Florida approach the swamp” (p. 413). He explained that there was “the eastern route by Kingsley’s pond and New river, passes near Fort Moniac” and “the western, by the natural bridge of the Santa Fe and upper Suwannee, passes near Fort Gilmer” (p. 413). Bliss informed the governor that, “A company of dragoons is stationed at Fort Gilmer, and a company of infantry, liberally supplied with horses, for the purpose of prompt pursuit, at Fort Moniac” (p. 413).

23. See Smith (2000a, 2000b, 2000c, 2000d) for more information about the history of Georgia militias. In both Georgia and Florida, White civilians were activated in the state militias to fight against the Seminole Nation. William Kendrick, a White man who served as a captain in the Florida militia during the Third Seminole War, stated that “every man, who was old enough to fight, went out against the Indians, who were protecting their rights and who never broke an agreement they made” (“Florida in the Early Days,” 1900, p. 5).

24. Robertson (2002, 2006, 2008a, 2008b, 2009, 2011) has examined the ways Seminole Freedmen descendants have been mistreated in the Seminole Nation in relation to the allocation of money and benefits. He has also argued that Seminole Freedmen descendants have often been marginalized in the Seminole Nation during the 20th and 21st century. Robertson conducted in-depth interviews wherein Seminole Nation descendants complained about that marginalization in
the form of differential and unequal treatment when compared to American Indian descendants in the Seminole Nation. In addition, Robertson explored the effects of that marginalization on the Seminole Freedmen descendants. As a journalist, J.L. Brown (2002) covered how the Seminole Nation became divided by race and money. Brown reported that, “Two years ago, the council formalized the distinction between black and blood, changing the tribe’s constitution to double the blood requirement for tribal council representation to one-fourth Indian ancestry” (p. 1). To further explain the situation, Brown addressed the lived experience of Wilbert Cudjoe in the Seminole Nation. Brown wrote:

Tribal leaders say Cudjoe and 1,500 other black Seminoles who cannot trace at least one-fourth of their ancestry to native people may not sit on the tribal council. And those without at least one-eighth native blood, they say, cannot vote in tribal elections or share in $42 million Congress allotted in the 1990s as compensation for running the Seminoles out of Florida more than 100 years earlier. (p. 1)

She continued by quoting Wilbert Cudjoe as follows:

“We were just like brothers and sisters until this little money come up,” said Cudjoe, a small, soft-spoken man. “They are forgetting their history. Their past is entwined with the blacks.” (p. 1)

Robertson used his scholarship and Brown used his journalism to address the plight of the descendants of Seminole Freedman after the money was received by the Indians in the Seminole Nation.

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Title: Finding Self in STEM: Fostering Positive Hawaiian STEM Identity Development in Elementary School Students through Culturally Relevant STEM Activities

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Finding Self in STEM: Fostering Positive Hawaiian STEM Identity Development in Elementary School Students through Culturally Relevant STEM Activities

Background & Context

There is a growing interest in science, technology, engineering, and mathematics (STEM) for all students, including those who are underrepresented and underserved, such as indigenous students. In September 2017, the President signed a Memorandum to increase access to high-quality STEM education in the U.S. (The White House, 2017). Additionally, the National Science Board Vice Chairman posits that “STEM knowledge and skills enable both individual opportunity and national competitiveness, and that the nation needs to develop ways of ensuring access to high-quality education and training experiences for all students at all levels and for all workers at all career stages” (National Academies of Sciences, Engineering, and Medicine, 2016). Implementing a culturally responsive and culturally relevant STEM curriculum and fostering STEM identity, especially for those who are underrepresented in STEM, have been found to be successful for positive educational outcomes (Singer, Montgomery, & Schmoll, 2020; Young, Young & Ford, 2019).

In Hawai‘i, a state thousands of miles away from the continental U.S., students have historically faced a disadvantage due to curriculum being presented in Western contexts and through Western methods. This has especially hampered students who are indigenous -- e.g. Native Hawaiian (NH). The preferred system of Western STEM education in Hawai‘i has long implied that indigenous math and science knowledge and tradition are less successful vehicles for
delivering content to students and for guiding students towards academic success, yet has also shown to discourage student engagement with STEM concepts because of the contents’ foreignness (Galloway et al., 2005; Kaomea, 2011; Jin, 2021; Meyer and Aikenhead, 2021). Low engagement and poor performance by academic measures and standardized tests in turn have had negative and long-lasting effects on NH students’ academic performance (Galloway et al., 2005; Kaomea, 2011; Jin, 2021; Meyer and Aikenhead, 2021). Patterns of failure in and continual disconnect with STEM subjects in school lead NH and other indigenous students to develop “negative self-images” in STEM domains (Kaomea, 2011) and to distance themselves from adopting positive STEM identities.

In line with Hughes, Nzekwe, and Molyneaux (2013), we define STEM identity by: 1) students’ interest in STEM and STEM careers; 2) self-concept as it relates to STEM domains (student’s belief that they have strong abilities in STEM and can be successful in STEM careers); and 3) the influence of role models on students’ perceptions of STEM professionals. We acknowledge that the positive interplay of all three concepts can foster STEM identity and lead to persistence in STEM. Furthermore, we propose that a Hawaiian STEM identity can be developed as students foster these STEM identity concepts through lessons that focus on STEM in Hawaiian culture and activities that are culturally relevant.

Ladson-Billings (1994) defined culturally relevant teaching as “a pedagogy that empowers students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes” (pp. 17-18) and has three components: student learning and academic success, cultural competence, and critical consciousness. By presenting math and
science in culturally relevant ways, Ka Pilina Noʻeau II (KPNII) aims to increase STEM engagement and improve math and science knowledge and competencies of all students, especially those who are Native Hawaiian in grades K-5, by making connections between students’ personal lives, cultures and traditions, and the STEM students learn in school. KPNII has created four 12-lesson culturally relevant curricula for K-5 students, recruits and trains mentors in the project’s Math & Science Learning (MSL) Model and curricula, and provides STEM enrichment programs during school breaks and after school to give students opportunities to learn math and science through culturally relevant hands-on activities.

About Ka Pilina Noʻeau II

From 2020-2022, KPNII has implemented 20 STEM camps and serviced over 290 students in Hawai‘i. Student participants in kindergarten and grade bands 1, 2-3 and 4-5 were surveyed before beginning STEM camp and again after completion in the program. Kindergarten students from the KPNII piloting camp in the summer of 2022 did not show statistically significant change in their attitudes towards math and science, expectations for their own performance in math and science classes, Sense of Belonging and Sense of Place. Examples of the HĀ Sense of Belonging subscale items included “I am proud of Hawaiian culture” and “I know names, places, and stories in Hawaiian culture.” Whereas, examples on the HĀ Sense of Place subscale items included “I care about others” and “I do school and community activities (e.g., beach clean-up, makahiki, museum open house).” However, kindergarten students showed significant negative change on the HĀ Sense of Responsibility subscale, including on the items, “I ask questions and listen to what others have to say” and “I think about how well I do in class.” In contrast, at the end of the program the students equally reported in the post-survey that hands-on learning
activities grounded in Hawaiian culture and language are fun and interesting and that the program helped them to improve in math and science. Several students commented that they liked engaging with Hawaiian concepts and activities in the program, such as lei making and designing their own kapa.

Participants in grade 1 who took part in the KPNII piloting camp in the summer of 2022 did not return significant results on attitudes towards math and science, and Sense of Place. However, students showed overall growth on the Sense of Belonging scale, including on the items, “I can pronounce everyday Hawaiian words” and “I know names, places, and stories in Hawaiian culture,” but these results were not statistically significant. While students returned significant negative change for their Sense of Responsibility, as on the items “I come to school on time” and “I think about how well I do in class.” After the program students from grade 1 shared that the program grounded in Hawaiian culture and language improved them in math and science especially because it helped them to learn more about Hawaiian culture. Additionally, students who gained more from the program in terms of their performance tended to make changes in their attitudes towards math and science less negatively, but these results were not statistically significant. A couple of students also shared that they liked learning Hawaiian vocabulary, as well as the concepts and activities, such as counting in Hawaiian and hula.

Overall, participants in grades 2-3 reported a significant increase in attitudes towards math and on two items referencing science attitudes such as, “I can learn more science if I work harder,” and “I can do science experiments if I work harder.” Additional survey items included the HĀ Framework: Sense of Responsibility, Sense of Belonging, and Sense of Place subscales.
Participants in grade band 2-3 showed a statistically significant increase in scores on the Sense of Responsibility subscale which included items such as, “I finish my schoolwork without being told,” and “I have many interests and ideas.” Additionally, students who gained more in terms of their math and science performance made more positive changes in their Sense of Responsibility, including their attitudes towards asking for help and trying out new ideas to solve a problem. On the HĀ Framework scale, the item, “I listen to and think about different voices and opinions,” from the Sense of Belonging subscale returned a significant increase in scores for grade band 2-3. A statistically significant increase in scores was also observed for Sense of Place for grade band 2-3. This subscale featured items like, “I take part in school and community activities such as beach clean-up, Makahiki, museum open houses, etc.” After completing the program, students participated in focus groups; they explained that the program helped them to learn new approaches to solving math and science problems and understand math and science better because “it’s new ways to do things,” as one student shared. Other 2-3 grade students commented that, “learning about it (Hawaiian culture) here is a lot funner than learning about it at school,” “We learned like different words I didn’t even know would exist like kiʻi pōhaku” and “la and ahi.” Another student commented that learning about the limu reminded them of what they see at the beach; others mentioned they learned how to measure in Hawaiian units, how to play Hawaiian games, and enjoyed learning Hawaiian words, stories, and places. One Hawaiian student also explained that having to learn more Hawaiian concepts in the program got her more interested in her Hawaiian background.

While participants in grade band 4-5 overall did not return significant results on the HĀ Framework Subscales, they did report increases on both the Sense of Responsibility and Sense of
Belonging subscales. On open-response questions, a student wrote that they wanted to participate again because “we are learning Hawaiian, and I am Hawaiian,” another stated, “I like making Hawaiian stuff,” and a third wrote, “it teaches me about Hawaiian culture.” In a post-program focus group, one student commented “I think learning all of these projects and doing it really helped me learn about the Hawaiian culture and language, and it helped me learn new things that I didn’t know and things that I did know,” and another student commented that they “liked that the lessons would include learning Hawaiian stories.” Students described that they “learned about the hale, the ahupua’a, and the loko i’a” and “that a loko i’a is a fishpond” as well as “some Hawaiian signs” and “about the Hawaiian history that has like … the streams and estuaries.” For several students, the program provided them with opportunities to build on their prior knowledge about Hawaiian culture from school or home and community settings. One student commented that “I learned about fishpond walls and like um, also, hales, in fourth grade [at school], but because of the summer school, I learned more about them.” Learning by doing and interactive lessons grounded in Hawaiian culture supported students’ motivation and interest to engage with math and science. For instance, one student explained: “When I do the activities with my friends and my teacher it has … it gets more energy and it makes me more motivated to do the activities and finish it.” Another student reported that the program “helped me improve my skills in school because I am more efficient and confident about my goals and will complete them fully.” These positive responses to participation in the STEM camp shows students’ enthusiasm for learning math and science through a cultural and local lens.
Lesson Examples and Demonstrations

In this workshop, conference attendees will try culturally relevant STEM activities from KPNII student curricula. We will present four lessons, one per each of our grade band curriculum, which highlights how KPNII lessons reassociate students with cultural STEM traditions in order to foster their development of positive STEM identities using the three STEM identity concepts of: 1) students interest in STEM and STEM careers, 2) STEM self-concept, and 3) the influence of STEM role models.

Piquing STEM Interest and Perpetuating Traditional Practices by Connecting to Modern Technology Skills

Most traditional Hawaiian crafting practices (such as lauhala weaving, kapa making, and stone carving), which were once essential to daily life in the islands, are no longer common activities in Hawai‘i today and are not considered jobs that are in high demand or high paying. The 4th grade lesson “Lauhala Craftsmen & Artist,” encourages students to learn about lauhala and lauhala weaving by connecting the traditional craft to computer programming, a career field with jobs that are in high demand and can potentially be high paying, and which uses computer-based technology skills that most students in Hawai‘i and the US are already being equipped with in schools today. In this lesson, students learn how to weave lauhala bracelets and observe how repeating the same actions creates a pattern in their design. They connect this experience to using loops (repeated instructions), pixels and angel measurements to create a program for an avatar to create digital designs.
Making the connection between this traditional practice revered of old to STEM skills treated as essential in modern society elevates the importance of and can help foster an appreciation for these traditional skills that may not seem so significant today. Relating to these long-standing cultural skills can also appeal to students who are taught to develop new technology skills in schools and programs that emphasize pathways to STEM-related careers.

Using Culturally Specific Examples to Strengthen STEM Self-Concept

The “Five Yellow Meli Bee & In Danger of Beeing Extinct” Kindergarten lesson puts a cultural spin on a familiar song that inherently teaches subtraction and counting down skills. In lieu of the traditional speckled frog characters, our song remake tells the tale of meli (or honey)bees and incorporates science concepts of pollination using Hawaiian language and instrument (the ukulele) all while teaching subtraction skills. The lesson also uses a game to teach students about special bees that live in Hawai‘i called the Hawaiian yellow-faced bee. Students use their counting and subtraction skills to be melittologists (scientists who study bees) saving the Hawaiian yellow faced-bee from extinction from predators, which also happen to be non-native species in Hawai‘i.

Using the example of a species of bee native to Hawai‘i (which is even called the Hawaiian yellow-faced bee) and creating the song using a Hawaiian instrument (the ukulele) in the Hawaiian language, can empower students to learn using examples and elements from their traditional culture while making the connection to elements (math and science concepts and a song) that students have learned through more Western ways. Also, learning about both native and non-native animals in Hawai‘i and describing their interaction with plants, each other, and
even with humans can help students see that there is science and math to explore in the world right outside their door and that these math and science concepts are a part of their everyday lives. Making this connection and presenting STEM in familiar ways can give students confidence to learn concepts they may be unfamiliar with by making connections to concepts or examples that they are familiar with.

*Exploring Evidences of Traditional STEM Knowledge with STEM Role Models*

In the 3rd grade “Kino Lau of Pele and Balancing Lava” lessons, students learn about the different manifestations of Pele and the formation of the Hawaiian islands. Through hands-on experience, students observe how a plaster of paris and water mixture shows the different stages of lava from a flowing liquid to a solid rock, eventually breaking down into sand. Using balances, students learn to measure and compare mass of different forms of lava: lava rocks and black sand.

This lesson is evidence of traditional scientific knowledge as it demonstrates that ancient Hawaiians understood the scientific concept of transformation of matter and explained their understanding of how lava transforms through the representation of different kino lau (bodily manifestations) that Pele is able to assume. Knowing that their ancestors, who act as role models for their progeny in this lesson, understood this scientific concept and embedded it into the identity of someone of such cultural significance can instill pride within students and inspire them with confidence to do science knowing that their ancestors held transmitting of scientific knowledge in such high regard.
In the 1st grade “Illuminating ʻIolani Palace & Palace Objects Seek and Find” lesson, students learn through storytelling how King David Kalākaua, the last reigning king of the Kingdom of Hawai‘i, was a STEM “person.” He loved science and technology so much that he traveled to a far away land called New York to meet an inventor named Thomas Edison because he (Kalākaua) wanted to bring light and electricity to Hawai‘i. Students learn the history of the lighting of ʻIolani Palace, then explore how light helps us see in the dark by playing a game searching for missing ʻIolani Palace items using flashlights.

In this lesson, students are able to learn about STEM through the example of a Native Hawaiian king who insisted on being at the forefront of scientific knowledge and technology and who found ways to use science and technology to help his people. Students are provided with a STEM role model they can identify with as one of their own people and whose example of being passionate about STEM students can follow.

**Conclusion**

It has become a common mantra for educators to say that “Math is everywhere;” however, it is just as common for students to fail to see where math and science concepts they learn within the classroom are outside of the classroom in the real world. Developing a positive STEM identity for NH and other indigenous students begins with showing students that math and science really are “everywhere,” not just in Western society or Western examples of math and science, but that math and science are just as present and relevant in their indigenous traditions and histories. In knowing that they come from a rich tradition of STEM-minded people, students can believe they
are capable of self-identifying as a STEM “person.” Educators can encourage students’
development of positive STEM identities by guiding students and giving them opportunity to
make personal connections to concepts taught in class to examples from their own cultures and
traditions.
References


Professional Development and Teacher Emotion:
Finding Equilibrium Through Reflection
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INTRODUCTION

The professional life of an English language university instructor entails relationships with
students, parents, colleagues, administrators and often the general public in conjunction with the
institutions where they work. For some instructors, these relationships can be and are often stressful and
challenging. These instructors’ careers depend on these relationships as they endeavor to improve subject
knowledge, pedagogic efficacy and professional development. Instructors teaching (EFL) in a country
outside of their country of origin, however, are often faced with additional unique stressors and
challenges when compared to other English language instructors teaching in their home country. For
example, foreign nationals in Japan are often subject to teaching contracts different from their Japanese
colleagues. Japanese university instructors historically have received tenure upon hire, that is, permanent
employment for life. In contrast, foreign instructors often experience age caps, contract renewal limits, or
demands requiring an instructor to have native-like ability in Japanese even though English is the
language of delivery for courses taught. Also, when EFL instructors seek out ways to develop
professionally, such as CELTA courses or Master’s or doctoral degrees, external stressors often create an
uneven playing field. These events and others often produce emotional responses of which can impact
teachers in their role as instructors, their pursuit of professional development and their identity within the
ESL teaching community. Unfortunately, there exists minimal scholarly research connecting teacher
emotion and professional development in Japan at the university level.

In the subsequent section, the literature review defines key terms about the topic of
professionalism, the role of professional development in English language teaching, emotion in general
and studies in teacher emotion in Japan. The methodology section outlines the study and provides a
theoretical paradigm in which the study is framed. The methodology section includes the data collection
methods and the epistemological understandings and judgments, and then reiterates the aims, and
identifies any key ethical issues and limitations encountered during the study. Section four analyses
qualitative data collected from the study and interprets its significance relevant to the research questions,
and in the conclusion, suggestions are made regarding ways to continue research in the arena of teacher
emotion and the impact emotions may have on teacher improvement and professional development.

2 LITERATURE REVIEW

2.1 Professionalism

During the early 1990s the term ‘professional development’ of teachers was practically absent,
even elusive in academic literature. Fullan and Hargreaves (1992) indicate little attention has been given
to the topic and that it was in “…only the last few years that teacher development as a concept has come
under scrutiny” (8). Leading researchers at the time either failed or refused to define what they meant by
the term. Darling-Hammond (1994), Leithwood (1992, p. 87), and Fullan and Hargreaves (1992) missed
opportunities to offer specific teacher development or professional development definitions. Fullan and
Hargreaves (1992, pp.8-9) state:

We will not attempt to define the term teacher development at this stage of the chapter. As will
become clear we use it both to refer to specific developments through in-service or staff
development, as well as to more thorough advances in teachers’ sense of purpose, instructional
skills and ability to work with colleagues.

The concise definition was deemed as a work in progress. A few years later Bell and Gilbert (1994)
clarify, though do not define, teacher development through their interpretive lens by viewing teacher
development as teachers learning, rather than as others getting teachers to change. In learning, the
teachers were developing their beliefs and ideas, developing their classroom practice, and attending to
their feelings associated with changing (493). They further describe and identify three developmental
types—personal, professional, and social—and outline key teacher development process features:

   Teacher development can be seen as having two aspects. One is the input of new
theoretical ideas and new teaching suggestions…The second is trying out, evaluation and
practice of these new theoretical and teaching ideas over an extended period of time in a collaborative situation where the teachers are able to receive support and feedback, and where they are able to reflect critically...Both are important if all three aspects of teacher development—personal, professional and social development—are to occur (Bell and Gilbert, 494).

In part, these three teacher development processes—personal, professional, and social—continue to evolve and shape decisions in current day teacher professional development literature, yet even as these evolve, *professionalism* means different things to different people and organizations in a wide range of contexts. In certain contexts it means behaviour within the guidelines and rules of administrative directives such as ‘teach to the test’ rather than establish a teacher-directed learning pathway. In another situation it may refer to the acquisition of qualifications recognized by educational authorities or professional organizations that accredit teachers to perform towards educational mandates (Richards, 2008).

At present, teacher professional development continues inarguably as one of the most highly debated topics in academic education including its definition, the practices associated with being and becoming a professional and the ways in which these practices vary in professional settings. Leung (2009) defines a professional as “a trained and qualified specialist who displays a high standard of competent conduct in their practice” (52) and reveals two dimensions of professionalism. The first as a dimension of institutionally directed participants (*institutionally prescribed professionalism*)—involving teaching organizations, regulatory bodies, administrators—that determine or dictate the contents of quality teaching, and the second (*independent professionalism*) which involves the teachers’ own beliefs, views and the processes by which they consider reflecting upon their values, beliefs and practices.

Professionals almost always undergo study and training processes in various academic fields of knowledge, as well as discussions, examinations, practicums and observation to become qualified in transference of knowledge to learners and other professionals. The teaching profession is practiced, conducted and studied in various ways, however, at the core is teachers learning, understanding how to learn and how to impart this knowledge into practice for the development of their students. Becoming an English language professional includes entering a global community of professionals with shared ideals,
values, discourse, and behaviors but one with “...a self-critical view of its own practices and a commitment to a transformative approach to its own role” (Richards, 2010, 110)

2.2 Teacher professional development

Many language teachers continue to improve their profession in teaching and increase knowledge into how to effectively perform in the workplace, however, in recent years language teachers have pursued avenues of learning beyond professional development activities such as seminars, course work and workshops organized by other teachers within their social or professional networks (Johnson, 2009). Several alternative professional arrangements have resulted in institutions and educators acquiring new technologies to facilitate increased professional knowledge. Chat rooms, online teacher certificate programs, computer-mediated communication (CMC) tools and virtual communities are contemporary ways language teachers participate in their own learning as well as learning environments they seek to create for their students. Teachers engaged with other teachers and in some cases community leaders develop communities of practice (Richards, 2010). These collaborative, self-directed groups of professionals have led to create more socially acceptable roles and influenced teacher learning and classroom practices as well as student opportunities for learning. Also, language teachers seek out opportunities to further advance their content and pedagogical knowledge by entering master’s and doctoral programs. Doing so facilitates opportunities for professional advancement, increased salary remuneration as well as recognition in professional communities. In summary, teacher professional development in English language teaching is a continuous process by which teachers act as agents of change, and become agents that change the way learning shapes the attitudes and minds of future teachers by contributing to various knowledges required in professional development. Since teacher professional development (TPD) is a lifelong process of learning and growing, teachers need time to regularly learn in a supportive manner and opportunity for regular improvement that benefits students, the institutions they serve, the community at large and the teachers themselves.

The literature for second language learning teachers as they develop professionally includes a variety of knowledges. Shulman (1987) refers to a variety of knowledges including content knowledge,
general pedagogical knowledge, curriculum knowledge, pedagogical content knowledge (PCK), knowledge of learners and their characteristics, knowledge of educational contexts and knowledge of educational ends, purposes and values. For example, it is not enough for a language teacher to “know” how to have a conversation. Instructors of second language speaking require specialized knowledge in awareness, instruction, practice and experience in how to develop learner communicative competence of which includes knowledge of interactional competence. If language teachers are not aware of conversation analysis as a tool to understanding various interactional practices that reveal interactional competence—turn taking, repair, overall structuring—then it may be very challenging for them to effectively teach a second language conversation class. Awareness of turn-taking, sequencing and the practices associated with them contribute towards a specialized knowledge which helps teachers to understand how to construct a turn, how to allocate a turn and how to implement actions within the turn, and demonstrate these acts to students.

Given the advances in technology in classrooms, technological pedagogical content knowledge (TPCK) has become another component of professional knowledge and refers to the ability to include and integrate technology into the teaching setting (Mishra and Koehler, 2006). Depending upon a teacher’s expertise in technology, TPCK could include the teacher following the process of the use of a particular technology, then creation of activities and materials with technology, and after which teaching with technology and facilitating this knowledge to learners so that they may develop skills to meet growing technological demands (Reinders, 2009, 236).

In the arena of classroom learning, be it learner, language learner or teacher learning to teach language, there exists pedagogical knowledge and guidelines that impact classroom learning and teaching. Kumaravadivelu (2006) links language ability and language knowledge by stating that “…language knowledge is what is in the mind of the language users, and when they use it appropriately to achieve their communicative purpose in a given context, they exhibit their language ability” (21). As second language teachers embark on developing within their profession, it is essential that they are made aware of cognitive development essential to learning how to be a language instructor.
Teachers as professional educators possess a great responsibility as role models. In addition to instructing, mastering subject matter and teaching methodology, they provide direction, encourage, increase knowledge and improve service to students and the community, of which is essential to the learning process in the classroom. Further, the teachers’ ability to teach establishes an effective and appropriate benchmark for positive outcomes in classrooms. To accomplish these processes and outcomes, teachers require a high level of learning and a willingness to make adjustments in their own development as a teacher and the processes in which bring about effective change.

It is not uncommon knowledge that the teaching profession is intricately and invariably linked with teacher professional development (TPD) and that TPD is presented in relevant literature in various ways, however, central to every definition is an understanding that it is about teachers learning, learning various ways to learn and transferring learning to practice to benefit student growth and development (Avalos, 2011). Several articles address how teachers learn by applying theory to practice and discussion of teacher change (Clarke & Hollingsworth, 2002; Korthagen, 2004, 2010; Penlington, 2008). In programs that foster professional development, teachers examine student work, develop performance assessments and standards-based report cards, and jointly plan, teach, and revise lessons. Interestingly, in situations where teachers work separately apart from their colleagues, they report favorably of programs that bring them in close contact with colleagues in active work on improving practice (Garet et al., 2001).

2.3 Emotion

In the discipline of applied linguistics, So (2005) defines emotion as, “the psychological outcome of dynamic interactions between different layers of internal and external systems – psychological, cognitive, behavioural and social” (43). The word “emotion” involves movement or motion (Hanson, 1999) or motivation, and Barcelos (2015) outlines five characteristics of emotions as referred to by Solomon (2004, 13). The five features are described as:
“(1) behavioural: When we experience an emotion it usually includes facial and verbal expressions, reports (such as I love you) and elaborate plans for action; (2) physiological, including hormonal, neurological, neuromuscular changes; (3) phenomenological, which includes physical sensations, ways of seeing and describing the objects of one’s emotions, as well as “metaemotions;” (4) cognitive, which refers to appraisals, perceptions, thoughts, and reflections about one’s emotions; and (5) social, referring to interpersonal interactions and cultural considerations” (Barcelos, 2015, 309).

For the sake of this discussion, emotion will be used as referenced by Gordon H. Bower in his article titled, “How Might Emotions Affect Learning” in The Handbook of Emotion and Memory: Research and Theory (Christianson, 1992). Bower explains emotions as thoughts and responses in the brain to an event triggered by what he explains as “computational demons” that monitor our behaviours, goals and future plans, and that can even be categorized as foundational or basic, (presumably universal) and subordinate, of which are constructed socially. Similarly, Damasio (2000) states emotion as:

“specific and consistent collections of physiological responses triggered by certain brain systems when the organism represents certain objects or situations (e.g., a change in its own tissues such as that which produces pain, or an external entity such as a person seen or heard; or the representation of a person, or object or situation, conjured up from memory into the thought process” (15).

Scholars agree emotion comprises 'subjective experience, physiological reactions, expressive reactions and certain types of cognition’ (Munkejord, 2009, p.152) and itself is part of a complex system of rationality, (Li et al., 2014) however, disagreements abound as to which aspects of the definition are most significant. Concurrently, however, some scholars view emotion for research purposes as troublesome and disturbing. Cunningham and Kirkland (2012) state, “…definitions of ‘emotion’ often include an implicit (or even explicit) contrast with “cognition” (p. 369) and therefore create a false dichotomy that pits emotion as the opposite process than rational cognition.”

2.4 Teacher emotion in English language teaching

Teacher emotion has continued to be recognized as a significant area of study for the past twenty years (Frenzel, Goetz, Stephens, & Jacob, 2009). There exists unanimity that the field of English language teaching encompasses strong emotion and that teachers’ emotional events and instances are a significant part of their thought process and perceptions of reality. Hargreaves (1998) acknowledges the action of teaching as an "emotional practice" and this claim is supported by extensive research on
teachers' emotional responses to teaching in school contexts (Hargreaves 1998, 2000, 2005; Denzin, 1984). Some researchers further suggest that emotions influence teacher behaviour (Saunders, 2013), and argue the importance of understanding how emotions give shape to what teachers do (Borg, 2006) and how teachers learn (Nespor, 1997). These particular bodies of research imply two primary reasons in which conducting research on teacher emotions is of significance for educational purposes: first, it notes that teachers’ experience both negative emotions such as frustration, anger, disappointment, shame (Demetriou, Wilson, & Winterbottom, 2009) and positive emotions, (pride, elation, satisfaction) related to their teaching experiences and teaching contexts. Emotions such as these have an impact on teachers' well being, teaching satisfaction as well as risk of burnout and retention, and thus may impact the professional development and teaching improvement of teachers.

Secondly, teachers’ emotions and emotional bonds or relationships inform their teaching practice. Teachers make decisions regarding curriculum development, lesson planning and professional development, and as a consequence, the quality of teaching is influenced by and depends upon teachers’ emotions as well as the connections impacting these emotions (Hargreaves 1998, 2005; Martin and Lueckenhause, 2005). Hargreaves (2001) refers to teaching as a cognitive and behavioural practice “…where improving teaching involves attending solely to what teachers should know and be able to do (505).” This implies that experience informs their teaching and through reflection teaching improvement occurs, and an integral part of professional development in the field of language education includes improvement. Additionally, underlying teaching as an emotional practice is the assumption of teaching as social in nature, and as a social practice (Zembylas, 2005). Interestingly, although effort to understand how teachers learn to teach is valuable to administrators and policy makers connected to the role of beliefs in learning to teach, there exists scant research on the role of emotions in learning to teach (Borko & Putnam, 1996).

Teacher emotion continues to be a significant area of study because researchers continue to discover correlations between teacher positive emotion and student positive emotion. Frenzel, Goetz et al (2009) tested a hypothesis through a longitudinal study of over seventy 7th to 8th grade math teachers and
over 1700, 7th to 8th grade students in Germany. Measurements included scales of teacher enjoyment such as “I look forward to lessons in this class” (Frenzel et al., 2008) in which teachers responded to a five-point Likert scale. The Achievement Emotions Questionnaire was given to students to assess their enjoyment and questions like “I enjoy my mathematics class” also were included and based on a five-point Likert scale (708). A mathematical modelling was used to correlate responses and researchers discovered a positive link between teacher enjoyment and student enjoyment of their math class (Frenzel, 2009, 711) rendering the results notable and meaningful.

Another reason worth mentioning teacher emotion relates to how research about the topic continues to evolve. As previously discussed, emotion often refers to a binary of positive or negative, however when viewed from a critical approach, an approach considering the role of power and the role of resistance to power (institutional, professional and individual) particularly at college and university level English language teaching, shifting views emerge. Benesch (2017) explores ‘feeling rules’ which are often part of institutional guidelines of teacher performance and that impact teachers’ pedagogical decisions and ways teachers negotiate this tension. Through interviews with English language teachers in New York, the author provides examples of critical English language teaching interacting with emotion. When asked about standardized requirements, such as standardized literacy test or plagiarism, instructors voiced opposing views. Benesch focuses on emotion labor, (not to be confused emotional labor) and states, “…emotion labor is the struggle between workplace feeling rules (Hochschild, 1983) and employees’ prior training and/or beliefs about appropriate workplace conduct” (1). Instead of labelling emotions in English language teaching assumptions in literature as “bad” (e.g. anxiety which interferes with language acquisition) or positive (enthusiasm and motivation to encourage learning), Benesch suggests shifting the focus to what emotions do socially, not what they are in the minds of human beings (vii). The subsequent paragraphs in this section identify studies of teacher emotion in Japan.

Although a number of studies of teacher emotion exist, there are only a limited number of studies examining teacher emotion in Japan and even fewer linking teacher emotion and teacher professional development. In this section, two studies will be mentioned. The first study (Cowie, 2011) was
conducted in 2008 in Tokyo, Japan and explored feelings of ‘emotional warmth’ that EFL teachers experience regarding their students and in the capacity as carers and moral guides (235). The study is discussed here primarily because of its qualitative approach to researching teacher emotions in a university context and sought to answer the following research questions: (1) What emotions do experienced EFL teachers perceive in their interactions with students, colleagues and other involved in education? and (2) What implication does the study of emotions have for the development of EFL teachers. The study was conducted with a social-constructivist approach, an approach by which participant and researcher construct meaning to view reality.

Five of the nine participants had teaching experience only in Japan while the others had taught in Africa, Asia, North American and Europe with structured interviews as the primary means of data collection. Cowie (2011) categorized teacher emotions into seven categories; emotions in relation to (1) colleagues, (2) institutions, (3) professional networks, (4) warmth towards students, (5) student progress, (6) anger towards students, and (7) teachers as a moral guide (238-239). Results revealed the term “emotional warmth” in response to positive emotions expressed towards colleagues and students, however, negative emotional responses were reported primarily towards institutions and professional networks. For example, Cowie (2011) writes: “The teachers used a variety of alternative professional networks as a way to overcome the feeling of vulnerability and lack of a career structure that exists in EFL” as one response to challenges EFL instructors face within professional networks, and “I get really angry…It bothers me when administrations don’t support teachers to make it easier for them in just little ways” in response to institution policy (238). In the discussion, the researcher highlighted three implications for teacher development in EFL and other educational areas of which included discussion about emotions, the significance of encouraging emotional warmth and addressing the moral aspects of teaching. One interesting observation from the study revealed that teachers, though having discussed interest in leaving the profession of teaching or feelings of wanting change, that through collaborative efforts with other teachers they were still able to develop professionally.
The second study explores the conditions and structures of the foreign language teaching profession in Japan and Finland (Sarja et al, 2017) in order to compare the conditions of teacher professional development in the respective countries. This study was selected due to the nature of descriptions of professional development and the ways in which data was collected as well as the participants. Data collection included Finnish and Japanese policy documents, interviews of university instructors and lower-secondary foreign language teachers, an assistant language teacher and field notes from classroom observations. To my chagrin, however, there were no published research questions guiding the study. The results of the study revealed variance in language teacher education between the two countries. Many Japanese teachers indicated their education focused on theory but significantly lacked in teaching methodologies and class management unlike the Finnish teachers whose specialized knowledge was formulated in inquiry based learning.

The study also highlighted differences in professional development, particularly teacher identity. In Finland, instructors developed professional identities through “…personal biographies, social interaction competence and reflection on ethical and philosophical questions” (238) while Japanese teacher education embraced goals of a curriculum-based approach. Also, the study revealed that the Japanese government supports assistant language teachers (ALTs) from English speaking countries to assist language teachers in high schools and junior high schools throughout Japan, however, often these ALTs are asked to create lessons and teach classes when they have little or no specialized knowledge. The primary requirement of an ALT is to have a Bachelor’s of Arts or Science (in any field of study) and have an interest in teaching English in Japan. As of July, 2018, there are just over 5,000 ALTs in Japan (http://jetprogramme.org/en/) with over half from the United States and a combined 80% coming from the US, Canada, Australia, New Zealand and the UK. Assistant language teachers are undoubtedly helpful in classrooms throughout Japan, however, having English speakers that have little or no specialized knowledge in English language teaching displays serious implications on how Japanese teachers are taught to teach.
The study also sheds light on the process of teacher development in Japan primarily through schooling and professional coursework while highlighting deficiencies in classroom practice. Furthermore, Japanese instructors expressed frustration and dissatisfaction (emotion) about the education they received because it was primarily theoretical and struggled to find answers to management problems in their teaching, however, the study did not focus on teachers’ emotions even though they appeared relevant in the results.

As previously stated, there are a limited number of studies that explore emotion at the university level in Japan. One particular study not detailed here (Hosotani & Imai-Matsumura, 2011) addressed teachers’ emotional competence by which emotions are expressed in human contacts, however, the study was conducted with Japanese elementary school teachers, and as such their teaching context, curriculum knowledge, pedagogical knowledge and pedagogical content knowledge are likely dissimilar than that of university instructors. By examining the emotions experienced by university language instructors in Nagoya, Japan, insight can be provided concerning the situations in which the instructors experience emotion in the context of their teaching. This in turn may identify factors and critical events that trigger emotional reactions and possibly assist in determining the degree an event impacts professional development.

3 METHODS

3.1 As previously stated in the introduction, this study seeks to investigate how English language university instructors in Japan view professional development and better understand the impact of emotion in their teaching contexts on their professional development. Further, this study is situated in a sociocultural context. From a sociocultural point of view, the epistemological position of a sociocultural stance constructs human learning in a socio-situated, dynamic cultural community (Johnson, 2009) in which learning is circulated amongst actors, activities and tools. In discussing teacher learning and knowledge in the previous section, it was stated that although learning often occurs within the classroom, it is not restricted to the classroom and contains a multiplicity of realities that are shaped through interaction with others. Johnson (2009) writes “How an individual learns something, what is learned, and
how it is used will depend on the sum of the individual’s prior experience, the sociocultural contexts in which the learning takes place and what the individual wants, needs or is expected to do with that knowledge” (2). The sociocultural view of learning transcends knowledge transfer and creates situations by which teachers converse with other teachers, engage in collaborative planning or teaching and decision-making. Thus, at the core of L2 professional education is teachers as learners of teaching.

Having taught in Japan since 2005, I often wondered how other instructors made decisions about their own professional development and was curious about emotions other teachers experienced in their teaching contexts. Though my background and graduate degrees are in English literature, not unlike many other language teachers in Japan I decided to increase my pedagogical knowledge in second language teaching by pursuing a doctoral degree. Similar to other English language teachers, I attended professional conferences and presented research on a variety of language teaching topics. A few participants in this study indicated they had chosen to study for a master’s degree in Japan after having taught for a period of time, and this decision afforded many opportunities they likely would not possess had they chosen not to obtain a master’s degree. My decision to develop professionally as a doctoral student was in response to primarily 3 factors; (1) contract limitations; (2) my own emotional responses to student learning in connection with my pedagogical decisions; and (3) my emotional response to self-evaluation of my own teaching.

There are several situations to which language teachers at universities in Japan experience negative emotions. Many universities lack a coordinated program of study. Class sizes are often large, students generally meet only once a week with their instructor for 90 to 100 minutes and facilities often leave much to be desired. At the university level, hiring committees consists of men, and men are overwhelmingly hired to fill vacant positions. In my first position as a university instructor in Japan, the post was “pre-arranged” and shortly after a phone call with a tenured professor at that Japanese university from my home in Oregon, I was advised that the position was mine. To my understanding, there was no advertisement for the post. On the other hand, many universities in Japan offer a wide latitude of topics to teach and often do not question the pedagogical content decisions teachers make. Also, many full-time
university instructors enjoy significant research funds for domestic and international travel—often the
equivalence of thousands of US dollars—to attend conferences or to engage in research projects,
however, such opportunities for part-time university instructors rarely exist. Situations such as these may
inspire or discourage teacher professional development and prompt various emotional reactions.

3.2 Research questions and aims

The research questions guiding this study are: (1) How do English language instructors in
Nagoya, Japan define and describe professional development?; (2) according to the instructors, which
emotions do these university ESL instructors experience related to their teaching contexts?; and (3) What
impact do these emotions have on their professional development? In order to discuss these questions in
detail it was essential to investigate the beliefs and values through detailed interviews.

3.3 Participants and study context

Given the various university teaching environments in Nagoya, Japan, (e.g. public university,
private university, limited contract, open contract, full-time, part-time, etc.) a purposeful sampling
strategy was employed to seek out and select university EFL teachers from a wide range of backgrounds
including gender, working conditions and ethnic nationality. The participants involved seven university
instructors, four men and three women (n=7) in Nagoya, Japan who have been teaching English as a
Foreign Language, and who currently are employed as university employees. Of the seven, two were
part-time teachers (one man, one woman) with the remaining teachers employed full-time. Several of the
instructors had taught at more than one university in Nagoya, and currently, two instructors teach at more
than one university in Nagoya. The researcher invited full-time, part-time, tenured and non-tenured
faculty as possible candidates for this study and pooled from a network of professionals known
personally and from constituents in universities throughout Japan. Additionally, the instructors’ countries
of origin were representative of four continents; Asia, Europe, North America and Australia. Two
instructors originated from Europe (one male, one female), three from North America (one male and one
female from Canada, one female from the United States), one instructor from Asia and one instructor
from the Oceania region, (male, New Zealand of Japanese ethnic nationality). The researcher informally met with participants to explain the purpose and relevance of the study and discuss assurances of anonymity and complete confidentiality. A purposive, non-probability method of sampling was selected to target a particular group (university instructors in Nagoya) with the understanding that the sample does not represent all or even a certain percentage of university instructors in Nagoya. The sample is suitable for this small-scale exploratory study because of the size of the study, the specificity of the study (professional development and emotions of university instructors) and the deliberate and selective bias and suitability to the basic needs of the researcher (Cohen, et al, 102).

This research project was conducted in Nagoya, Japan, abides by the ethics guidelines set forth by educational institutions in Japan for professional research of human subjects and the ethics guidelines of the British Educational Research Association. Further, the researcher followed the guidelines set forth by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in Japan, and the Collaborative Institutional Training Initiative (CITI Japan Program) that details knowledge of international standards for research.

3.4 Data Collection Methods

The researcher conducted interviews with a social-constructivist approach in which researcher and participant jointly constructed meaning whilst making view of reality. The interview utilized in this study was semi-structured with a series of interview questions guiding it. The semi-structured interview is a conversational, two-directional communication in which the interviewer is considered part of the measurement instrument. One common format of qualitative data collection is the interview as it often proves to be a useful means to examine opinions, beliefs, and viewpoints regarding specific matters (Oakley, 1998). Regarding an interview, Kvale (1996) states, an interview is an exchange of views between two or more people on a subject of mutual interest, establishes a means towards knowledge production and emphasizes the social situation of research data (Kvale, 1996:11). To explore the research questions in depth requires investigation into the values and beliefs of participants through interviews, and interviews enable participants (the interviewer and interviewee) to express how they view
their world from their own point of view. Cohen, Manion & Morrison (2018) state qualitative data collection as “socially situated” and as the antithesis of a straightforward process, thus a one-size-fits-all approach would prove unhelpful. The semi-structured interview as a less structured approach allows for constructions of events, activities, concerns and reconstructions of “gathering facts, accessing beliefs about facts and identifying motives and feelings” (236). Given the nature of this study, emotions that university instructors experience in the context of their teaching, the semi-structured interview fits the data collection purpose by allowing participants to answer the same questions thereby increasing comparability of response data and allowing for prompts and probes.

3.5 Procedures

A copy of the interview schedule is provided in Appendix A. Additionally, a pilot version was sent to a small sample of instructors to assure questions are phrased properly and following minor adjustments, the interview schedule was sent the instructors indicating they would participate in the study. The interview schedule design encourages various themes to unfold, and when provided for participants in advance, allows each participant time to think about responses to queries. Interviews were organized starting with main questions, succeeded by follow up questions and probes (Rubin & Rubin, 2005). Although follow up questions emerged as a natural aspect of the discussion, questions 1, 2, 5, 9 and 11 include prepared follow-up questions designed to elicit emotional responses which allowed for probes.

The approximately 60 minute, semi-structured, face-to-face interviews were conducted primarily in the office of the researcher to minimize interruptions, however, interview times varied between 50-65 minutes depending upon the content each participant shared. Interviews were audio recorded and transcribed for analysis and coded to determine themes that emerged from the data.

Teachers were asked to share information about their lives and teaching in three specific areas: (1) emotional words used to express enjoyment or dissatisfaction about teaching and their teaching contexts in Nagoya, Japan; (2) emotional words and responses to teaching situations, experiences with
students, other teachers and paraprofessionals or administrators; and (3) ways in which these teaching situations or experiences impacted teacher improvement or professional development.

3.6 Data analysis

The primary method for analysing participant interviews is content analysis or meaning categorization (Kvale, 1996). With multiple ways to analyze content, Lieblich, Tuval-Mashiach, and Zilber’s (1998) ‘categorical-content’ perspective was adopted which included four stages: text selection, definition of content categories, category sorting—coding—and drawing conclusions (112). Participants were coded by alpha initials for family name, given name, order of interview and interview question (e.g. TV5-9 is the fifth participant interviewed responding to question 9).

The interview transcriptions, (forty-three pages and over 41,800 words, were imported into Nvivo Data Analysis Software and analyzed by drawing upon strategies outlined by Miles and Huberman (1994) and quoted from Kvale (1996). These strategies included counting, clustering noticing similarities and differences, and nuances as well as physical reactions. The continued re-examination of the information allowed for conclusions to be drawn.

3.7 Limitations

Although a small sample size of participants helps researchers investigate problems in an in-depth, comprehensive manner, challenges remain in the ability to draw useful generalizations from the data. Furthermore, there may be bias by the researcher because of similarities in experience as a language teacher, due to relationship with participants, and as in individual with similar views of professional development and situations which evoke emotion in teaching. Finally, given the nature to of this study, the interviews were conducted shortly before the summer holiday. Having limited time for recruiting additional participants meant having less data for analysis.

4 RESULTS
Though several themes emerged, given the limitations of the study and its scope, results are divided into four broad categories. Interviews that focused on definitions of professional development were followed by the broad theme of emotion relations with students and emotion relations with colleagues and staff. The fourth theme, critical incidents and the degree the event impacted professional development, examined ‘extreme situations’ as a result of their teaching. When possible, groupings included correlations between professional development and behaviour when negative emotions were experienced as well as correlations between professional development and behaviour when positive emotions were experienced. These areas are summarized and grouped together with participant quotations and illustrated by tables.

4.1 Professional development definitions

Improvement of learning and teaching are core principles of professional development. The instructors’ definitions of professional development focused on improvement of curriculum, level of expertise, instructional goals, future leadership, increased knowledge and the ability to work with other teachers to accomplish these objectives. Instructors referenced their professional development in both institutionally prescribed and independent ways towards the students and institutions in which they serve. Most interviewees answered question seven without hesitancy and provided similar responses, though not all respondents agreed that attendance at professional conferences was essential. One participant believed attending professional conferences benefitted her significantly less than sharing and collaborating with colleagues that she works with directly (see Table 1).

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Statement</th>
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<tbody>
<tr>
<td>BB2</td>
<td>becoming a better teacher. Being brave enough to try new activities in the classroom, being brave enough to record those activities for example video, or getting feedback from students. leaving the comfort zone trying something new.</td>
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</table>
DH4: professional development is what we’re doing now. It’s a great reflection on our work and what’s expected of us. For me it’s always important to be doing some little project. If it’s taking a course in, I don’t know iELTS certification or TOEIC preparation or using drama in the adult EFL classroom.

OK7: the continuing process of getting better at whatever you’re doing, whatever you working at. For me as a teacher it’s improving my teaching abilities, Leadership abilities, just trying to get better at whatever you do. And the purpose could also be to feel better about the job that you’re doing but also to help you with moving onto the next step.

ON3: honestly I think professional development would be you know updating your skills and better teaching material and better teaching quality, you know General work

TV5: Well, I would say the sense that I’m able to teach what I want to teach and my students feel they are getting something important an interesting out of that. What I’ve also tried to do what’s to make my students more independent. That hasn’t succeeded so well.

HL1: I’m always learning something in the classroom, I’m always tweaking courses. So individual people that can work with me or hear it or give me some ideas what they’ve done in the particular case, that’s better professional development for me than keeping up with the researchers going to conferences in general.

HMA6: it’s the sort of constructive sharing of ideas, Being open to new ideas, But we do need to get out of our comfort zone sometimes and that means going to conferences and interacting with people and, even finding ideas that we don’t like,

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One unique definition of professional development came from a male, full-time instructor when referencing bravery in the classroom. He indicated “trying something new” and “leaving the comfort zone” with students was important because it modeled vulnerability and risk-taking when trying out new pedagogical decisions. This instructor brings his guitar to each class and plays it in each class:

“One thing I’ve done this semester is take my guitar playing into class. And I consider that professional development, because the reason why although I love music, I would have loved to have done it years ago, but I didn’t because I didn’t want to make mistakes in front of the students. And now I realize making a few mistakes while playing chords and singing songs is not a bad thing because they see that [similarly] presentations don’t have to be perfect and in spontaneous performance there are mistakes, so professional development can be playing guitar in the classroom” (BB2-7, July).
He believed by modeling vulnerability whilst performing in front of his students, he would model risk taking and communicate the importance of willingness to try and make mistakes as a positive language learning experience. In language teaching, teachers expect students to make mistakes.

4.2 Emotion relation with students

When teachers expressed emotions about their students, responses were generally optimistic and positive, and expressed emotively. When speaking about emotions connected to their relationships with students, almost all of the participants exhibited what Solomon (2004) referred to as “facial and verbal expressions of emotion” (13). Participants smiled, used sarcasm, used positive emotion words such as “enjoyable, laughter, care, proud, fantastic, curious, enriching, opportunity, and great” to describe the students they serve. HMA6-5 responded, “I think my students are just great. Great, great, great. They’re some really lovely students.” The same instructor further commented about the students’ work ethic by indicating that students at a university in Nagoya worked “really hard” with more effort when compared to another university in the same city.

Some teachers expressed their emotional closeness in response to situations occurring during class. The same instructor recanted the social-economic status differences between students at two universities during the interview. “Students at [ ] are really, really wealthy students, I mean we’re talking Gucci bags, Louis Vuitton, …and girls would come to class wearing diamonds, Real diamonds!” However, when asked a follow-up question how she was able to discern the socio-economic status of students from a previous university, she responded by indicating a topic of discussion (poverty and discrimination) and explained how she had provided a safe setting for students easily and openly to discuss their personal and family lives, thereby fostering a space for emotional closeness with students and developing rapport an asset (HA6, July).

One male instructor, critical of 19 year-old first year students in his classes, expressed negative emotion words like “confusion and disappointment” when describing the behaviour of students coming to class unprepared. “Simple things like showing up to class on time, showing up to class without your
textbook, asking me, ‘What should I do?’ when they show up to class without the textbook, or missing class for three or four weeks [and] asking me ‘What should I do?’” (OK7, July)

4.3 Emotion relations with colleagues and staff

In response to question eight, *What are some teaching situations with other teachers that produced positive emotions?* participants shared a variety of responses, however, a common theme emerging from interactions with colleagues and staff involved various forms of collaboration. Five instructors indicated some type of collaboration including (1) *showcasing*—combining 5-6 project-based courses into a single joint session for presentation of student projects—(2) *joint classes*—bringing two classes together to provide authentic audiences for presentation purposes, and team teaching—sharing one course in which one instructor teaches for 8 weeks followed by a different instructor. One male, full-time participant referred to an English language book of stories and how students learn to tell and write stories. He expressed how a colleague initially encouraged putting his lessons into book format for publication. The joint publishing project brought professional knowledge and experiential knowledge together to write and publish a book. His knowledge increased significantly in relation to publication format styles, writing styles appropriate to language learning textbooks, and expectations of the industry. Furthermore, this instructor indicated the joint book publication produced a positive emotion and facilitated professional development by informing his teaching. At present, this language teacher starts each class with a story.

When further discussing with BB2, he revealed an experience teaching with a colleague during a joint class in which teachers and students experienced positive emotion. During this joint class session, students gave presentations on a range of topics in small groups of four or five. Students from one class used technology (Power Point presentations) while students from the other class used poster presentation mind maps to assist in content explanations.

“Certainly our shared presentations produced positive emotions, not just for me but for the other teachers’ students. My students were kind of low tech and that’s the way I trained them. It’s not their fault, it’s just the way I trained them. It produced positive emotions because I
was curious about what Ken’s (pseudonym) students were bringing to the party [joint class] and what other skills they bring, not just the technology…so what we accomplished in the last month, is a very good example of teaching situations with other teachers that produced positive emotions…so the following week we spent about 30 minutes in the classroom really reviewing the presentation for the shared class, and I was very happy we did because there was a lot of positivity” (BB2-8.1 & 8.2, July).

Johnson (2009) states the Zone of Proximal Development has the potential to create a meditational means in which through,

“…social interaction, the public spaces created by inquiry-based approaches both make visible teachers’ current capabilities and reveal those abilities which are not yet fully formed but are still in the process of developing. Likewise, given the power of language within a sociocultural perspective, it is assumed that the talk or social interaction that goes on in inquiry-based approaches functions as meditational means that support teacher learning, creating the potential for improvement in instruction (Johnson, 2009, 99).

By engaging in pedagogical discussions, sharing of ideas, collaboration of classes, opportunities for positive emotional responses leading to professional development may also be created.

The teachers’ relations with the colleagues were viewed negatively when encountered with perceived differences in educational values. One male full-time instructor discovered that he was teaching twice as many courses than other teachers while other teachers were “getting paid quite a bit more” (OK7-9), however he further indicated that the event motivated him to develop professionally and was not a hindrance. Another teacher (TV5-9) noted a time when colleagues were highly critical of his work as a course coordinator, criticizing syllabus and active learning strategies. “I’m not doing it enough, standardization? I’m not doing it enough to ensure quality, and those teachers, if I have to work with those teachers, and I have, I find extremely stressful.” Although the teacher felt the criticism hindered his effectiveness as a coordinator, there were no long term negative effects on his professional development.

4.4 Critical incidents

Brookfield (1995) defines critical incidents as “vivid happenings that for some reason people remember as being significant” and consider important and may summon reflection (114). These events are generally unplanned and unanticipated and can be positive, negative or neutral. The category critical incident emerged during data collection as less than positive emotion (questions 9 and 11) and although critical incidents can be positive (e.g. a reading lesson that concludes with students asking questions
related to other texts unprompted by the instructor) the subsequent incidents were selected to give attention to the incident by participants and emotional responses during inquiry.

One of the participants experienced two unique critical incidents of discrimination and racism. In some universities in Japan, administration differentiates between “Japanese” English language teacher and foreign English language teacher with different salary scales. ON3-11, a New Zealand national with Japanese ancestry—both parents Japanese—when speaking about his nationality referred to himself as “Kiwi”—the way in which New Zealanders refer to themselves—even though he grew up with dual citizenship in a culture where Japanese and English were used in home and society. He also works part-time at universities and corporate language schools. “I considered myself “kiwi with Japanese blood, I mean I can speak both languages, I use both languages for work, and I guess in Japan I conveniently choose which one is better depending upon the situation.” However, when administration informed him of the “Japanese rate” of renumeration, he inquired with other foreign teachers about their salary and discovered the Japanese rate was considerably lower. It was not until this instructor informed a tenured staff of the perceived injustice before his salary was raised to that of other foreign language teachers.

The same instructor experienced a critical incident in the form of bullying. Although his background is not in teaching and he does not have a Master’s degree, he does have technical consulting experience in information technology and a background in the gaming industry, Japanese anime film production and manga. When working in a corporate environment as a language teacher, it was not uncommon for lead teachers to introduce the language teachers to the students. Other instructors attempted to undermine his teaching ability by criticizing his specialized knowledge and limited teaching experience. When asked if the event had hindered his teacher improvement or professional development, he stated:

…no it didn’t hinder at all, actually it helped me realize that what I’m providing is a little bit different than just teaching. Maybe these professionals, you know their pride is at stake, their academic background is very important, but for my students I realize that we are all English teachers. No matter where we studied, at the end of the day we’re all English teachers in their eyes and in that case like when they look at me, I want to be able to provide something you know with a twist so I can be that kind of fun teacher that teaches about Manga and animated video games using English, you
know, they can tell their juniors hey take that guys class, it’s really fun. If I can be that fun teacher, that’s a win for me so I might not have, I might not be Mr. PhD or Mr Masters, but if the students come that’s my win so I think it made me realize that that there are more important things. It has actually really helped with my improvement as a teacher. (ON3-9, July)

In a different example, an instructor felt unfair treatment when he had to undergo urgent surgery and as a result was unable to be present for classes. He believed he had followed all protocols by informing colleagues and administration that he had an emergency.

“So I was over in the hospital over there, you know calling everybody, sorry I can’t make it I got to have this surgery, you know it’s an emergency and I was in hospital for a week and I got my paycheck the next month and there was like all this money taken out. And I said ‘what’s this all about?’, and they said you missed the class so… like you know it’s shogana (Japanese for “can not be helped”). That just like, that killed me and so whenever one of my coworkers missed a class, and she often missed class, for whatever reason, nothing happened” (OK7-9).

When critically reflecting on this event the instructor used emotion words such as disappointment, negative attitude and unfair, and in response to Do you believe the situation hindered your teacher improvement or professional development? the teacher replied,

it maybe did because I came to work with a negative attitude. I was constantly looking for the next, okay I’ve got to look someplace else for the next job. I guess I wasn’t putting as much, maybe I put less energy into improving my classes and more energy into research and presentations and publications, you know my future. So I was like okay, I want to help my students, I really enjoy my students they’re awesome, but if this is the environment that I’m put in then I’m going to focus on something else that’s going to help me get out here. I’m sorry to say that (OK7-9, July).

In almost every occurrence, unfair treatment often exuded strong and open emotional responses.

5 CONCLUSION

This study discovered teachers defined and described professional development in fundamental ways in their contexts as language teachers. It was also essential for teachers to emphasize the individual values important to them when describing and discussing professional development. For each instructor, “getting better” at the craft of teaching was significant, however, each acknowledged different paths to the same end, especially the discussion about paths they have chosen compared to others. Furthermore, each instructor valued the improvement that occurs in the
classroom as well as outside of the classroom, however, responses were limited to independent professionalism, that is, a reflection of their own views, beliefs and processes (Leung, 2009). Interestingly, each teacher expressed positive physical emotive expressions (smiles, positive interest, curiosity) when approached about the study and was keen to participate in the study as it is a means of sharing ideas. The instructors described and defined professional development like it was a breath of air they had been holding in for some time and finally was able to release with thoughts as words. One participant went as far as to suggest that we as teachers need to “do more of this”, listening to each other and asking these and challenging questions about teaching. Through discussions, questions and reflection as well as the sharing of research on how teachers learn to teach and learn to learn, teacher awareness can be raised to include pedagogical content and more opportunities for teacher collaboration. Surprisingly, technological pedagogical content knowledge (TPCK), another facet of professional knowledge (Mishra and Koehler, 2006) still intimidates some teachers in the study. However, through encouragement, experiences in the classroom and witnessing more students and teachers engaged in technology, opportunities will undoubtedly present themselves for teachers to consider more technology in language learning classrooms.

From the onset, it appeared clear that there exists a direct correlation between teacher emotion and teacher professional development. In the study, several teachers identified the classroom as a space where professional development occurred. Collaboration with other teachers in classroom experiences can inform teacher cognitions, either consciously or unconsciously, through reflection, co-teaching a course or in pedagogical decisions to modify the direction of a course currently being taught. From my own experience, during a post-semester assessment critiquing our newly adopted program, my course was scrutinized. As I listened to criticism of how I had conducted the course, initially I felt frustrated that faults in my course had been “exposed” however, because the relationship between each teacher is positive, encouraging and supportive, I did not feel the need to defend myself nor hear the criticism as an attack. Not every program has such feedback, and this in
and of itself is also professional development. Following the criticism were ways and suggestions the course could be improved which was valued. In the moment, however, it was frustrating and tough to hear.

It is undisputed that teachers experience emotion in the context of their teaching and this study also reflected evidence of teacher emotion. Negative emotional responses as well as positive emotional responses to teaching situations led to circumstances for self-reflection and self-evaluation. Although some participants experienced negative emotion, their emotional responses to the event did not in each case negatively impact professional development. However, with two of the participants, it did.

Teacher professional development is a continuous process, lifelong and sustaining when experienced in a supportive environment. Negative experiences in a teaching context can increase burnout and increase negative behavior towards other colleagues, staff and even students. However, as this study demonstrated, negative experiences may also become motivating factors to encourage professional development vis-à-vis change of employment or advanced degrees of study.

University instructors teaching in Nagoya were interviewed to gather information about their current teaching situation, their definition of professional development and ways in which the emotions experienced in their teaching contexts impacted professional development. Analysis and interpretation of these interviews signifies recognition and acceptance of emotions is indispensable in English as a foreign language teaching as it relates to professional development. Finally, emotion in education at the university level is underdeveloped for a multiplicity of reasons, thus, it is recommended the field of English language teaching acknowledge the significance of emotions for teaching and professional development.

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**APPENDIX A**

Interview Schedule

**Section 1: General questions about teaching:**

Thank you for taking the time for this interview.

How did you end up teaching at universities in Nagoya?

1. What are a few things you enjoy about teaching in Nagoya, Japan?

What emotional words you would use to describe your enjoyment of teaching in Nagoya, Japan?

2. What are a few things that you do NOT particularly enjoy about teaching in Nagoya, Japan?

What emotional words you would use to describe any less-than-enjoyable things about teaching in Nagoya?

3. Would you mind explaining some of your university teaching situations / contexts while teaching in Nagoya? (e.g. number of classes taught per term, content of the classes, schools, expectations by administration)

4. How would you describe your students that you serve?

5. What words would you use to describe your feelings about teaching the students and community you currently serve or have served in the past?

Can you think of a few situations to support these feelings?
Section 2: Working with others. (Administration / Colleagues)

In many cases, university teachers work alongside other teachers in their teaching contexts.

6. How would you describe your working relationship with your colleagues?

7. Part of the professional life of a university instructor may involve professional development. How would you define “professional development” as a university teacher?

8. What are some teaching situations with other teachers that produced positive emotions? Do you believe this/these situations contributed to your teacher improvement or professional development? If so, how? If not, why not?

9. What are some teaching situations with other teachers that produced less that positive emotions? Do you believe this/these situations hindered your teacher improvement or professional development? If so, how? If not, why not?

10. One definition of self-efficacy is an individual’s belief in his or her innate ability to achieve goals. In the context of your teaching, have you ever felt or believed you would not be able to achieve your personal goals? Do you recall the situation(s) or reason why you felt this way?

11. Many university instructors in Japan (full-time and part-time) interact with other professionals (e.g. administrators, university staff, deans)

Can you think of any situations which produced negative emotions? How did you feel when this occurred? Do you believe it hindered your teacher improvement or professional development?

12. What are some situations with other professionals which produced positive emotions?

Do you believe it contributed towards teacher improvement or professional development?

13. From our discussion today, how do you believe some of these emotions impacted your teaching improvement and professional development?

14. Do you have any final comments?
To Come Out or Not? Navigating the Decision to Come Out as a Trans or Gender Nonconforming Educator

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Abstract:
Coming out has never been an easy process for LGBTQ+ individuals. An extensive body of research indicates that a large majority of LGBTQ+ youth experience bullying and harassment in secondary schools, and this negative treatment may deter LGBTQ+ youth from coming out at school. National advocacy groups like GLSEN and the Trevor Project work to promote safe and inclusive environments for all queer youth, and in doing so, highlight the negative experiences LGBTQ+ K-12 students face in America’s schools. LGBTQ+ educators are also affected by unsafe and unwelcoming school environments. A significant body of research focuses on the school climate and coming out experiences of lesbian, gay, and bisexual (LGB) educators, yet very few research studies have focused on the personal and professional coming out experiences of transgender and gender nonconforming (TGNC) pre-service and in-service teachers. Overall, the TGNC demographic reports the highest levels of discrimination. Research has demonstrated a correlation between lower levels of mental well-being and professional self-efficacy. Research has also demonstrated that when educators, including LGBTQ+ teachers, feel safe in educational spaces, teacher professional and self-efficacy correlate with higher academic achievement for students. Together, this research suggests a need to continue efforts to improve school climate and the need for deeper sociocultural transformation and understanding of inclusive curricula. This longitudinal qualitative case study of two transgender pre-service teachers focuses on how they navigate their personal and professional identities and the coming out process in an effort to create a supportive environment for their LGBTQ+ students. The data resulted in the researchers developing the constructivist grounded theoretical framework of a culture of CARE (rooted in Compassion, Awareness, Respect, and Empathy) which demonstrates the criticality of building positive support structures for both TGNC teachers and LGBTQ+ students. The researchers provide implications for future research and practical suggestions on how educators can implement a culture of CARE to promote safe and welcoming educational environments in which LGBTQ+ educators and students can thrive.

Key words: transgender, gender nonconforming, educational partners, school culture

Purpose
The discourse about sexual orientation and gender identity has greatly evolved in the 21st century. There has been a paradigm shift in schools; language and culture are becoming less cis/heteronormative and more inclusive and diverse, bringing about a greater awareness of transgender and gender nonconforming (TGNC) students. The digital age has allowed LGBTQ+
American youth to see themselves represented (e.g., in film, media, and social media), and many are coming out at an earlier age.

According to the latest estimates; 7.1% of all adults in the U.S. identify as LGBTQ+. This number has doubled since the Gallup Poll began recording this data in 2012 (Jones, 2022). The Williams Institute concluded that 1.6 million individuals (adults and youth) in the United States currently identify as transgender. 20% of those identifying as transgender are youth, and this estimate has also doubled since the previous survey (Herman, Flores, & O’Neill, 2022). In a 2018 survey of over 180,000 college students, 17% identified as LGBTQ+ and 1.7% as TGNC (Postsecondary National Policy Institute, 2021). These numbers affirm the need for safe and equitable environments for LGBTQ+ individuals in educational institutions, which includes spaces for these individuals to self-identify.

School mission statements often state an intention to value inclusivity and diversity in education for the students they serve (Slate et al., 2008). These statements are typically fairly general; LGBTQ+ and other marginalized groups must rely on robust anti-bullying and harassment policies at schools and effective leadership to enforce them (Kuehn, 2020; Kosciw et al., 2020; Kosciw, Clark, & Menard, 2022). However, only 12% of students reported that their schools had comprehensive policies to protect students from harassment based on both sexuality and gender (Kosciw, Clark, & Menard, 2022).

Results from LGBTQ+ youth mental health surveys are grim. The Trevor Project (2022) found that 45% seriously considered suicide in the past year. Even worse, almost 20% of transgender and nonbinary students actually attempted suicide. The LGBTQ+ student population needs better support, and TGNC students struggle with their mental health the most of all.

Racial and ethnic diversity in the United States has increased within the last decade with current census data indicating that Hispanics outnumber White non-Hispanics in secondary and university classrooms (U.S. Census Bureau, 2018 & 2021). Teacher education programs must consider this increasing diversity when preparing their teacher candidates. One common and longstanding pedagogical approach is multicultural education. Banks (1994) described multicultural education as a way to transform the traditional curriculum, reducing the disenfranchisement of students of color and those who “feel alienated, left out, abandoned, and forgotten” (p. 4). Although multicultural education is an inclusive pedagogy, research indicates that LGBTQ+ issues are being left out of the curriculum at both secondary and tertiary levels (Brant & Willox, 2020; Sherwin & Jennings, 2006).

For students to thrive at school, teachers need to be well-supported and feel secure at their schools and in their classrooms. Leithwood and McAdie (2007) found that “teachers also thrive when the cultures of their schools value and support their safety and the safety of their students” (p. 43). Educators who feel safe in their work environment experience higher rates of personal and professional efficacy which directly impacts students.

While self-efficacy is a cognitive process that affects everyone, it is undeniably more challenging for adolescents because their executive function is still in flux (Medina, 2018; Schunk, 1985). The development of students’ academic self-efficacy is situational and teacher-impacted. Teachers play a significant role in helping establish environments where students can build this self-efficacy, improving academic success in their content areas. For example, a student may feel supremely confident in their ability to succeed in English class but may feel much less successful in Math. This may change from year to year, depending not only on the subject, but also on the teacher.
The feeling of safety for educators is only one element of the complex set of working conditions that factor into a teacher’s internal state and sense of well-being, which in turn, impact not only students’ self-efficacy, but also their mental health. All of these, taken together, impact the school culture (Leithwood & McAdie, 2007). School culture is defined as the understanding, intentions, and actions which lead to significant changes within the institution that promote the emotional, psychological, physical, and academic growth of all students, faculty, and staff (Kane et al., 2016).

Every teacher deserves to feel safe and supported in educational spaces. Our participants considered their own experiences in education and reflected on their intentions to improve the circumstances that impact school climate for themselves and their students. The purpose of this paper is to explore how two TGNC-identifying pre-service teachers navigated the coming out process in their personal and professional lives. This study attempts to answer the following research questions: (1) To what extent did the quality of support TGNC individuals received in secondary institutions impact how they navigated the coming out process when these individuals became pre-service educators? (2) What are the perspectives of TGNC pre-service educators concerning their own emerging professional identities?

Literature Review

The National Center for Transgender Equality has been studying the issues and providing support for transgender and gender nonconforming people for a number of decades. In 2011, their National Transgender Discrimination Survey (NTDS) found that transgender (trans) and gender nonconforming (TGNC) people “face injustice at every turn: in childhood homes, in school systems that promise to shelter and educate, in harsh and exclusionary workplaces, at the grocery store, the hotel front desk, in doctors’ offices and emergency rooms, before judges and at the hands of landlords, police officers, health care workers and other service providers” (Grant et al., 2011, p. 2). Analysis of the United States Transgender Survey (USTS) data just a few years later echoed these findings, documenting widespread discrimination and bias occurring in all facets of TGNC individuals’ lives. More than a third of the survey respondents reported serious psychological distress, and 40% said that they had attempted suicide (James et al., 2016).

Although data from the most recent USTS in 2022 is not yet available, survey results from related sources such as The Trevor Project and the National School Climate Survey (NSCS) in 2021 have consistently shown that the trans and nonbinary or gender nonconforming population reports the lowest mental well being of the LGBTQ+ population as a whole (Kosciw, Clark, & Menard, 2022; The Trevor Project, 2022).

Injustice against TGNC individuals appears to be pervasive and lifelong. According to Spade (2015), “trans people are told by legal systems, state agencies, employers, schools, and our families that we are impossible people who are not who we say we are, cannot exist, cannot be classified, and cannot fit anywhere” (p. 137). Kean (2021) took this one step further, explaining that “trans individuals are silenced through various forms of epistemological oppression” (p. 273). When people refuse to acknowledge the existence of trans identities in educational spaces by not using pronouns, names, honorifics, and other forms of identities, it is a unique form of oppression that “is experienced by a large number of trans and nonbinary people every day” (p. 273).

Epistemic injustice can cause mental exhaustion, a feeling of being misunderstood, of being disregarded, or even of being attacked. According to Kean (2021), it would be helpful for K-12 schools, colleges, and universities to employ more trans people overall. This would
increase visibility and, over time, reduce the tendency of cisgender people to argue that trans people do not exist. There should be trans-affirming policies and procedures in place “on an ongoing basis” (Kean, 2021, p. 277) with educational organizations providing trans-inclusive training for all faculty and staff. According to Bartholomaeus and Riggs (2017), plans to improve trans inclusivity at schools should transcend safety and bathroom access for students. The authors outlined a comprehensive “whole-of-school” approach that also considered the well-being of transgender adults in educational spaces.

The disturbingly high suicidality rate of 20% reported by The Trevor Project (2022) may be linked to the oppressive experience Kean (2021) described. The mental health survey also noted that 78% of transgender and nonbinary youth reported anxiety or depression (The Trevor Project, 2022). Although there are some differences between the various subgroups (e.g. transmen, transwomen, nonbinary, etc.), it appears clear that the TGNC population struggles the most with their mental health overall when compared to the LGBTQ+ population as a whole. Intersectionality is a compounding factor, with students of color reporting higher suicidality and lower mental well-being. More than half of all those surveyed indicated that they were not able to procure the mental health care they needed. These worsening statistics appear bleak but the mental health survey also indicated some positive results. TGNC youth who lived in supportive homes and those who had their pronouns respected reported lower suicide rates than those who did not. The attempted suicidality rate was lower for students who attended a school that was LGBTQ-affirming (The Trevor Project, 2022).

The biennial National School Climate Survey (NSCS) explored LGBTQ+ issues in education. Survey results mirrored those suggested by the NTDS, USTS, and the Trevor Project Survey. More than any other students surveyed, transgender students reported the most negative experiences in the school environment (Kosciw et al., 2020; Kosciw, Clark, & Menard, 2022). When TGNC students felt unsafe, they skipped school or avoided school functions. They were also less likely to feel connected to their school community, graduate, and therefore less likely to pursue higher education (Kosciw et al., 2020; Kosciw, Clark, & Menard, 2022). School-based support structures, including GSA (i.e., Gender and Sexuality Alliance) clubs, inclusive school policies and curriculum, and a supportive school staff may mitigate negative experiences. Unfortunately, these structures were not consistently available in all schools (Kosciw et al., 2020; Kosciw, Clark, & Menard, 2022). Over half of the students of color surveyed also experienced victimization based on race or ethnicity (Kosciw, Clark, & Menard, 2022). Although school climate appears to have improved overall for LGBTQ+ students since the inception of the National School Climate Survey in 1999, it still has not improved significantly over the past few years (Kosciw, Clark, & Menard, 2022).

Overall, the data outline what may help TGNC youth and what may not. Surveys and the subsequent academic scholarship constructed around their results have consistently indicated that the vast majority of TGNC individuals experience a hostile school climate and a lack of reliably supportive childhood homes. A connection between these experiences and poor mental health is plausible (Kuehn, 2020). A host of organizations such as the Human Rights Campaign, the Trevor Project, GLSEN, and the National Center for Transgender Equality advocate for the TGNC community by raising awareness, outlining and providing programs aimed at improving mental well-being, and continuing to put pressure on public systems and institutions to increase anti-discrimination legislation and enforce inclusive policies and practices.

To best address the research questions of our study, we present a brief literature review concerning school climate, coming out experiences in work spaces, and professional identity.
School climate

There are multiple interrelational aspects that make up the climate of a school. Loukas (2007) defined school climate as the “feelings and attitudes that are elicited by a school’s environment…a multidimensional construct that includes physical, social, and academic dimensions” (p. 1). School climate cannot be solely defined by an individual perspective but one which encapsulates that of a collective body. On its website, the National School Climate Council defined school climate “as the quality and character of school life…it also reflects norms, goals, values, interpersonal relationships, teaching and learning practices, and organizational structures” (National School Climate Center, 2007). This definition can somewhat misconstrue the differences between school climate and school culture as it combines tangible actions (e.g., teaching and learning practices) with intangible constructs that mold a school (e.g., values and interpersonal relationships).

Tus (2020) claimed that “school culture is all about the continuous sequence of acts and behaviors of all the people within the school (23). By this definition, school culture constitutes the shared beliefs and values that are founded on the actionable steps educational partners take to align their group norms with procedures, guidelines, and processes that lead to measurable outcomes. This creates “the unique working conditions inside organisations” (Zahed-Babelan et al, 2019, p. 140) that help define a school and set them apart from others. Examples include school policies, dress code, ways in which teachers approach behavioral issues at school, and methods used for engaging parents, all of which are actionable steps that may directly impact the feelings and beliefs of the school environment (i.e., school climate) including faculty, administration, staff, and curriculum.

There is much academic research that centers school climate reform as a driving force for advocacy for marginalized groups of students (Kosciw, Clark, & Menard, 2022; Thapa et al, 2013). School connectedness, the “feeling,” and a sense of belonging are also tied to school climate which impacts the feelings and actions one takes. This is why it is difficult to speak about school climate separately from school culture.

Some researchers have adopted a social justice approach when addressing how educators should consider improving school climate for TGNC individuals. Bartholomaeus & Riggs, 2017 advocated for schools to broaden the conversation over supporting transgender individuals in education with a more holistic and proactive approach to creating a positive school climate. The researchers suggested that the conversation may need to begin with a look at the poor mental health of TGNC individuals and the negative experiences they have in schools, but it should not end there. Focusing solely on these things could have a stigmatizing effect on TGNC individuals and does not improve school climate.

According to Bartholomaeus and Riggs (2017), the responsibility of creating school wide transformational change should not be placed on transgender people or on the parents of transgender children (p. 361). The authors drafted a plan which included philosophical underpinnings, the importance of leadership, and specific policies and procedures that educational partners can follow to improve school climate for all transgender people. To put this plan into action, schools should not be afraid to examine and challenge the capacities of cisgender teachers and pre-service teachers (Bartholomaeus, Riggs, & Andrew, 2017).

Sadowski (2016) advocated for improved safety measures for all queer students with equitable school wide policies that support LGBTQ+ youth. Implementing actionable steps towards building LGBTQ+ affirming and inclusionary measures promotes the establishment of
safe and welcoming educational spaces. However, educators should not just be thinking about safety or bathroom access in schools to better school experiences for transgender people (Bartholomaeus & Riggs (2017). “Improving school climate for transgender and nonbinary students goes beyond ensuring that they can access school facilities like bathrooms and locker rooms. They must work to be inclusive and affirming of transgender and nonbinary students in their teaching and in their interactions with transgender and nonbinary students” (Kosciw et al., 2020, p. 105).

According to Kosciw, Clark, and Menard (2022), future research is needed to better understand the experiences with respect to school climate between the subgroups within the transgender, nonbinary and genderqueer groups of students. The researchers considered that the bias experienced by some of these student groups “can be considered manifestations of misogyny, in that they demonstrate hostility towards females and femininity” (Kosciw, Clark, & Menard, 2022, p. 94). To improve climate, schools should work on counteracting sexism and misogyny; a problem that extends beyond LGBTQ+ or TGNC hostility.

**Professional identity**

Individuals in the professional environment often project a version of themselves which reflects the social norms and values that are representative of the organization’s culture (Ladwig, 2021). Thus, teachers construct and project a public teacher identity. The navigation of professional identity for TGNC individuals who become teachers is a subject that has not been well represented in academic scholarship (McCarthy, 2003). Research from Wright and Smith (2015) stated that a majority of teachers surveyed did not receive professional development related to LGBT students, and even more had not received any training related to LGBT professionals. The negative repercussions of coming out at the workplace that queer educators have had to deal with also reinforces the imperative need for administrative professional development on LGBTQ+ issues. These include awareness, equity, and sensitivity training about queer issues that K-12 students and professionals face in educational spaces.

There is a large body of research on professional identity and the development of teacher identity which extends beyond the scope of this article. To target the specific research questions of this study, we have focused on the intersections of personal and professional identities as they pertain to TGNC teachers. Akkerman & Meijer (2011) addressed the postmodernist approach to identity which stresses the multiplicity of identities that we all play depending on the social situations we find ourselves in. The researchers claim that identity “is not a fixed entity” (p. 310), which also supports the notion that identity is performative (Gee & Gee, 2007).

Teacher identity is complex and multifaceted. Because teachers possess multiple identities that coexist at the same time, emerging depending on the situation, this complicates the separation of personal and professional identities. Community members may treat teachers differently while outside of the school environment (Connell, 2015b). Teachers retain their professional identities in and out of the educational space. However, queer identities which have, in many cases, been considered unacceptable identities to expose kids to are questioned either by the queer individual (e.g., whether or not to come out as a queer teacher) or are encouraged to tread lightly when identifying as a queer educator for fear of backlash from administrators and parents (Connell, 2015b).

O’Sullivan & de Abreu (2010) address how immigrants and asylum seekers experience “cultural discontinuity” (p. 275) when they are faced with adversity through lived experiences that do not coincide with their cultural identity. They are forced to figure out ways to navigate
new cultural experiences that challenge to derail their vision of their future cultural identity in a new environment. The feelings of being marginalized and misunderstood due to either sexual orientation or gender expression are all too common for TGNC educators. Many navigate predominantly cis/hetero-normative educational spaces that do not welcome or comprehend gender diversity. Much like the marginalized individuals O’Sullivan and De Abreu (2010) discuss, TGNC teachers must learn to work within the often suppressive organizational system of schooling that does not afford them freedom to develop their queer identities on the job.

Within the last two decades, there has been a growing concern for the safety of LGBTQ+ students in K-12 schools (Kim, Sheridan, & Holcomb, 2009; Kosciw, Clark, & Menard, 2022) with LGBTQ+ affirmative organizations providing recommendations for best practices that support queer youth at school. Legislation in states like California that are proactive in promoting awareness of the issues LGBTQ+ youth face at school have started a wider conversation amongst educators and school administrators on how to train school faculty, staff, and other educational partners to improve the school climate for this population of students (AB-493, 2019). However, while the concern for queer K-12 youth seems to grow, there still remains little support for and training on working with LGBTQ+ faculty, administrators, and staff (Clark & Kosciw, 2022). Our research study hopes to shed light on some remaining gaps in support for TGNC educators by examining their self-perceptions of professional and personal identities.

**Coming out experiences at work**

The latest Gallup Poll results suggest that the number of adults who identify as LGBTQ+ has doubled in the last ten years, reaching “a new high of 7.1%” (Jones, 2022). The numbers are even higher for Generation Z adults (those born between 1997 and 2003) with 21% of this group identifying as LGBT.

The Williams Institute compiles data from several survey sources to estimate how many individuals in the United States identify as transgender. Although the number of adults identifying as transgender has remained relatively steady since 2016-17, the data suggest that nearly 20% of the 1.6 million individuals who identify as transgender are between the ages of 13 and 17 (Herman, Flores, & O’Neill, 2022). The Williams Institute concluded that the estimated number of youth identifying as transgender had doubled in the past five years, reaching 1.4% of youth in 2022 (Herman, Flores, & O’Neill, 2022).

For many years, the term ‘coming out’ has been used to describe the iterative process of disclosing sexuality, sexual orientation, or gender identity (Murray, 2015). According to Khayatt and Iskander (2019), gay and lesbian teachers have historically approached ‘coming out’ in the workplace with a measure of caution. Some individuals have chosen to postpone ‘coming out’ until they have achieved a perceived measure of safety, either in terms of their employment status or in terms of having supportive coworkers or administrators (Connell, 2015b).

At some point, LGBTQ+ educators must personally decide whether or not to ‘come out’ in the workplace and to what degree. Some may ‘come out’ to trusted co-workers or administrators and others may ‘come out’ publicly. Connell (2015b) mentioned that “All teachers, regardless of sexual identity, engage in an ongoing negotiation of self-disclosure with their students, who are inevitably curious about the personal lives of their teachers” (p. 99). There is a wide range of possibilities; some educators may choose to remain fairly private about their relationships and family matters, not discussing much about their lives outside school at all. Others may choose to use general terms only, referring to their “spouse” or “partner” and do not
show any personal photos. According to Connell (2015b), it is even more difficult for gay and lesbian teachers to navigate these topics when they are single and possibly dating.

Khayatt and Iskander (2019) noted significant differences between the ‘coming out’ process of gay and lesbian individuals and the way this works for TGNC teachers. This may be in part because “our gendered bodies make their own announcements” (Khayatt & Iskander, 2019, p. 14). A gay or lesbian teacher may have the option to remain closeted if they choose to. For some TGNC individuals, it may be difficult because they do not ‘pass’ as the gender with which they identify. They may also reject the option of ‘passing’ because they strongly desire to be seen and identified with their gender.

Another difference is in the intentionality of ‘coming out.’ The participants in Khayatt and Iskander’s (2019) study desired to come out, asserting their nonbinary identity repeatedly. However, the authors explained that “their ‘outness’ did not stick” (p. 13). Despite the fact that they wanted to ‘come out,’ their identity was not seen or acknowledged by others in the educational space. This is the epistemic injustice Kean (2021) described. One of Khayatt and Iskander’s participants said that their experience was further exacerbated by racism, giving rise to an intersectional struggle. The geographic location of the school, the participant felt, was a contributing factor.

Not only is there a gap pertaining to studies about the specific experiences of TGNC students (Kuehn, 2020), there is also a paucity of research available on TGNC educators. The lack of both could be partially explained because “educational spaces often do not welcome trans people” (Shelton, 2018, p. 299). Delving further into the coming out experiences of TGNC teachers, for example, depends upon finding published studies on this topic, and these have been somewhat sparse. This may be because the policies that protect gay and lesbian educators in the workplace leave transgender and genderqueer workers vulnerable, since they do not specifically outline protections that have to do with gender and gender expression (Connell, 2015a & 2015b). Many districts do not have policies that are comprehensive enough to protect TGNC teachers, just as they do not do enough to protect TGNC students (Kosciw, Clark, & Menard, 2022; Kuehn, 2020).

Some smaller studies, such as Bartholomaeus, Riggs, & Andrew (2017) have concluded that despite the fact that open-minded teachers felt good about having TGNC students in their classrooms, they felt a lack of confidence in handling situations that might come up, and having a TGNC adult on staff helped them feel like they had someone to go to if they had a question or concern. Moreover, the study suggested that while professional development is a positive thing, teachers need ongoing support and partnership with an organization, and this is not available in all locations for all schools.

Shelton (2018) explained that well-intentioned allies in educational spaces were more likely to raise issues of gender when a TGNC person was on staff. In this study, a transgender educator had recently come out publicly at a professional development event. Shelton (2018) found that “crogender colleagues begin to unlearn inculcated notions of gender and help themselves and students begin to examine and critique gendered norms” (p. 309).

Sometimes, LGBTQ+ people report that they do not enjoy becoming the “poster child” for all queer topics and activities at the school (Connell, 2015b). They may automatically become nominated as the GSA advisor, ask them for their help concerning queer issues, or even go to them to ‘come out.’ This can become burdensome, given that there may not be many TGNC educators to begin with.
Methods

In this qualitative longitudinal case study of two pre-service teachers, we explored how these TGNC individuals conceptualized navigating their personal and future professional identities. The first round of interviews took place pre-pandemic, and then three years later, we conducted a second round of interviews. We chose our participants through convenience sampling because their perceptions about TGNC identity in education are intrinsically valuable to the research questions. Our literature review identified a paucity of scholarship on TGNC teachers. Conducting unique research provides a perspective worthy of study (Creswell, 2015; McCarthy, 2003; Merriam, 2009). We employed qualitative methods, which allow researchers to “go into depths and details of a phenomenon” (Gammelgaard, 2017). These methods allowed us to analyze interviewees’ firsthand accounts with respect to the research questions.

Participants

We conducted semi-structured interviews of two participants who self-identified as TGNC. To respect their confidentiality, we assigned the participants pseudonyms and used their asserted pronouns throughout the study. The first set of interviews took place when participants were students at public universities in the western U.S. Both stated their intentions to become secondary school teachers. Zachary was a 19-year-old undergraduate earning a Bachelor’s Degree in Child Needs Studies. Zachary planned to continue with a one-year post-graduate secondary teacher certification program thereafter. At the time, Zachary identified as White, trans-masculine, agender, and was using they/them pronouns. Alex was a 23-year-old post-graduate earning a preliminary teaching credential to teach English Language Arts in secondary schools. They identified as nonbinary, trans, and queer.

At the initial interview, both participants were still pre-service teachers earning fieldwork experience in public secondary schools on the west coast of the United States. Since each interviewee was still completing coursework, their fieldwork was linked to their certification.

The second set of interviews occurred three years later. Zachary was working at an in-patient facility for young people struggling with their mental health. Zachary identified as a transman and asserted he/him pronouns. Alex was working full-time as a teacher at a public high school. Their self-identification and pronouns had not changed.

Procedures

One of the principal researchers emailed participants requesting their study participation, established interview dates and times, and conducted the first set of interviews. Both participants consented to be recorded and for all other associated data (e.g., email correspondence concerning the research study and public social media posts) to be used in academic research. Participants received a digital copy of their transcribed interview and clarified any potential ambiguities.

Three years later, the two principal researchers contacted participants and set up the second set of interviews. Both participants consented to be interviewed and recorded again three years later for their data to be used for academic research. Due to the constraints of the participants' schedules and impact of Covid-19, both participants were interviewed via video conferencing software which allowed for ease of recording and transcription of each interview.

Limitations

Due to the sensitive nature of the participants’ identities and limited access to this population of teacher candidates entering the field, this case study serves as a small yet valuable
snapshot representing TGNC pre-service teachers. It is unknown how many TGNC teachers and pre-service teachers there are or will be in the near future. We used convenience sampling to recruit the two participants in this study. We recognize that the small number of participants in this study provides a limited range of perspectives on TGNC identities and that this may not represent the breadth of lived experiences of the larger TGNC community in educational spaces.

Results

Scholarship on TGNC individuals in education is a vibrant field, focusing primarily on how to improve their experiences in school (Bartholomaeus & Riggs, 2017). For example, hostile school climates may be mitigated somewhat by a variety of support structures, such as student clubs at school, inclusive policies, practices, and curricula, as well as ongoing professional development and supportive leadership (Kosciw et al., 2019; Kosciw, Clark, & Menard, 2022). The current case study focuses on two TGNC-identifying individuals who stated intentions to provide support to LGBTQ+ students after becoming teachers themselves. Due to the longitudinal case study design, we extracted the data from both sets of interviews and then compared and contrasted these findings separately, since the interviews had been conducted three years apart from one another.

We conducted a second interview three years later after both participants had completed their university coursework and fieldwork as pre-service educators. We completed this interview for a variety of reasons. First, we wanted to learn more about participants’ perceptions regarding their identity development, both personally and professionally. Second, we wanted to follow up on any changes that may have taken place along their journeys to becoming teachers and then document how they navigated their TGNC identities with respect to those changes from pre-service to in-service teaching. Third, we recognized that it was impossible to ignore the potential impact of the ongoing pandemic; we considered that this may have had an effect on our participants’ life decisions and perceptions regarding their TGNC identities and education.

First Interview

The experiences and personal identities of TGNC individuals can vary greatly, and this was true for both Zachary and Alex. At the time of the first interview, Zachary was 19 years old and identified as “trans-masculine and agender” and used they/them pronouns. Zachary did not associate with any gender, yet also found themselves leaning toward a somewhat masculine identity. As a freshman in high school, Zachary tried identifying as trans-male but later stated, “[T]his doesn’t feel right.” It was not until they were introduced to the term ‘nonbinary’ by a senior friend at school that Zachary started doing some internet research to find out more about this identity. The summer of their sophomore year in high school, Zachary attended Queer Rock Camp for budding musicians where they met other transgender and nonbinary individuals their age. They fully embraced being trans by the end of high school. Zachary’s trans-masculine identity seemed to emerge later in the interview when they disclosed that “today was my first day on T (i.e., testosterone), I start hormones today.”

Alex was 23 years of age at the time of the first interview, used they/them pronouns, and was well-spoken about their self-identification, possibly due to their interests and schooling in gender and sexuality studies. Alex identified as nonbinary, trans, and also queer. They expressly clarified that their nonbinary and trans identities did not conflict with one another. They stated, “…some people get confused about nonbinary [saying] ‘Well, you’re transgender but you don’t wanna have surgery.’ Well, that’s not the case…There are binary
transgender people; they identify as trans-male and trans-female…but being nonbinary [is] a gender other than that.”

Alex’s explanation of their nonbinary and trans identity seemed to affirm the uniqueness of gender complexity that extends beyond the concept of a normative gender binary. Alex then dove into the explanation of what it means to be *trans* by situating their transness within an academic and historical context. They said, “I like tying it [being trans] back to that heritage of being trans.”

Alex expressed great affinity for their queer identity that was tied to a personal philosophy defining queerness as a distinctly separate concept from being LGBT. Referencing the historical significance of the term *queer*, Alex differentiated between the two by stating, “And as far as queer, I think that might be the most important term for me…not every LGBTQ person is queer; not every queer person is LGBT, but there is this interesting relationship… A lot of people don’t identify that way. A lot of people don’t like that word [queer], but for me it’s about being different than cis-normativity, hetero-normativity. Queer relationships don’t look like heterosexual relationships. They don’t look like straight relationships. They don’t look like anything else. They look like queer relationships, and that’s important to me too.”

Alex’s statement above confirmed the multitude of identities that extend beyond the simple acronym of LGBT. They made the connection between gender and sexuality by recognizing the complexities of queer relationships. For Alex, queer people relate to one another in ways that non-queer people may not understand, including other lesbian, gay, or bisexual individuals.

Both Zachary and Alex were bullied by their peers in secondary school. In Zachary’s case, bullying was also instigated by their teachers who made negative remarks about TGNC individuals. In a math class, Zachary’s teacher attempted to explain the lack of subjectivity in a math concept by relating it to the gender binary and thereby negating the existence of trans and nonbinary people. This opened the door for Zachary’s peers to snicker, laugh, and agree with the teacher’s comment while Zachary struggled to find the right words to respond. They experienced dismay at the lack of empathy displayed by the teacher as well as the students. Zachary shared several instances like this that had occurred throughout their time at secondary school; not only did Zachary’s teachers fail to provide protection, they were sometimes the ones initiating the harassment.

Alex explained that they were bullied because “my gender didn’t look right.” Their experiences of being bullied were perpetuated because they did not present feminine enough. At the time, Alex identified as straight and had not yet learned about queer identities. Classmates told them they were “man-ish and a butch lesbian,” thereby equating gender expression with sexual orientation. Like Zachary, Alex heard negative comments made by teachers who only exacerbated the ignorance of misunderstanding TGNC individuals by making inappropriate comments in class and allowing students to interject their biases. Alex added that students “hear the teacher say it, and then it's suddenly okay to take it 10 steps further.” Zachary planned to interrupt bullying immediately after becoming a teacher.

Zachary and Alex reported that the climate at university was less hostile to LGBTQ+ students. Both participants attended liberal colleges on the west coast of the United States and were exposed to a greater diversity of students and professors who demonstrated inclusive practices. Zachary experienced little pushback on the use of pronouns while at university. They mentioned that most professors made it a part of their teaching practice to ask and affirm all
students’ pronouns. In one case, an English professor showcased Zachary’s essay about their trans identity, and Zachary felt seen, supported, and accepted by their professor and peers. Alex met other nonbinary students and this helped them navigate their own emerging gender identity. Asserting Alex’s name and pronouns, however, remained a challenge for them, and coming out did not prevent misgendering.

Zachary said that they planned to “normalize the conversation about pronouns” from the first day with their students once they had their own classroom. Even though their conviction to demonstrate inclusivity was evident, Zachary did not appear to have a clear plan of how to implement this. Zachary worried that they would get in trouble for talking about “the trans thing” at the middle school where they were currently working. They did not know how they would navigate living authentically in the professional environment, stating, “If the president is allowed to ban trans people from serving in the military, what’s going to stop schools from banning trans teachers? What if parents get mad and have me fired?” Nevertheless, Zachary considered the risk “worth it.”

Alex explained that they use they/them pronouns in their personal life but she/her in the school environment. Alex had to take a proactive approach to avoid being misgendered in university courses. While in their teacher credentialing program, Alex would email their professors in advance to let them know about their pronoun use and would often find it a burden to constantly have the conversation about pronouns with professors at the beginning of each semester. Alex adopted a more relaxed attitude with classmates who would use either they/them or she/her pronouns because Alex had not completely transitioned to they/them pronouns at school or work environments. When asked to elaborate on that apparent disconnect, Alex replied, “I would like to get hired is my explanation of that.” Their stated intention was to get hired teaching secondary English in a liberal area, and once they had achieved tenure, they planned to come out publicly as trans. They anticipated that coming out professionally would be difficult and painful.

Second Interview

Three years afforded the participants much development in their personal and professional growth as TGNC educators. By the time of the second interview, Zachary had been using testosterone for three years. Zachary was now using he/him pronouns and identifying as a trans man. Zachary’s positionality with respect to his identity and his transition had shifted. He stated, “I’ve just more so settled into the masculine end of the nonbinary or trans spectrum. I guess it’s more binary-aligned now than I’ve felt in the past, which is interesting.”

Zachary’s interviews and public social media posts documenting his transition have reflected a non-linear and challenging journey. He described himself as the “family outcast” while growing up. Zachary considered that not having had positive male role models made it harder for him to conceptualize masculinity in a positive way and this may be the reason why it took him a long time to settle into his identity. Therapy has helped with this. “As a trans man now, I feel like I’ve had to be really intentional how I interact with my own masculinity and misogyny.” Zachary was very clear about wanting to be seen as a man while “still rejecting toxic masculinity.”

Zachary has found online resources helpful, learning more about queer issues and intersectionality in the past three years. Describing himself as a leftist, Zachary has become more politically active and was outspoken about his own White privilege, especially now that he is also cis-assumed by others in public. When asked the reason for the uptick in activism he
answered, “I wasn't listening to other people in the community and I was very focused on my own experience and my own trauma.” Zachary has begun advocating for trans women of color and the unsheltered population in the large urban city on the west coast where he lives.

When asked what had changed since the last interview regarding his professional career or success in education, Zachary responded with a rejection of these terms and concepts. Zachary stated, “I just feel the idea of professionalism is very classist, inherently racist, and a lot of times queerphobic.” Zachary added that it “excludes a lot of people” and “as somebody who grew up with not a lot of money and was also queer, I felt my presence wasn't welcome in a lot of professional spaces and I never could see myself becoming a professional in any sense.” Zachary explained that he has worked hard to unlearn the idea that any job is more professional than another, and that he now focuses on jobs that make him feel good about the community that he is working with.

Alex continued to use they/them pronouns and identify as nonbinary, but their identity has also evolved these past three years. They have embraced the term “genderqueer” and has begun to identify as “queer, sapphic, and gay.” Alex took an introspective and communal stand on their identities in this interview, one that positioned identity as part of a larger queer community. Alex stated, “It’s more of community-like, [to] identify with these experiences, with these people. I have this political positioning in the world that’s not the same as someone who’s heterosexual or cisgender, but it’s gotten a lot less, the need for me to be personally identified in a certain sort of way, but more as a group, community sort of identification.”

Alex embraced feeling welcomed by the queer community with positivity over feeling othered by a cis/hetero-normative society. They continued to make the distinction and separation of the Q in LGBTQ as a celebration of “the sense of queerness that’s sort of a general rebellion from normative conceptions of genders and sexualities.” Alex’s identity development is profoundly connected to their understanding of what it means to be ‘other’ in a world where ‘otherness’ is negatively connoted. Their individual queerness is intricately tied to the communal experience of being queer and not cisgender. Alex challenged the societal labels that often constrict one’s identity when they stated, “Maybe my gender and my sexuality isn’t lesbian, bisexual, gay, or transgender, but it’s not cis[gender]. It’s away from, it’s other and living more in that space of less specifics, less certainties, more of a sort of exploration and excitement and that sense of queerness as kind of a distortion or a perversion, not in a negative way, but in a sort of empowering way. I’m not society. I’m not mainstream. I’m not this. I am other.”

Although Alex said they would prefer to use ze/zir pronouns, they continued to use they/them in the workplace because they recognized that people struggle with the usage of neopronouns. Rather than take offense to this, Alex stated that accepting they/them pronouns is a way of “making way for other people who use they/them.” They explained that their decision to use they/them was socially and politically driven, because the use of they/them is already more familiar to many people and more likely to be publicly utilized and respected than ze/zir. The more people there are using they/them, Alex considered, the more quickly people will get used to using these pronouns, and Alex thought this would be a benefit for the greater TGNC population.

As both participants took on professional roles in education, their roles with respect to the discrimination and harassment of LGBTQ individuals in educational spaces changed. Rather
than being on the receiving end of bullying and inappropriate comments they experienced and witnessed as students in high school, they were both now able to advocate for their own students from a position of power. Zachary was working at an in-house youth facility for children between 10-13 years of age.

A nonbinary youth was in the middle of an active mental health crisis and needed to be physically restrained by staff at the facility to prevent them from attempting suicide. Other staff members were misgendering the youth, and Zachary “was trying to find ways to advocate that strongly without outing myself.” Zachary had witnessed the misgendering of this client previously and made the intentional choice to intervene because “misgendering them is extremely dangerous and extremely harmful.” Even though his actions threatened to reveal his own trans identity to people he had not come out to, Zachary knew about TGNC suicidality rates and the link to pronoun usage and misgendering, and he was willing to risk his own safety to advocate for the youth. He did this because this was something he did not experience much when he was in high school; very few educators ever came to his defense or aid, and this was something he resolved to change as an educator himself.

Similarly, Alex counseled their students whenever they were being misgendered and disrespected by other teachers during classes. Alex also recognized the disconnect between what their school district was saying and doing when it came to implementing anti-bias practices. For example, Alex attended an anti-bullying workshop for teachers to help them recognize students affected by discrimination and harassment. Not long after the training, administrators at Alex’s school pressured them to remove the pride flags that represent the identities of GSA students. Alex perceived the administration’s actions as disingenuous; embracing inclusivity means combatting discrimination and harassment, but it also means highlighting the importance of LGBTQ+ representation in the classroom as a way to create safe spaces for queer students. Due to their lived experiences with name-calling and harassment in high school, it was particularly important to Alex to provide safe spaces and support to their GSA students as an educator themselves.

Because both participants had transitioned from pre-service to in-service roles in education, workplace climate was a dominant topic of conversation throughout the second interviews. Zachary reflected on his sense of agency to come out, and said that in the workplace, he sometimes chose not to come out because if a coworker had negative attitudes about trans people, Zachary could shield himself from this negativity. By this time, Zachary was cis-assumed and unless he came out to people intentionally, many would not know that he was trans. He recognized this as a privilege. Because he lives and works in a liberal state on the west coast, Zachary was reflecting mostly on coworkers’ attitudes rather than on having to protect himself from employers. In his personal life, Zachary considered it more important to come out to people because “if I feel like I want somebody around me, I need to trust that they're not a bigot essentially and that they're going to be a safe person to have in my life.”

Alex had reached their goal of coming out in the workplace and was the GSA advisor at their school site. Both personally and professionally, Alex was living authentically, and they had achieved tenure status at the beginning of their third year of teaching, so they felt that their employment was somewhat protected. However, they continued to face some significant challenges because the school climate appeared to promote a double-standard that espoused inclusivity on the surface but did not truly embrace their queer and trans identity. For example, Alex had been approached and warned by their teacher’s union representative prior to a Back-to-School event to be cautious about how much of their queer identity they should disclose.
to parents and other faculty since they were “on the administrator’s radar and not in a good way.” Back-to-School events are often conducted a month or two into the academic year and offer opportunities for the families of students to visit the school campus, meet administration, and interact with teachers to get a sense of who they are as educators. It is not uncommon for teachers to openly share their teaching philosophies and pedagogical styles, as well as some bits of their personal family lives (e.g., spouses, children, hobbies, etc.). Alex was disappointed that they were expected to hide their “LGBT identity or queer identity to avoid what the administrator saw as potential for repercussions or blow back from parents.”

Discussion

We have presented the progression of lived experiences of two TGNC individuals over a course of three years as they started off as pre-service teachers and moved into being in-service educators. We have introduced the literature of school climate, professional identity, and coming out experiences in work spaces as a way to frame the participants’ experiences as they transitioned from high school, to college, and into professional spaces. As we consider ways to implement positive transformational change for all queer individuals in educational spaces, spotlighting TGNC educators as we have throughout this study, we will merge what we can learn from the research and academic discourse with what we have discovered through our interviews and research process.

The research questions of this study prompted participants to reflect back on the quality of support they did or did not receive when they were in high school and encouraged them to consider whether this affected their decision to come out when they became educators themselves. Both participants experienced being more or less told by peers and/or teachers that there were specific boundaries in place regarding sexuality and gender identity. In both cases, participants heard that they had to identify in the ways that others perceived them; their identities should remain in accordance with social norms and both continually sacrificed their comfort for the well-being of others. We understood that these lived experiences shaped our participants’ perspectives on coming out and identity that ultimately factored heavily into their decisions to become educators and provide the support and advocacy for LGBTQ+ (especially TGNC) students that was not readily and reliably available for them when they were in high school.

The participants of our study are not the only individuals to engage with the topic of how to improve school experiences for TGNC individuals. Like many other studies and surveys, Meyer and Leonardi (2018) described TGNC students as one of the most vulnerable populations in schools. The authors suggested that school climate can be improved through a process that begins with pedagogies of exposure. “Many educators believe that merely providing contact with trans people or books about trans lives will be an improvement in helping teachers be more prepared to support trans youth” (p. 454). The authors emphasized that schools should “create spaces that assume gender, sexual and family diversity are always present and therefore make efforts to recognise and affirm a diverse population of students and families through curriculum, norms and everyday practices so that ongoing efforts are not ‘blamed’ on or land on particular students more intensely” (Meyer & Leonardi, 2018, p. 455). This way, TGNC individuals will not be exposed as “sacrificial lambs” (p. 452) for the educational benefit of others.

Meyer and Leonardi (2018) added that exposure alone is insufficient to effect change and followed up with an idea they termed a culture of conversation, in which they envisioned teachers having open dialogues that are “interactive, ongoing and involving critical self-reflection” (p. 457). According to the authors, these conversations could take place in both
structured and casual environments and are necessary for teachers’ growth and learning. In a *culture of conversation*, educators should be willing and able to admit and discuss their own limitations and lack of knowledge about the issues at hand. We posit that even when individuals are willing to reveal their vulnerabilities, not everyone will be in a reliably safe space to do so. A variety of scenarios can compromise safe spaces in schools; each time a person enters or leaves a room, the balance of power in that room shifts. For example, if a group of teachers is openly talking about gender in a professional development workshop and an administrator enters the room, the conversation could suddenly stop or change as a result of this disruption. In another example, if a teacher is learning about gender from a colleague in the faculty lounge and another teacher enters, this could very well end the conversation in a similar way. That is not to say that we consider the *culture of conversation* to be wholly impractical or ineffective, we suggest that educators must consider the larger framework of school climate and prioritize the well-being of TGNC individuals.

We agree with Meyer and Leonardi’s (2018) ideas that true transformational change of school climate should involve all educational partners, including students’ families and other stakeholders. It begins with the acknowledgement of one’s lack of knowledge and vulnerability and necessitates open conversation and dialogue. We also agree that while increased visibility and exposure can be positive, TGNC people should not be outed without their consent nor should their identities be exploited for the educational benefit of others (Meyer & Leonardi, 2018). Our participants echoed the sentiment that they had felt burdened by being the one and only person on campus chosen to represent everything that has to do with LGBTQ+ topics, and they also did not want to be the one person everyone goes to in order to unburden themselves or even to come out to.

However, we vehemently disagree with the description of trans youth as “canaries in a coalmine” (Meyer & Leonardi, 2018, p. 460). According to these researchers, TGNC youth will sound “the alarm about toxic elements in the school community and will be most sensitive to early changes and efforts to promote respect and affirmation for gender diversity and students’ identities” (p. 460). Although it is certainly true that TGNC youth are vulnerable, we do not believe that they should be viewed as early indicators of whether new or possibly experimental programs do or do not work to improve school climate. To describe any person or group of people as such is problematic and emblematic of a lack of care, awareness, respect, and empathy for these people.

We wish to introduce a framework that includes critical yet practical elements that all educators can implement which will begin to build this lack of care and respect. These may involve exposure and vulnerability, yet we emphasize that true transformational change ensures that all queer and TGNC individuals (i.e., students, staff, and faculty) are fully heard, supported, and embraced in educational spaces. Instead of viewing TGNC students as a vulnerable population that will indicate whether or not new programs are working, building equity for marginalized populations must keep the well-being of those groups as a central, key element.

**Introducing the Culture of Care**

According to Bartholomaeus, Riggs, and Andrew (2017), ongoing partnerships with professional support systems can increase educators’ confidence in working with gender diverse students, but these systems are also impacted by the fluctuating political climate, and this does not address the underlying attitudes and school climate which affects all stakeholders. Meyer and Leonardi (2018) emphasized that “a culture of conversation must also extend to students and
families” (p. 459). In that, we absolutely agree. True transformational change to school climate should extend far beyond professional development opportunities, comprehensive anti-bullying policies, and effective leadership. That is why a *culture of CARE* is needed.

“There are several steps which educators can take to create a culture of care for their schools and the diverse students they serve” (McFarland & Kuehn, 2020, p. 68). A *culture of CARE* is a grounded theoretical framework that we have developed as a way to address the need for transformational change on how educational partners work with and support queer students, faculty, staff, and administrators at school. We employed inductive reasoning in the formation of the *culture of CARE* since the framework emerged from the data themselves (Charmaz, 2014; Corbin & Strauss, 2008; Creswell, 2015; Merten & Wilson, 2012). The *culture of CARE* is originally founded on an inclusive pedagogical perspective of helping educators be culturally responsive to the issues of LGBTQ+ students in K-12 schools; however, the framework may also be applied to all queer individuals in educational spaces as it addresses the multiple problems queer people face including bullying, harassment, school safety, and suicidality by helping all stakeholders to demonstrate compassion, awareness, respect, and empathy (C.A.R.E.) for the queer-identified individuals with whom they work.

*Figure 1: Culture of CARE*

The above Figure 1 presents the *culture of CARE* as a linear process that teachers and other educators can follow. The first step begins with compassion. Goetz, Keltner, and Simon-Thomas (2010) define compassion as a distinct and subjective emotion that “motivates a subsequent desire to help” (p. 351) others in need. Other scholars have framed compassion in educational spaces as foundationally grounded in quality relationships that promote safety, trust, understanding, and respect (Conklin & Hughes, 2016; Hart & Hodson, 2019). Educators need to first experience and subsequently decide to practice compassion for queer individuals who they know will need their CARE.

The second stage in establishing a *culture of CARE* is to develop awareness. This stage of the framework is driven by the initial desire of educators to help their marginalized queer students. They want to do better for them by doing better by them. This can begin by educating themselves to become more aware of the historical, social, and political issues that have negatively impacted the queer community. Research has demonstrated that the fluctuating political climate can impact the availability and efficacy of support and information provided by para-educational groups, making the reliance upon these sources a difficult minefield to navigate (Bartholomaeus, Riggs, & Andrews, 2017). Educators should inform themselves about state laws and school district policies affecting queer students, read about pedagogical practices to best serve this marginalized population of students, and inquire about local and/or national resources that provide additional support for LGBTQ+ individuals.

After working through compassion and awareness, educational partners arrive at the third phase of the framework, which is respect. It is important to acknowledge that the actionable steps
of the framework begin with positive developments that are internal. A compassionate mindset allows for educators to then manifest this compassion externally towards their students. Curiosity and a desire to build awareness begin with internal personal growth, but then this newfound knowledge can be applied externally for the benefit of queer students. In a similar way, respect begins within and then extends as an outward manifestation. Examples of this may be seen in using students’ chosen names, honoring students’ sexualities and gender identities, and using asserted pronouns. GLSEN’s Ready, Set, Respect! (2016) online toolkit includes specific lesson plans and a list of practical suggestions geared towards elementary school classrooms; teachers do not need to look very far if they need ideas.

We stress that young peoples’ identities are still in flux and demonstrating respect includes being flexible when names, pronouns, and even gender identities change as young people grow. Some educators may feel that the best way to demonstrate respect for an individual is to impose their own set of personal morals and beliefs upon a child, believing that these are true and valid, but we argue that when educators demonstrate respect that is foundationally grounded in compassion and awareness, there should be no conflict of beliefs or values. We emphasize the idea that respect has both internal and external components; respecting a person’s pronouns goes beyond simply using asserted pronouns when a person is present. Using a person’s pronouns when they are not present demonstrates that respect for the person has been fully internalized and that the usage of the pronouns is in no way a performative action.

The fourth and last phase of the culture of CARE is empathy. Scholars who have studied empathy in educational spaces suggest that it is an affective emotion with cognitive elements whereby one assumes the perspective of others in an altruistic manner that promotes greater understanding, openness, and improved relationality (Goodman, 2000; McAllister & Irvine, 2002). It is imperative to make the distinction between sympathy and empathy. Sympathy has roots in deficit thinking, promotes beliefs that students are unable to achieve or meet expectations, and in short, demonstrates pity for students. Empathy is in opposition to sympathy; empathetic educators do not feel sorry for their students but seek to better understand them and take steps to ensure their success. This, in turn, helps to reduce the oppression of those students experiencing marginalization (Goodman, 2000).

In the following Table 1, we present several actionable steps associated with each stage of the culture of CARE.

Table 1: Actionable Steps for Each Stage of the Culture of CARE

| Compassion | ● Lead with the heart; teach from the heart  
|            | ● Demonstrate understanding through action  
|            | ● Practice simple acts of kindness  
|            | ● Get to know the students & their funds of knowledge  
|            | ● Connect with students through their backgrounds  
|            | ● Be willing to do what is necessary for students to succeed; be flexible  
|            | ● Put oneself in students’ shoes  
|            | ● Familiarize yourself with students’ schedules to gain more understanding about why they may be late or upset when they enter class |
| Awareness  | ● Practice social justice in & out of the classroom  
|           | ● Recognize students’ changes in & out of the classroom  
|           | ● Research & get informed about LGBTQ+ issues |
Seek training about working with & serving queer students
Provide tangible forms of representation for recognition of LGBTQ+ students
Display realia to demonstrate allyship, solidarity, & safety for queer students in the educational space

### Respect
- Use students’ asserted pronouns
- Recognize & call students by their chosen names to avoid deadnaming
- Leave instructions for names & pronouns with substitute teachers on seating charts
- Ask students what names & pronouns they use with peers, family members, and other teachers
- Avoid misgendering by using nonbinary & inclusive language
- Do not dwell on mistakes made, apologize, & move on
- Recognize the value every student brings to the class

### Empathy
- Acknowledge the emotional intelligence of students
- Understand & practice empathy rather than sympathy; championing for students is not feeling sorry for them
- Choose listening over speaking
- Teach & practice cultural sensitivity
- Learn from students’ experiences
- Work to dismantle one’s implicit bias
- Get comfortable with queering the curriculum & LGBTQ+ resources and material

Each stage of the *culture of CARE* includes actions that can easily be discussed in greater detail that extend beyond the scope of this research paper. In the following sections, we offer examples of how the participants of this research study demonstrated or applied elements of each stage of the framework.

**Compassion in Action**

Zachary has recently realized that he wants to become a choir teacher. Although he was in various music programs throughout high school, he never had the private lessons that many of his peers did, and so he lacked music theory knowledge and thus the confidence to pursue music education. “Recently I've started to accept the fact that maybe that's a good thing in that I could bring something new to the music education field as somebody who isn't into the elitism that is often portrayed in music education. So just some more kindness with myself.” Because Zachary experienced financial hardship growing up, he perceived that there were certain career paths that he would not have access to, even after a college degree. He did not feel that he had the same value as other students that he grew up with, and because he did not feel cared about, this was something he had to work through with therapy.

Alex demonstrates understanding through action and altruistic kindness for their students by giving up their own comfort and use of ze/zir pronouns for they/them pronouns so that their GSA kids can feel more bonded to them. They stated, “I can make that kind of space for students…They just absolutely glow when they hear that I use they/them pronouns, their faces light up…that's been a lot more valuable than needing ze/zir pronouns as something that I uniquely identify with and resonate with.” Alex models a sense of community through pronoun...
usage. They metaphorically find themselves in the shoes of their students with the use of they/them pronouns and having to navigate heteronormative perceptions and misunderstandings of the change in pronouns.

Demonstrating Awareness

Because Zachary attended a large, public university on the west coast, he took many classes about mentoring LGBTQ+ youth and attended a variety of diversity trainings. As a queer person, Zachary’s response was, “Yeah, I've lived that sort of thing.” Although he did consider it important for people to learn about queer issues, he said that diversity trainings are often “designed by people who haven't had the actual lived experiences and aren't affected by it.” In his opinion, they could be improved. Zachary has, however, spent the last few years learning more about “the intersectionality between race and queerness and how I still am very privileged as a white trans man especially.” He has found it eye-opening to listen to trans people of color, particularly, and has realized that his White privilege has given him the freedom to come out and also disregard the negative judgment from his family because he may have easier access to things (e.g. jobs, career, social connections) than many trans people of color.

Alex’s queer self-identification demonstrated a sense of heightened awareness of their positionality within the queer community, and they expressed a type of altruism that is often seen in leaders of various movements throughout time. They stated, “It's a way of organizing multiple people and not as much of a way of identifying my own experiences…It's more of a community like, identify with these experiences, with these people.” Alex has taken themselves out of the equation and situated themselves into a communal queer mindset, considering themselves as part of a larger whole that does not fit into heteronormative society. Alex’s queerness as part of a larger community seemed to give them the strength and power required to be a source of support for the LGBTQ+ students in the GSA club on their school campus.

Showing (Dis)Respect

Zachary explained that pronoun usage is a good example of how to demonstrate respect for a TGNC individual because “trusting that people are still respecting my identity and seeing my identity when I'm not around. If I'm not in the room, I want to trust that you're still seeing.” Now that Zachary is cis-assumed, he has witnessed his cisgender coworkers interacting openly with each other about pronoun usage without knowing that he is trans. They did not seem to take pronouns very seriously. Although Zachary agreed that it is okay to make pronoun errors on occasion, it is crucial to recognize how harmful misgendering can be, particularly when working with youth who may be in crisis or experiencing distress.

When asked if they ever felt like they needed to watch what they said and did before earning tenure, Alex shared an example of how they felt threatened when during their first year as a new teacher their union representative spoke to them about not using the honorific Mx with parents at Back-to-School Night to avoid possible parental backlash about their queer identity. At the time, Alex was not a tenured teacher and was told, “you’re on the administrators’ radar and not in a good way.” Tenure holds power for the educators who possess it. Unfortunately, school administrators have used tenure and the uncertainty of untenured teachers’ professional futures against them (Greene, 2014). While the necessity and validity of tenure has been hotly debated nationwide, it continues to support civil rights laws that protect individuals from being unlawfully fired based on sex and gender (Kahlenberg, 2015). In this case, tenure was used as an overt administrative directive to suppress Alex’s queer identity. If administrators in this case
were to adhere to a *culture of CARE*, they would respect Alex’s decision to use the honorific Mx and advocate for Alex against any parental backlash that might have taken place after the event. This would have afforded the administration an opportunity to demonstrate respect for the diversity of the teaching faculty, promote solidarity, trust, and administrative support between faculty and administration, and affirmatively model respect for the diversity of the queer community.

**Extending Empathy**

When Zachary elaborated on questions about who he comes out to personally and in the workplace, he explained that “if you're not accepting of it or whatever, I'd rather know that right away and work through it together than be spoon fed this false illusion of acceptance.” True empathy is only achieved when both people are able to hear each other and also feel that they are heard. Only then, does Zachary feel truly safe with a person. This is why Zachary has decided to draw distinct boundaries with respect to who he comes out. There is some emotional labor involved, and Zachary is willing to do that work if the person is going to be important in his personal life. If the person is just a coworker, then Zachary does not always choose to come out to that person.

When discussing what would be considered a safe space for Alex, they responded with elements that were intricately tied to developing a culture of CARE. When it comes to empathy, listening is a key component. Alex discussed intersectional experiences being queer, trans, and disabled which many people are not comfortable discussing. Alex stated that, “the ability to talk about queerness without people getting uncomfortable” was important to them. An integral element of demonstrating empathy is to exhibit cultural sensitivity and listen to the lived experiences of others even when such experiences are uncomfortable to hear. Alex experienced similar uncomfortable reactions in people when they discussed their disability. Alex stated, “I need people to know that I am going to talk about living as a disabled person, having a disability, you know, my mobility aid, and my wheelchair, and people are going to have to be comfortable with me just talking about that.” Educators can learn from the experiences of their queer students in order to find ways to better support their success in school.

**Implications**

Through this study, we see that there is a growing need to address TGNC issues in teacher education (Rands, 2009), as well as provide greater support to existing queer educators (Clark & Kosciw, 2022). Future research needs to extend beyond reporting about negativity, including suicidality rates, bullying, discrimination, and harassment involving TGNC individuals (Bartholomaeus & Riggs, 2017). The path to address all of these needs is to focus on clear solutions that empower all queer stakeholders in educational spaces. Only then can we begin to consider transformational and positive change, rendering schools truly inclusive for all.

TGNC individuals are not victims; they are strong and resilient people. As the creators and researchers of a *culture of CARE*, we recognize the need for more inclusive queer representation that draws from the lived experiences of a greater pool of queer educators to add to the examples of CARE within this framework. We encourage further development of the framework by other scholars to improve the practicality and implementation of the concepts presented in the *culture of CARE* which would help school districts and educational partners conceptualize and realize the framework within their own communities.
The culture of CARE was originally developed as a framework that promotes an understanding of TGNC individuals that promotes the recognition and empowerment of queer students and educators alike. However, LGBTQ+ individuals are not the only marginalized population that can benefit from the culture of CARE. “Simply stated, it is unethical to allow some groups a place at the table while denying other groups the same level of access” (Kuehn, 2020, p. 2). We envision school districts implementing the framework of a culture of CARE to address the needs of other disenfranchised groups in order to help build equity for all educational partners.

Scholars of diversity, equity, and inclusion (DEI) have fallen short of providing actionable steps to creating transformational change in schools that K-12 educators can actualize for the benefit of their diverse populations and communities. With the culture of CARE, we hope to bridge the gap between theory and praxis for educators (i.e., faculty, staff, and administrators) and families who can benefit from the comprehensive inclusion of an actionable framework that all members of school communities can practice.
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Development of a System to Visualize the Performed Sound

Based on Pitch and Acoustic Pressure

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Abstract: This study develops a system that visualizes the sound of a wind instrument performance in real time, and clarifies the instructional strategies of a skilled wind band instructor. The aim is to develop a system that automatically provides advice on the sound
of a performance by combining the two. The authors developed a system that visualizes the sound of a performance using graphics and numerical values obtained from pitch and acoustic pressure. The background of the research, former research developments, and an overview of their newly developed system are described.

Wind band activities are common in Japanese schools. In an increasingly large number of cases, music teachers are forced to lead school bands, regardless of their experience or knowledge of wind instruments. In such cases, it is difficult to provide students with appropriate evaluation and instruction. Although individual basic practice and guidance are essential for improving performance skills, it is difficult for a single instructor to guide all students in their basic practice. It is desirable to utilize a system that evaluates individual performance sounds and provides appropriate instruction.

The current study develops a system that can provide instruction on wind instrument performance as an instructor does. The authors have developed a web application that enables long-tone practice of the B-flat major scale and have also developed a leaflet as a learning tool (Kaneko et al. 2019a, 2019b). A screenshot of their former web application and a part of the page of the leaflet is presented in Figure 1. However, because the leaflet is a paper-based medium, it does not automatically provide advice on the notes to be played. This study develops a system that visualizes the sound of a performance in real time and also clarifies the instructional strategies of a skilled wind band instructor. The aim is to develop a system that automatically advises on the sound of a performance by combining the two.

Figure 1. Former application and leaflet
The authors newly developed a system that visualizes the sound of a performance using graphics and numerical values obtained from the acoustic pressure (power or sound pressure) and pitch. The system is designed to output an analysis data file of acoustic pressure and pitch from a sound data file of a single-note instrument, such as a trumpet or clarinet, along with a time stamp. The system also allows real-time audio input, analysis, and graphical display of the results. Real-time audio input is performed through a microphone jack or other audio input device. Tempo settings and beat guidance (including preliminary beats) are provided during the audio input. The results of the analysis of acoustic pressure and pitch information of the input sound are plotted as a graph on the screen in real time.

A screenshot of the system is presented in Figure 2. The acoustic pressure (power) and pitch information are displayed on separate graphs, along with the number of beats or seconds. It should be made possible to change the display range of graphs as necessary, but this function has not yet been implemented.

![Figure 2. Screenshot of the system](image)

The results of the analysis of the input sound information are output as a CSV file with acoustic pressure, pitch, and beat information, and time stamps. The system targets the Mac OS and is an installable application.

In a further step, it is necessary to clarify how an experienced wind-band instructor gives instruction. Conducting an interview survey of such instructors is needed to clarify their instructional strategies. Specifically, it is important to identify the physical characteristics of the sounds that a skilled instructor judges to be good. After that, the authors will clarify the instructional strategies that skilled instructors use for certain sounds.
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Title: The Importance of Justice, Equity, Diversity, Inclusion, and Indigeneity in Higher Education: Lessons Learned and Paths Forward

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Acknowledgement: In this paper, we (co-authors) write about our experiences as co-chairs of the Committee for Critical Social Justice (CCSJ) in the School and Applied Child Psychology (SACP) program at The University of British Columbia (UBC). While this paper highlights some of our personal ideas and observations, it is important to note that the committee also includes other members who have co-created this work with us. As such, we would like to acknowledge the social justice efforts of Aisha Ghani, Linnea Kalchos, Sun Hong Min, Melanie Nelson, and Harris Wong.
Abstract

The aim of our roundtable discussion was to exchange ideas on the topic of Justice, Equity, Diversity, Inclusion, and Indigeneity (JEDII) in higher education. As co-chairs of the Committee for Critical Social Justice (CCSJ) in the School and Applied Child Psychology (SACP) program at The University of British Columbia (UBC), we discussed the inception and development of this working group. Further, we facilitated critical conversation on the western and colonial nature of much of the work that has been completed thus far across university contexts. In this paper, we begin by sharing our positionality in relation to the topic at hand. Next, we briefly define the concepts of JEDII in higher education, psychology training, and SACP. We conclude by highlighting the strides we have made and the challenges we have faced as a committee dedicated to critical social justice.

**Keywords:** Justice, Equity, Diversity, Inclusion, Indigeneity, Higher Education, Psychology Training, School and Applied Child Psychology.
The Importance of Justice, Equity, Diversity, Inclusion, and Indigeneity in Higher Education: Lessons Learned and Paths Forward

Over the past three years, institutions of higher education have been confronted with a sharp shift in the global socio-political landscape. Specifically, issues pertaining to race and racism have resurfaced in unique ways and sites of higher education have been challenged to address issues of Justice, Equity, Diversity, Inclusion, and Indigeneity (JEDII) at multiple levels (UBC Equity & Inclusion Office, 2023). This societal discourse has not only permeated higher education, but the field of psychology as well (Wada et al., 2020; Sabnis & Proctor, 2022). The School and Applied Child Psychology (SACP) program at the University of British Columbia (UBC) has historically grappled with these same issues, and as such, two years ago a Committee for Critical Social Justice (CCSJ) was formed. As two new faculty members, who have limited institutional knowledge, we (co-authors) have been tasked with co-chairing this committee. This roundtable discussion was centered on our collective experiences on this committee to date, in an effort to share our process and learning as well as converse about possible steps forward. In line with JEDII efforts, we begin this paper with a brief overview of our own cultural background and associated positionality. We then address the topic of JEDII in higher education, as well as psychology training and SACP more specifically. We conclude by outlining the creation of the CCSJ in SACP, highlighting some of the strides we have made along with the challenges we have faced.

Positionality

Scholarship related to JEDII is often carried out by individuals who have been socio-politically underrepresented and/or marginalized in various societal contexts. This has certainly been the case for us (co-authors) both in our own psychology training and more broadly within society at large.
Specifically, I (Anusha) grew up in a bi-racial, bi-lingual, bi-religious household – an experience that has shaped the way I understand and make sense of the world. This upbringing has led me to adopt a critical social justice lens in all my scholarship, which naturally impacts the way I carry out my work as an associate professor in higher education. That is, I strive to maintain JEDII principles at the core of all my scholarly activities. To date, I have led several groups (e.g., a counselling psychology training program and the board of a K-12 institution) through the process of implementing JEDII at the core of their operations. Relatedly, my program of research is informed by social justice principles, and it presently includes two major foci. I am studying the impact of immigration across different communities. I am also conducting teaching and learning research, investigating cultural and social justice responsiveness in professional psychology.

I (Thomas) am a cisgender, gay, white male, who grew up in a working-class family and was a first-generation college student. Growing up in the southern United States, religion was a dominant force and impacted the development and reconciliation of my own various social identities. I have had the opportunity to be a program director/coordinator for four different school psychology programs, as well as serve as a member (and former chair) of the National Association of School Psychology’s LGBTQI2-S Committee. Within my clinical and research work, I seek to further identify and include those whose voices have been muted or excluded.

**JEDII and Higher Education**

At UBC, JEDII work has been long-standing. However, increased, dedicated efforts have been seen in recent years, to preface issues related to Indigeneity, anti-Black racism, and other difficulties facing people of color. As part of these efforts, a toolkit has been developed to help various structures and programs within the university attend to JEDII issues (UBC Equity & Inclusion Office, 2023). Within this resource, several terms are defined, including Equity,
Diversity, and Inclusion. Further, a separate toolkit is offered in the area of Truth and Reconciliation (TRC) (UBC First Nations House of Learning, 2023).

*Equity* is defined as the achievement of parity in policy, process, and outcomes for historically and/or currently underrepresented and/or marginalized peoples and groups while accounting for diversity (UBC, 2022). In working toward parity, it considers the concepts of power, access, opportunities, treatment, impacts, and outcomes, in three main areas. First, *representational equity*, which is the proportional participation of diverse individuals at all levels of an institution. Second, *resource equity*, which considers the distribution of resources to various individuals, groups, or units to be able to close equity gaps. Third, *equity-mindedness*, which entails the demonstration of an awareness of, and willingness to, address equity issues.

With respect to *diversity*, this concept is defined as differences in the lived experiences and perspectives of various people (UBC Equity & Inclusion Office, 2023), which may include but is not limited to, race, ethnicity, colour, ancestry, place of origin, political belief, religion, marital status, family status, physical disability, mental disability, sex, gender identity or expression, sexual orientation, age, class, and/or socio-economic situations (Kassan, add). Here, there is a clear focus on adopting an inclusive definition of culture. *Inclusion* is described as the active, intentional, and continuous process to address inequities in power and privilege in an effort to build a respectful and diverse community that ensures welcoming spaces and opportunities to flourish for all (UBC Equity & Inclusion Office, 2023).

*Indigeneity* entails prefacing Indigenous ways of knowing, prioritizing relational / communal approaches, honoring the need for Truth and Reconciliation, committing to learning and changing, as well as the need to offer rather than receive (CPA, 2018; UBC Equity & Inclusion Office, 2023). It is important to note that some scholars have criticized the idea of merging Equity, Diversity, and Inclusion (EDI) with Indigeneity given their very different origins...
and orientations; with EDI stemming from North American ideologies and associated models, and Indigeneity emerging from non-Western ways of knowing. In our work, which will be described in greater detail below, we opted to preface social justice, as an umbrella term that can take into account various ways of knowing, conceptualizations, and orientations. Of course, nested in a Canadian institution of higher education means that western ways of knowing are ever prevalent. As such, the concept of Indigeneity must remain at the forefront, even in situations where that may not be intuitive.

The conceptualization of justice that we have adopted focuses on achieving the full and equal engagement of all groups within society (Stewart, 2014). Several types of justices have been proposed in the psychological literature (see Sinacore, 2022). These include distributive justice (the process of determining how resources are allocated and to whom), procedural justice (examining how fairly and equitably people are treated), retributive justice (assessing how punishments are determined for wrong-doing), and restorative justice (mending relationships that have historically been tense, problematic, or abusive).

**JEDII and Psychology Training**

As discussed above, conversations surrounding JEDII have long been prioritized in higher education. In parallel, this discourse has been present within the field of psychology as well (Bedi et al, 2020; Sullivan et al., 2022). For example, the topic of Multicultural Counseling Competence has been critical in several divisions of the American Psychological Associations (APA) since the late 1970s / early 1980s (Sue, 2001). Unfortunately, such conversations were slower to surface in substantive ways in Canada (Sinacore & Ginsberg, 2015). With the rise of racial tensions across the globe over the past three years, JEDII has resurfaced in different ways across higher education settings and psychological contexts more specifically.
In psychology, several models and strategies have been used to infuse JEDII principles into various aspects of training. These range from group-specific approaches (e.g., Critical Race Theory) (De Mello, 2022) to models that are intended to be adaptable to many diverse groups (e.g., cultural and social justice responsiveness) (Ratts et al., 2016). Further, many psychology associations have increased their efforts in this area. For example, the Canadian Psychological Association (CPA) has developed a Human Rights and Social Justice Committee (CPA Human Rights and Social Justice in Psychology Committee, 2023) and the College of Psychologist of British Columbia has begun requiring registrants to complete professional development hours in the area of Indigeneity (College of Psychologists of British Columbia, 2023). Similarly, psychology training programs across the country have created various JEDII efforts. The Counselling Psychology program at the University of Calgary has asserted itself as a social justice-oriented training program (Educational Studies in Counselling Psychology, 2023). Similarly, in SACP at UBC, the topic of JEDII has been at the forefront in recent years.

**JEDII efforts and initiatives in SACP at UBC**

In the SACP at UBC, topics such as diversity and inclusion have historically been important. At the same time, a student-led survey conducted three years ago revealed challenges in the program. Some of these difficulties were directly related to JEDII, for example, the lack of diversity among students and faculty. In an effort to be increasingly responsive to student concerns, a working group (eventually known at the CCSJ) was created. In its original iteration, the committee was composed of two new faculty members (co-authors), two advanced doctoral students, and two new masters’ students. Currently, the committee is slightly different with three new faculty members, one advanced doctoral student, two new doctoral students, and one new master’s student. CCSJ in SACP continues to be made up of individuals from various underrepresented cultural backgrounds and social
locations.

The fact that two new faculty members were tasked with the creation of this committee held both advantages (e.g., a more neutral perspective on student concerns) as well as disadvantages (e.g., a lack of institutional knowledge). It is not surprising that two faculty members who hold lived experiences that have been racialized and/or minoritized would volunteer to engage in this work. It is our passion for social justice that has led us to carry out this work in the midst of multiple responsibilities related to teaching, research, service, and clinical practice.

Since its inception, the CCSJ has engaged in numerous tasks, including the development of a) a mission statement (see Appendix A), b) a yearly training initiative (e.g., having difficult conversations), c) a survey pertaining to JEDII and program climate, d) the publication of a regular newsletter, and e) efforts to secure funding. All of these activities have led the CCSJ to relay recommendations to the SACP program as a whole. Contextually, it is important to mention that the program is relatively small, constituting five faculty members and under 50 graduate students.

A lot of JEDII work, particularly in psychology, has also emphasized a critical need for decolonization. This is based on the idea that current psychological approaches reproduce existing conditions of oppression and perpetuate deficit-based views which maintain systems that disenfranchise individuals and communities who have been marginalized (Teachers College, 2023). As per the mission statement of the CCSJ, decolonization is very important, along with all concepts subsumed under the JEDII umbrella. In an effort to move away from the western underpinnings of JEDII models in higher education, our committee opted for the term critical social justice as an umbrella term. Like with all JEDII efforts, it is incumbent on the committee to avoid being performative or aspirational, but rather action-oriented.
The steps taken so far have been productive and reportedly well-received by the student body. At the same time, as is common with JEDII work, some challenges have merged. For example, a) negotiating dual relationships and issues of power that typically accompany them, b) deciphering overall program challenges from that of JEDII-specific issues, c) the importance of being collaborative while also mentoring students, d) the role of clear communication among the committee and with the program, and e) the need for openness to different perspectives, particularly generational ones. These difficulties, among others, have been taxing to grapple with, both in terms of time and energy. The committee has found itself blocked on a couple of occasions, trying to balance the importance of responding to the needs of the majority of students, identifying clear JEDII priorities, and establishing next steps.

**Conclusion**

The challenges identified above are nested in multiple systemic difficulties, which can be found inside and outside of the program in which we operate, along with the university and community structures that support our scholarly work. To unpack these larger systemic issues goes beyond the scope of our paper; however, they were vividly highlighted during our Roundtable Discussion at the Hawaii International Conference on Education. We were pleased to share ideas, commiserate in the difficulty of this work, and generate innovative solutions during this time. We are hopeful that they will be helpful to us in continuing to enhance the JEDII training of graduate students in SACP.
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Appendix A

CCSJ in SACP: Mission Statement

Vision

The CCSJ in SACP has come together through shared values that centre on Indigenous and other non-western ways of knowing, the voices and experiences of underrepresented communities, anti-racism, anti-sexism, anti-homophobia, anti-transphobia, anti-ableism, anti-ageism, anti-oppression, diversity, equity, inclusion, social justice, human rights, and intersectionality. Our vision is to see a SACP program that is collectively working towards a more equitable and just climate, which will in turn help inform culturally responsive, socially just, and decolonized school psychology teaching, clinical training, research, service, and community engagement.

Values

The approach of the CCSJ is informed by an inclusive, critical understanding of social justice. To us, focusing on social justice means that we purposefully intend to decolonize various multiple aspects of our profession.

In this way, social justice can be understood as a professional commitment, an action-oriented process, and a desired goal. The process entails investigating, and dismantling inequities related to age, race, ethnicity, gender, gender identity, sexual / affectional orientation, language, (dis)ability, religion, spirituality, Indigenous ancestry, nationality, status in country, social class, accessibility, physicality, and their intersections. This action-oriented process requires critical, reflective, ongoing, community-driven multidisciplinary research, which addresses issues of inequity, power, privilege, and oppression, and includes traditional and indigenous ways of knowing, with the aim of challenging unjust policies and systems. We reject the assumption that white, western intellectual traditions are universal or superior, and instead intend to diversify our perspectives on psychology to include multiple ways of knowing. As such, the goal of our social justice efforts is the full and equitable engagement of all groups within society in the ways that they prefer and define for themselves.

We believe social justice efforts can be demonstrated in several ways, including a focus on (a) specific topics of study that have not traditionally been prioritized in the field of school psychology (e.g., ableism, ageism, heterosexism, racism, sexism, weightism, etc.); (b) research approaches that prioritize the voices and experiences of underrepresented communities (e.g., Indigenous ways of knowing, critical race theory, feminist epistemologies, etc.); (c) work and advocacy with specific groups who typically have reduced access to care and services (e.g., vulnerable youth, newcomers, individuals from social classes that have been marginalized, etc.); (d) scholarly work that contributes to social and systemic change (e.g., discriminatory practices, organizational guidelines, government policies, etc.); to name but a few examples.

* This mission statement was co-created by Kalchos, Nelson, Kassan, Ghani, Wong, and Schanding on April 25th, 2022.
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Title: An Arts-Based Engagement Ethnography Centered on the School Integration of Newcomer Youth

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Acknowledgement: We would like to acknowledge the contributions of numerous research assistants who have worked on this project along with the deeply engaged participants who shared their experiences with us.
Abstract

In this paper, we outlined the results of a two-year research project that centered on newcomer students’ experiences of school integration in a large, western, urban Canadian city. The phenomenon of school integration captures the adjustment of newcomer youth across all aspects of student life – both inside and outside the educational context – and represents a novel point of entry to capture immigration experiences. We employed a social justice framework, coupled with an arts-based engagement ethnography to investigate this phenomenon. Specifically, eight high school and ten university students shared their journeys of school integration over a two-year period. Results of this ethnography helped shape an emerging model of school integration, which highlights the importance of individual, educational, familial, and communal factors in the process of school integration. This model indicates that these factors are relational and interconnected in nature, and they are active inside and outside of the school setting. Relatedly, implications for educational systems are discussed.

**Keywords**: Immigration, newcomer youth, school integration, social justice research, arts-based engagement ethnography, community engagement.
An Arts-Based Engagement Ethnography Centered on the School Integration of Newcomer Youth

Education is a fundamental human right; yet newcomer students face academic, social, and linguistic barriers when they transition into a new school system following immigration (Banks & Suárez-Orozco). Schools have an ethical responsibility to meet the needs of all learners, including those of newcomer youth. To better understand the process of school integration, innovation is necessary to engage newcomer students in research in meaningful ways.

Youth are the fastest growing group of newcomers in Canada, and studies indicate that resettling in a new country during adolescence and young adulthood comes with a unique set of challenges (Arthur, 2013; Sattin-Bajaj, 2015). In Canada, newcomers have been defined as individuals who have lived in in the country for less than 10 years (Immigrants, Refugees, and Citizenship Canada, 2018). Given that schools are often the first point of contact for newcomer students within a host culture (Galluci & Kassan, 2019; Li, 2010), engaging with them in the research process in such settings is necessary.

As such, we conducted a two-year research project focused on the school integration of newcomer students in high school and university. The aim of this research was to develop an in-depth, multi-layered, contextual understanding of the phenomenon of school integration – from the perspective of newcomer youth themselves. Two research questions guided our inquiry: a) How do newcomer youth experience school? and b) How do these experiences influence their positive integration into the school system?

We begin this paper with an overview of the process of school integration. We then outline the methods employed to conduct our research. We conclude with a discussion of our emerging model of school integration and present implications for educational systems in
School Integration

The phenomenon of school integration captures the adjustment of newcomer youth across all aspects of student life – both inside and outside the educational context – including, English Language Learning, academic performance, classroom behaviour, social networking, identity negotiation, emotional and familial well-being, involvement in school life, and understanding of the academic system (Kassan & Mukred, 2022). This represented a new point of entry to explore immigration experiences.

Led by Kassan (PI) and colleagues, previous research on the topic of school integration demonstrated that newcomer youth identified numerous factors as critical in their immigration process (Kassan et al., 2019; Kassan, Gallucci, & Tkachuk, n.d.). These factors included a) elements within the high school setting (i.e., school culture and support of teachers); b) variables that straddle between the school and the community (i.e., language transition and peer group development); as well as c) experiences in the home environment (i.e., the role of family and cultural expectations). Additionally, results showed that the integration into high school and the transitioning to university is marked by significant adjustment issues that pertain to a) the general school culture; b) newcomer students’ experiences of trying to fit in; c) youth’s growing self-identity; and d) family expectations (Gallucci & Kassan, 2019).

Further, this research pointed to a need for increased engagement and agency among newcomer students when sharing their journeys of school integration and immigration. As such, we designed an arts-based, qualitative research project, which was funded by the Social Sciences and Humanities Council of Canada. This project was carried out over a two-year period, in a high school and university setting.
Methods

Theoretical framework and Research Design

We employed a social justice framework (SJ) and an arts-based engagement ethnography (ABEE) to develop an in-depth, multi-layered, contextual understanding of school integration among newcomer youth. Our aim was to position students as experts on their own lives, who have critical information to share about their educational needs and school engagement.

More specifically, SJ was taken up as a process and a goal (Stewart, 2014). The process centered on understanding and dismantling inequities related to age, race, ethnicity, gender, sexual orientation, (dis)ability, religion, nationality, status in a country, and accessibility. By way of example, one’s newcomer identity was considered as it intersects with many others. The goal focused on full and equal engagement of all groups within society. In this way, the SJ framework guided critical, ongoing, arts-based research to address issues of inequity, power, and oppression, and challenge unjust policies and systems.

Further, this framework was complimented by an arts-based engagement ethnography (ABEE) (Goopy & Kassan, 2019; Kassan et al., 2020). ABEE is a form of critical and rapid ethnography, as it allows for an in-depth understanding of a specific phenomenon, among a culture sharing group, in a relatively short period of time (Beebe, 2011; Madison, 2019). In this case, the phenomenon of interest was that of school integration and the cultural sharing group was newcomer students. ABEE includes two sequential phases: 1) cultural probes and associated individual qualitative interviews, followed by 2) planned discussion groups.

Cultural probes and associated individual qualitative interviews

Cultural probes are items such as cameras, diaries, maps, which are given to participants to assist them in recording specific events, feelings, and interactions in their everyday
environment. They were distributed to participants to use as they see fit and help us get to know them better. Using cultural probes, adapted to meet participants’ needs and abilities, allows researchers to supplement the understandings developed through ethnographic research in situations where intrusion and disruption are likely to arise (Goopy & Kassan, 2019). Contents of the cultural probes, which become participants’ artifacts, were used to guide individual qualitative interviews with each participant. In this sense, they were tailored to each person’s unique experiences. Such interviews, which represent a common data collection technique in ethnographic research (Creswell & Poth, 2018; Goopy & Lloyd, 2006), were used to gather detailed information and understanding on students’ daily school integration experiences.

**Planned discussion groups**

Focus groups are a well-established means of collecting qualitative data, which can be traced back to the 1940s (Kamberelis & Dimitriadis, 2014). They represent an effective means of researching sensitive topics and vulnerable groups (Halls & al., 2011). In our study, we employed the planned discussion group variant of the focus group, which is widely used in ethnographic research (O’Reilly, 2004). Planned discussion groups have most of the characteristics of traditional focus groups. However, participants are likely to be a naturally occurring group rather than a group of strangers brought together to explore a particular topic.

By engaging newcomer youth using these three modes (i.e., cultural probes/artifacts, qualitative interviews, and planned discussion groups), they had the opportunity to share their experiences in different ways, in both individual and collective spaces (Kassan et al., 2020). All sources of data were analyzed following steps outlines for ethnographic research (Creswell & Porth, 2018; Saldaña, 2004), leading to an emerging model of school integration, which will be discussed below. Moreover, multiple means were used to ensure the rigor of the qualitative research process and ensuing results (Shenton, 2004; Williams & Morrow, 2009).
Outcomes and Implications

Participants

Over the course of the two-year study, eight high school and ten university students, from diverse backgrounds, engaged with ABEE to share their experiences of school integration in Canada. Our aim was to position them as experts of their own experiences, who have a critical, yet untapped perspective to share about their educational needs and school engagement.

High school participants included 5 girls and 3 boys who identified as cisgender. At the time of the study, they were between the ages of 15 and 18, and immigrated to Canada from the Philippines (4), Columbia (1), Mexico (1), South Sudan (1), and Vietnam (1). Religiously, they all identified as Christian (6). They were enrolled in secondary 11 or 12 in a large, urban high school.

University participants included 9 women and 1 man who identified as cisgender. At the time of the study, they were between the ages of 18 and 20, and immigrated to Canada from India (2), the Philippines (2), Nigeria (2), England (1), Mexico (1), Pakistan (1), and South Korea (1). Religiously, they identified as Christian (6), Hindu (2), and Muslim (2). They were enrolled in post-secondary studies in psychology (5), accounting (2), biology (1), English (1), and kinesiology (1) in a large, urban university.

Results

Results of this research project led to an emerging model on school integration. As depicted in Figure 1, this model highlights the importance of individual, educational, familial, and communal factors in the process of school integration. These factors are relational and interconnected in nature. They rely on a newcomer students’ identity, language abilities, and resilience. They are also dependent on elements that are present (or lacking) within the school, family, and community contexts. As such, this multitude of factors are active inside and outside...
of the school setting. For a more detailed description of each of the areas that informed this emerging model of school integration, please see Kassan and Mukred (2022), Matejko et al. (2021), Saunders et al. (2021), and Smith et al. (2022).

**Figure 1**

*Model of School Integration*

Note: Reprinted with permission from Kassan and Mukred (2022).

**Implications**

The emerging model described above highlights newcomer youth’s experiences of school integration in Canada. In addition to identifying factors that are central to the school experiences of this cultural group, we extracted several critical learning points from our research.
First, it appears that educational institutions act like microcosms of larger societal structures. That is, one of the main conclusions that we drew from our research is that students’ experiences of school integration often paralleled that of broader immigration experiences within Canadian society. In this way, issues encountered in the school were also encountered within the broader community. For example, difficulties expressing oneself and connecting with peers could be found inside and outside of the school context. Interestingly, when newcomer participants sought support, they rarely did so within the educational institution in which they were enrolled. This leads to two pertinent implications. First, systemic issues need to be addressed from the bottom up in schools, as well as from the top down in larger societal structures. Second, educational leaders need to question the reasons why newcomer students do not feel comfortable seeking out psycho-social support in the spaces where they spend most of their time.

Another critical question that emerged from our research centered on whether or not participants were truly integrating into high school and university systems. Unfortunately, it seems that participants who were successful academically did so by adapting and adjusting to Canadian expectations and demands. This does not encompass the entire conceptualization of integration, where one is able to maintain their own values and successfully contribute to the new system. Essentially, the shifts that newcomer students had to make to be successful were unidirectional. Consequently, it is incumbent upon educational institutions to understand the expectations they are placing on newcomers and assess the ways in which they are encouraging students to acculturate or even assimilate (Berry et al., 2006) in order to be successful.

Finally, our research highlighted the western, colonial nature of education in Canada. Participants shared vivid experiences of not feeling welcomed, understood, or considered in their new school context. The onus was typically on them to learn new strategies and practices
with very little regard for their own cultural beliefs, practices, and understandings. Encountering such realities in multiple settings (e.g., classes, extra-curricular activates, international relationships) sent the message that they did not have much to offer and additionally a great deal to learn. In essence, they did not see themselves reflected in their new environments.

**Conclusion**

Over the course of two-years, newcomer students shared their experiences of school integration in both high school and university settings. Through engagement in ABEE, along with the use of a SJ framework, we were able to unpack meaningful experiences and critical lessons about school systems in Canada. Our emerging model of school integration highlights the multi-layered factors that need to be considered to enhance newcomer students’ experiences and promote true integration into educational settings.
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Abstract
The University of Hawaii at Manoa (UHM) Undergraduate Research Opportunities Program (UROP) coordinates and promotes opportunities for undergraduate students to conduct research with a faculty mentor. Through writing a project proposal, the student obtains funding to conduct research and present their research at an academic conference. Students get hands-on experience with the entire research process from formulation of a project to execution to presenting results. At the end of the UROP process, all students share their research findings at the Undergraduate Showcase, an undergraduate academic conference, and receive feedback from peers. The UROP opportunity is a great way to allow students to take the knowledge from coursework and directly apply it to their specific interests and fields of study. It provides undergraduate students the chance to work closely with a mentor and gain valuable research experience they would otherwise not get in undergraduate studies.

The objective of this paper was to describe and discuss the personal and shared experiences of an undergraduate student mentee and a faculty mentor in a UROP research project.

I. Introduction
The Undergraduate Research Opportunities Program (UROP) allows undergraduate students to conduct research or creative work with a faculty mentor in their field of study and interest (UROP, 2023). This can bridge majors and disciplines allowing students to broaden their intellectual horizons and challenge new ideas. In undergraduate studies the emphasis is on coursework resulting in gaining a lot of education and training on a topic but other than labs no real hands-on or first-hand experiences. This can leave undergraduates with an inadequate understanding as well as being unprepared for post-graduation, whether that be graduate studies or work. This opportunity gives students the ability to gain this experience while in school and learn about the processes that go into a long-term project. These processes include proposal writing, formulation of project, conduction of an experiment, data collection and analysis, and
presenting data. All of these skills help to prepare students for graduation and enable them to do a project they are passionate about.

I have enjoyed mentoring university students with their research projects, in particular, those dealing with growing plants in a controlled environment agriculture (CEA). I have mentored UHM undergraduate students with their UROP (Undergraduate Research Opportunities Program) (UROP, 2023) (Figure 1) and HSGC (Hawaii Space Grant Consortium) (HSGC, 2023) funded projects. Funded by a HSGC Undergraduate Fellowship, Aleca Borsuk, an undergraduate student in the UHM Mechanical Engineering Department, worked with me on her research project “Spatial Optimization of Artificial Lighting for Space Grown Amaranthus Caudatus” (Borsuk and Kobayashi, 2016; UH News, 2017) (Figure 2).

I have had the opportunity to help mentor UHM College of Engineering students with their CEA related research projects. Preston Tran and his undergraduate team in the UHM Mechanical Engineering Department worked on a Box Farm Project which involved building an autonomous automated robotic hydroponic plant growing system (Trifonovitch, 2019) (Figure 3).

The objective of this paper was to describe and discuss the personal and shared experiences of an undergraduate student mentee and a faculty mentor in a UROP research project.

II. Procedure

*Student’s perspective*. Each student is able to work closely with a faculty mentor to develop a research project centered around their field of study and personal interests within that field. For example, I focused on simulated Martian soils and plant development as I was a Tropical Agriculture and the Environment major in the Tropical Plant & Soil Sciences Department.

*Mentor’s perspective*. Brylin Nelson, an undergraduate student in the Tropical Agriculture and the Environment program, worked with me on a UROP funded research project on the “Effects of Martian Soil Simulant and Artificial Lighting on the Growth of Fast Crops” (Nelson and Kobayashi, 2022; NREM Dept., 2022) (Figure 4).

III. Results

*Student’s perspective*. As an undergraduate student in the Tropical Plant & Soil Sciences Department I had taken many courses that covered a wide range of plant science and environmental topics which were super helpful and interesting to learn about. I had always been interested in doing research and was not too sure how to do that as an undergraduate as research is mainly a graduate program focus, while undergraduate is meant to supply the foundation and knowledge to conduct research. UROP is an amazing program that gave me the opportunity to further explore a scientific topic I had personal interest in and utilize all the knowledge from the
courses I had taken thus far. It also aided in my after-graduation decision of pursuing a master’s degree to continue doing more research.

*Mentor’s perspective.* UROP introduces the research process to the undergraduate student starting with what research problem to address; developing a research project proposal, timeline, and budget; and presenting research findings in at an academic or scientific conference (Nelson and Kobayashi, 2022) (Figure 5). Writing a project proposal provides an excellent opportunity for the student since this opportunity is sometimes not even available to a graduate student who is supported by a grant that the student’s major professor wrote. Being exposed to scientific research during their undergraduate years can help a student decide whether research is what they are passionate about and consider pursuing a graduate degree. Having the student write a project proposal helps distinguish more serious research minded student from students who are only slightly interested in research. Research skills obtained during the UROP project helps the student be aware of and enhances the research skills that they will need as a graduate student or in a career in research.

**IV. Conclusions**

*Student’s perspective.* I believe that UROP is an amazing opportunity that more undergraduate students should be taking advantage of. It can be used to satisfy an internship requirement as well as give you hands-on lab experience that is useful not only for pursuing a higher degree but also when applying for jobs.

*Mentor’s perspective.* The UROP project helped to improve my mentoring skills including working with and communicating with undergraduates. It provided me an opportunity to become familiar with the student’s goals, skills, and ambition in scientific research and perhaps offer the student a graduate research assistantship in the future.

**V. Acknowledgements**

Undergraduate Research Opportunities Program (UROP), University of Hawaii at Manoa. Magoon Greenhouse Facilities, University of Hawaii at Manoa. The Martian Garden.

**VI. Literature Cited**


VII. Figures

Figure 1. I developed projects which were posted on the Undergraduate Research Opportunities Program (UROP) website for students to evaluate. The projects dealt with growing crops under light-emitting diodes (LEDs) and growing crops in simulated Martian soils.

Figure 2. Aleca Borsuk, a mechanical engineering student at the University of Hawaii at Manoa, presented her Hawaii Space Grant Consortium (HSGC) funded research at the American Society for Horticultural Science Conference in Atlanta, GA in 2016.
Figure 3. Box Farm is an autonomous hydroponic growing system for vegetables that was designed and built by engineering students at the University of Hawaii at Manoa.

Figure 4. Brylin Nelson, a Tropical Agriculture and the Environment major, received a grant from the Undergraduate Research Opportunities Program (UROP) at University of Hawaii at Manoa to do research with me on growing vegetables in simulated Martian soils.
Figure 5. Brylin Nelson conducted research on growing vegetables in simulated Martian soils. She received an Undergraduate Research Opportunities Program (UROP) grant and presented her research at the University of Hawaii at Manoa Undergraduate Showcase virtual conference in 2021.
Decolonizing Learning by the Promoting Diversity, Equity, and Inclusion Framework in Higher Education in Canada: Concept Paper

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Abstract

This work aims to examine how to create a more inclusive and equitable learning environment in higher education in Canada by addressing how colonialism and systemic oppression have impacted the education system. This includes understanding residential schools' histories, ongoing effects on Indigenous peoples, and the impact of discrimination and bias on marginalized groups. The paper suggests using the DEI framework to achieve this goal. By adopting this framework, higher education institutions can work towards decolonizing their curriculum and providing culturally responsive teaching practices. In addition to curriculum reform, the DEI framework can also assist institutions in promoting equity and inclusion through institutional policies and practices, enhancing the learning environment for all learners.

Keywords: equity, diversity, inclusion, higher-education, decolonization,
Introduction

This concept paper provides an overview that articulates the importance of decolonizing learning in higher education, particularly in the context of promoting DEI. This work highlights the limitations of traditional approaches to DEI, which often fail to address the ongoing impact of colonization on Indigenous peoples and the need for decolonization in higher education. Decolonizing learning involves integrating Indigenous knowledge and perspectives into the curriculum and pedagogy, promoting accurate equity and inclusion for all students. Emphasis is also placed on the importance of empowering educators as a crucial step in implementing DEI strategies in higher education in Canada.

Decolonization in Higher Education

Including Indigenous knowledge and decolonization in higher education is of the utmost importance for fostering a truly inclusive and equitable environment for all students. Universities have a crucial role in promoting DEI and providing access to diverse knowledge and perspectives. There is a growing awareness of the need to address these issues and promote DEI inside universities and colleges. To achieve this goal, it is essential to empower educators and provide them with the necessary resources and support to effectively integrate Indigenous knowledge and perspectives and decolonize the learning process.

There are several reasons decolonization of learning theory should be central to efforts to promote the diversity, equity, and inclusion framework, including higher education's existing institutional structure, curriculum, and pedagogy limit access to Indigenous knowledge and
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decolonization of learning (Akena, 2012; Ballard et al., 2020; Charles, 2019; DEI, 2016; Fuentes et al., 2021; Hall & Smyth, 2016; Moreira et al., 2020; and Shahjahan, 2005). This has perpetuated social justice issues, such as systemic inequality and the marginalization of Indigenous peoples and their knowledge. Recognizing and addressing these issues is necessary for creating a truly inclusive and equitable higher education system.

Decolonizing the curriculum is critical to promoting social justice in higher education (Dei, 2016). It addresses and dismantles the systemic inequalities deeply rooted in modern capitalism's structures, including those based on race, gender, sexuality, and ability. To achieve accurate equity and inclusion, we must adopt a radical approach that prioritizes social justice, Indigenous rights, anti-racism, feminism, and anti-oppression. Incorporating diverse perspectives and knowledge through decolonization is vital to developing a more critical and inclusive curriculum. This is particularly important considering how western capitalism heavily influences education and the challenges of looking beyond mainstream ideas and theories to create a more equitable society.

Decolonizing the curriculum is not just about adding a few new courses or perspectives but fundamentally challenging and transforming the status quo (Hall & Smyth, 2016). This requires a "pedagogy of wrath" that actively critiques and rejects how the current curriculum and university system reflect and reinforce class and racial hierarchies at the crossroads of transnational hegemony. Adopting such an approach means actively and intentionally working towards dismantling systems of oppression and creating a more equitable and inclusive society. One way to do this is by releasing the knowledge, skills, and capacities developed at the university into society. This can contribute to addressing issues of social isolation and contributing to the empowerment of marginalized communities and individuals. By embracing a
decolonizing pedagogy, universities can play a crucial role in fostering social change and promoting greater equality and inclusion in society at large.

Morreira et al. (2020) argue that the decolonization of learning theory is not just a trend or a buzzword but a necessary step in creating a more inclusive and equitable higher education system. It offers the opportunity to challenge the dominant Eurocentric epistemologies that have historically been privileged in academic institutions and to learn from and work with marginalized and oppressed groups. After many years of debate, decolonization has become a vital topic in educational institutions. However, the study of decoloniality and decolonization in academic circles is still in its early stages, and there is much more work to be done. Even in situations where the information presented is highly abstracted, a decolonized curriculum and instruction allows for a more plural and contextual understanding of knowledge. By embracing decolonization, academics can also benefit from practicing epistemic humility, recognizing the limitations of their perspective, and actively seeking alternative ways of knowing and understanding the world.

Concerns Within Higher Education

It is time for higher education institutions to move beyond the use of carefully worded statements and take meaningful action toward promoting DEI and decolonization. While these statements may signal a commitment to equity, they alone are not enough to bring about real change. Ballard et al., (2020), have shown research that relying on such modes of communication could be more effective in promoting DEI. Instead, we must focus on concrete actions that address the differential power dynamics within higher education institutions and promote the interests of marginalized groups.
Decolonization of learning theory is one such action, providing a way to challenge the status quo and disrupt dominant Eurocentric epistemologies. We must be open to exploring multiple fields of study and lived experiences to gain a more inclusive understanding of the world and its complexity. Through meaningful action, we can only progress in fostering equity and inclusion in higher education.

Indigenous peoples have been marginalized within higher education institutions for far too long, and this is an issue that must be addressed. A critical examination of how Westerners construct knowledge and its implications for Indigenous knowledge and decolonization is necessary to understand the systemic barriers that Indigenous peoples face in higher education (Akena, 2012). Research shows that Indigenous knowledge has been systematically excluded from mainstream education, leading to a lack of understanding and appreciation of Indigenous cultures, histories, and societal contributions.

This marginalization has significant implications for Indigenous communities and their right to self-determination. However, more research is needed to understand the full extent of Western knowledge of Indigenous peoples. Therefore, it is crucial to continue to invest in research to gain a deeper understanding of the complex interplay between Western knowledge, Indigenous knowledge, and decolonization in higher education.

The importance of DEI in higher education has become increasingly acknowledged, and resources have become available to support its implementation (Fuentes et al., 2021). However, despite the availability of resources, many institutions have focused primarily on addressing DEI through curriculum and teaching methods. It is still necessary to thoroughly examine the syllabus, which is crucial to creating an inclusive learning environment.
The syllabus is the foundation upon which the course is built; it represents the content and expectations of a class. Therefore, reviewing the syllabus and ensuring it incorporates DEI throughout the curriculum is essential. Only by taking a holistic approach to DEI, including reviewing the syllabus, can institutions create an inclusive learning environment that promotes equity and inclusion for all students. Therefore, it is vital for the syllabus to include DEI and for institutions to commit to reviewing and updating the syllabus regularly.

The reluctance of higher education institutions to fully embrace the decolonization of learning is at the root of several critical issues. One of the main reasons cited is that decolonizing the curriculum is seen as a trend rather than a necessary step in creating a more inclusive and equitable higher education system (Charles, 2019). However, decolonization of the curriculum is not a trend; it is a vital step in addressing the structural inequalities perpetuated by the academy. For institutions to be successful in this process, they must work with key stakeholders and keep open lines of communication. The decolonization process will impact the curriculum and the institution's educators, researchers, and learners. Achieving true diversity and inclusion in higher education requires more than just talking about retention and progress; it requires a comprehensive, all-inclusive approach to truly decolonizing the academy.

Decolonization of learning theory is critical in making educational institutions more inclusive and equitable for all students, regardless of their cultural and economic background. By decolonizing the curriculum and teaching methods, institutions can address the issues of cultural representation and accessibility for all students. Many educational institutions continue to teach from a Eurocentric viewpoint, which can cause students from non-Western backgrounds to need more comprehension of and sensitivity to Indigenous ways of knowing and seeing the world (Martin, 2016).
This Eurocentric perspective can be a barrier to the full potential of decolonization, which could solve problems such as colonization and institutionalized racism. By embracing decolonization, students can reflect on Western ways of thinking about knowledge and develop their ability to think critically, thus gaining a more inclusive and nuanced understanding of the world. In this way, decolonization of learning can create a more inclusive and equitable school environment, thus making the educational experience more rewarding and beneficial for all students.

**Recommendations**

Providing educators with the necessary resources and support to effectively integrate Indigenous knowledge and perspectives and decolonize the learning process is essential. This can include providing professional development opportunities, access to decolonization experts, and resources such as curriculum and pedagogy materials. Building and fostering relationships between educators, students, and Indigenous communities is essential to creating a truly inclusive and equitable learning environment. This can include actively seeking and involving Indigenous perspectives, working with Indigenous organizations and experts, and listening to the voices and experiences of marginalized groups.

Decolonizing the curriculum is crucial to addressing and dismantling systemic inequalities in higher education. This can include incorporating Indigenous knowledge and perspectives into the curriculum, revisiting how history is taught, and examining the implications of Eurocentric epistemologies.

Identifying, acknowledging, and addressing implicit bias within the institution as well as cultural competence is essential to creating an inclusive and welcoming learning environment.
They also promote an understanding of different perspectives and cultures. This can include actively seeking diverse perspectives, fostering an open and respectful environment, and promoting inclusive language and practices.

Moving forward, an empirical research approach is recommended to explore the best ways to empower educators to implement DEI strategies that decolonize learning in higher education, particularly in Canada. To achieve the goals of diversity, inclusion, and equity in higher education, it is essential to decolonizing the learning process. This means challenging and dismantling the colonial practices and structures embedded in the educational system and replacing them with decolonized knowledge systems based on Indigenous knowledge and perspectives (Shahjahan, 2005). A theoretical framework based on decolonizing methods has been developed to assist educational institutions in creating more inclusive and equitable learning environments.

This framework guides decolonizing the curriculum, pedagogies, ways of knowing, classroom dynamics, institutional structures, and research procedures. By implementing this framework, educational institutions can actively work to break down the barriers that prevent marginalized groups from accessing and thriving in higher education. This is necessary for oppressed groups and the entire educational system, making it more inclusive, equitable, and sustainable.
References


Building a Culture of Data Democratization: Giving Data to the People!

HICE 2023 Conference Proceeding

Topic Area: Educational Measurement and Evaluation
Presentation Format: Workshop

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Although extensive data is collected across educational contexts, it is too often the case that only those with specialized training tend to access data to inform practice and policy. As Bethaz et al. (2021) have stated, if we approach data from an inclusive perspective, we need to democratize data so that non-specialists can comfortably explore data and extract knowledge that will empower consumers of data. While many institutions espouse a data-informed approach to decision-making, developing a culture of data ownership and democratization requires commitment to make data accessible (Millet, Resig, & Persel, 2021).

Workshop presenters walked participants through the P.I.T.C.H. framework (HOPE Leadership Institute, 2022) that can be effective in building a culture of data democratization. A critical component of this process is data access. Data can provide a North Star for an organization where all stakeholders are driven by shared goals and build a connection between their roles and the larger strategy or outcome, such as student success. Additionally, as funding formulas across the country have shifted towards performance based funding, the role of data in educational funding has been elevated. This has resulted in institutions prioritizing data and the need to build data literacy skills across stakeholders. The goal of our workshop was for participants to hear about best practices, experienced barriers, and valuable resources that can be taken back to their organizations to help build a foundation of data democratization.
Sisterhood for Equity Consulting

Sisterhood for Equity Consulting developed this workshop to engage others committed to equity work through data democratization. We believe programming and services that are equity-centered can be transformational and empowering for individuals, organizations, communities, and society at large. We are four sisters born and raised in Southern California. We founded Sisterhood for Equity Consulting out of the need to address social justice issues. We offer a range of services for various sectors including K-20 educators, school districts, government agencies, nonprofits, philanthropic organizations and corporations. We have over 80 years of combined experience in addressing issues of equity in various contexts. Our goal is to become strategic thought partners and tailor services to meet organization’s needs (https://sisterhoodforequity.com/).

The Data Democratization Workshop

Our Data Democratization Workshop began with background information that framed the importance of data democratization within our institutions. The Workshop addressed the following problem: Why do institutions and organizations struggle with making data-informed decisions? The Workshop then proceeded with problem statements that we explored using a P.I.T.C.H. framework.

There are several questions that can be asked to understand what data informed decision-making looks like at various levels within institutions. How is data accessed for decision-making purposes? How is data talked about? What is the tone and attitude towards data? It is important to acknowledge that colleges and universities are complex environments. There is often competition for resources that can stall or hinder access to data and its dissemination. Therefore, it is critical that institutions are intentional about their approach to data access and data-informed decision making. Furthermore, in order for institutions to engage in data democratization, the data needs to be accessible to non-specialists (Bethaz et al., 2021; Millet, Resig, & Persel, 2021).

Top 10 Questions Colleges and Universities Should be Able to Answer in Order to Enhance Student Success

According to a 2014 report from the Education Trust these are the top 10 Questions colleges and universities should be able to answer in order to enhance student success.

- How many students do we lose along the way (retention)?
- Are those returning students actually sophomores (progress)?
- Why aren’t our students accumulating the credits they need to be on track (course retention/withdrawals)?
- What are some of the other reasons our students aren’t accumulating the credits they need (success rates in high enrollment courses)?
- Who’s struggling with math (success rates in Math 101 courses)?
- How many students who need remediation succeed at our institutions (development education success)?
What is the role—or lack thereof—of the major in student success (success of students in different major fields of study)?

How efficient are we at getting students to a degree without excess credits (course taking and course completion)?

What pathways do students take on their journey to a degree (course-taking)?

How do pieces of student success-or failure-fit together (a comprehensive analysis of student pathways)?

Data is critical to be able to answer all of the questions listed above. Who has access to the data and how the data is examined is critical to developing a culture of data democratization within institutions. Only by looking at the data can action steps be identified.

Brief History of Institutional Research

We gain a better understanding of the role of institutional research by looking at the history of institutional research as documented by Peterson (1999).

Brief History of Institutional Research

What Type of Data Lives in Institutions?

As consumers of data, it is important that we understand what type of data typically lives in institutions of higher education. These data often fall under various categories. Under the category of Accountability, an institution houses data needed for reporting purposes at the federal and state levels as well as for grant purposes and for reports required by the Integrated Postsecondary Education Data System (IPEDS). Other data includes data tracked for accreditation purposes that often address issues of Diversity, Equity, Inclusion, and Accessibility as well as student learning outcomes, program review, and assessment and
evaluation. Institutions also often collect data related to research and evaluation. This can include data from surveys, focus groups, interviews, action research projects, and campus climate tools. Institutional Effectiveness data can inform decision-making and can encompass data related to resource allocation, marketing and outreach, and enrollment management. Finally, data tied to policy can include data that informs reporting requirements, is tied to legislative tracking, and/or addresses policy interpretation.

**Numbers Matter: An Example**

As an institution, it is important to examine data that has implications at various levels. For example, it may be helpful to understand the patterns of degree attainment for certain populations of your students as well as the enrollment trends across various colleges and universities across the U.S. over the past two decades. Making the effort to access and examine such data can directly impact an institution’s practices. For purposes of this workshop, data points examining Latinos/as in higher education were shared.

**Accessing Data: Things to Consider**

When accessing data it is important to consider a number of factors and issues that may arise. For example, how do you request data? You may want to consider how often you ask for data. Do you ask for it monthly, quarterly, yearly? You may want to ask for data over multiple years so you can identify trends and progress over a longer period of time. Another factor is who your populations of interest are. Consider who the stakeholders that would be interested in this data would be and why they might be interested in this information. If you are looking at funding, interventions or support for specific groups, you will want to look at disaggregated data. But if you are comparing different institutions you may want to only look at aggregated data. Other factors include timeframes and trends when accessing data. How soon do you need this data and can you gather the data needed to identify trends over several months or years? Another consideration is whether or not the data already exists or whether or not it still needs to be collected. If the data still needs to be collected, you will want to think about how to gather that data in a reliable and unbiased way to ensure its validity. Last but not least is the issue of how the data will be used. There are power shifts and dynamics among stakeholders including students, bargaining units, administrators, parents and funders who will all have different motives for using the data.

**Barriers for Researchers and Institutional Decision-Makers**

Getting data and research is not always as easy as it seems in today’s digital age. There are many barriers that researchers and institutional decision makers often face in this quest for data. Once data is acquired it is the task of the researchers to present that data in a meaningful manner and considering the audience. It is imperative that the Institutional Research Office maintain a supportive function to researchers instead of a leading function. Researchers are often limited by the resources they have to get the data. Other barriers can be sharing a vision and
needs of the Institutional Research Office with executive leaders. Sometimes the barrier is a lack of buy-in from institutional stakeholders which may include a lack of trust in the data from those same institutional stakeholders. In addition, researchers often face the barrier of getting clean data that is free from incomplete, inaccurate or irrelevant data.

Institutional decision makers also face barriers in the quest for data. Often they need to get data through regional or state entities which creates a barrier to even accessing the data they need or want. They also need to prioritize data needs to ensure they are meeting the institutional strategic plan and accreditation needs of the institution they are making decisions for. As institutional decision-makers, it is important for them to frame and reiterate the relevant data in order to get funding, justify policies and protect the status of the institution. Institutional decision makers also need to get key stakeholders on the same page when it comes to getting and utilizing data. In order to get buy in from all stakeholders it is the job of the institutional decision maker to foster a data informed culture so that stakeholders are not afraid of seeking and utilizing data. Another barrier for institutional decision makers is connecting data to policy so that they can make data informed decisions that further the goals of the institution. A final barrier for institutional decision makers is finding ways to have continuous data conversations so that it is normalized in the institution's culture and every day function.

**P.I.T.C.H. Framework**

The P.I.T.C.H. framework can be an effective tool for understanding what data is useful for examining the complexity of an issue and understanding its multiple components in order to create a tangible solution. The following are the various components of the framework.

- **P** Players, influencers, decision-makers, and constituents
  Who is the most affected by this issue? Briefly explain, citing any relevant data points.

- **I** Issues
  What are the rules and politics surrounding the issue?

- **T** Territory
  What are the physical/geographic resources, population & space, jurisdictions, and authorities that need to be considered?

- **C** Constraints
  What are the constraints of the players that may keep them from understanding each other? What issues are creating barriers? Are there any physical barriers?

- **H** History, Every issue has a history. There are no new challenges.
  How has the issue been acted on in the past? What were the repercussions?
  What information was taken into consideration during that decision-making process?
Charter Schools: An Example

To model how the P.I.T.C.H. framework can be useful, we provide an example using the issue of Charter Schools. Below is how we would identify the complexity of this issue:

**P** Players, influencers, decision-makers, and constituents  
*School boards, investors, community members, public schools, real estate developers, city council*

**I** Issues  
*Co-location of charter schools on public school properties, taking funding away from public schools, school choice, teacher credentialing requirements for charter as compared to public schools*

**T** Territory  
*Community, school district, state, and federal levels*

**C** Constraints  
*Financial tensions and difference in accountability for public vs. charter schools, selectivity of students and teachers*

**H** History, Every issue has a history. There are no new challenges.  
*History between teacher unions and charter school movement, started as a grassroots movement, available funding for education is highly influential*

**Two Cases For Workshop Participants to Explore**

We then applied the P.I.T.C.H. framework to two other issues that are heavily discussed in educational contexts: 1) The recruitment and retention of underserved minority students in STEM, and 2) The Teacher Shortage. We provided an opportunity for workshop participants to break into two groups and practiced applying the framework to one of the two issues identified. Following the allotted time, participants were invited to share their group conversations and concluded with a whole-group conversation about the usefulness of applying the P.I.T.C.H. framework.

**Call to Action (RL)**

Now that we have reviewed and applied the concept of data democratization, we face the question of what to do next. The first component of this call to action is to get your hands on the data. Seek out your institutional research offices, regional, state and federal databases as well as your own data from assessments, surveys and more. Then make sure you ask for data frequently and with a purpose. You want to be able to connect the reason for the types of data that you request. For example, if you want to find out whether or not your students’ math scores are improving you will want to mention this when you ask for several months or years of data so you can identify trends. If you want to find out the effectiveness of an intervention program you just implemented last year you may want weekly or monthly data. Finally, remember that people are often afraid of data because they just see numbers and not the human beings that those numbers represent. Ensure you make connections to real life experiences and people. Don’t be
afraid to talk about and name the student who was able to catch up and finish their bachelor’s degree in education because of an intervention program that your institution implemented to help them with that statistics course they struggled with. Chip and Dan Heath once said, "Data are just the summaries of thousands of stories-tell a few of those stories to help make the data meaningful."

References:


Developing Critical Thinking Skills Through Art in the EFL Classroom

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Abstract

This research paper will investigate the development of critical thinking skills (CTS) through the study of artworks in an English as a foreign language (EFL) class at a public university in Japan. Art is an under-utilized classroom tool that has the power to elicit deep intellectual thought and is therefore ideally suited for critical thinking (CT) instruction. For this study, a three-step task was created in which students analyze and interpret the meaning of artworks, with particular emphasis placed on having students formulate questions about aspects of the artworks that they wonder the meaning about. A student survey was designed to examine the effectiveness of the art analysis activity and to determine whether or not it resulted in any changes to students’ learning preferences in an EFL context.

Introduction

Universities must prepare students for success in a world that is being rapidly transformed by the forces of globalization and technological advancements. The ongoing digital transformation of societies and economies is ushering in a new era in which many of the skills and competencies that will be valued and in-demand may differ significantly from those of the past. In this backdrop
of accelerating change, critical thinking (CT) has been identified as an essential 21st century skill (DiCerbo, 2014) that is crucial for success in the global workforce (Liu et al., 2014), and is one of the most sought-after skills by employers (Pearson.com, 2021).

Although a consensus definition of CT remains elusive, Paul and Elder (2006) define it succinctly as “the art of analyzing and evaluating thinking with a view to improving it.” Prudence Williams (2016) describes the critical thinking process as containing the following elements:

(a) identifying the assumptions that frame our thinking and determine our actions, (b) checking out the degree to which these assumptions are accurate and valid, (c) looking at our ideas and decisions (intellectual, organizational, and personal) from several different perspectives, and (d) on the basis of all of this, taking informed actions.

Critical thinkers are said to be “skeptical, open-minded, value fair-mindedness, respect evidence and reasoning, respect clarity and precision, look at different points of view, and will change positions when reason leads them to do so” (Beyer, 1995).

The Japanese Ministry of Education (MEXT, 2018) encourages the development of critical thinking skills (CTS) so that students will be able to think, make judgements and express themselves in complex and unfamiliar situations. Accordingly, many universities in Japan are increasingly emphasizing CTS in their curriculums. Rikkyo University, for example, aims to help students develop into global leaders who can “think and act independently and live in harmony with the world” (Ikeda, 2020). Associate Dean of the College of Liberal Arts at International Christian University describes CT as the foundation of liberal arts education and adds that the acquisition of CTS does not come easily but requires great effort and training (Ikoma, 2022).
Therefore, an understanding of best practices in CT instruction along with awareness of the specific challenges unique to each learning environment is essential. In the case of Japan there are elements of culture, as well as pedagogical approaches in schools, that may hinder the development of CTS in Japan (Graham, 2018), such as the desire to maintain group harmony, fear of standing out—or ostracization—from the group, and strict hierarchical relationships. Okada (2017) concludes that many Japanese students may have difficulty in expressing ideas and asking questions in class because these activities clash with values that they have been raised with, and adds that students are often willing to accept what they are told by authority figures, such as teachers, rather than thinking for themselves.

Given that language and culture are inextricably linked, Japanese students may feel freer to ask questions and express opinions in English classes (Okada, 2017). Ichimura (2013) echoes these thoughts, stating, “We urgently need to train students to be globally competent. EFL teachers must take a leading role in teaching students to think independently, to ask questions, and to express themselves by including opportunities for these activities in class.”

This research project proposes that art is ideally suited to develop students’ abilities to think independently, ask questions, and express their original ideas and opinions. Art is a greatly under-utilized resource in the foreign language classroom (Grundy et al., 2011), and Tishman and Palmer (2006) describe a number of reasons why art is an effective classroom tool for developing CTS: 1) Art is complex, just like the real world; 2) Artists generally have a message to convey, and thus by design art naturally invites deep thought; and 3) Art is open to multiple interpretations and naturally encourages the types of thinking that are essential for CT, such as asking thoughtful questions, constructing careful explanations, exploring new viewpoints, and making connections.

It is important to bear in mind that learners who possess particular thinking abilities may
not be disposed to use them (Perkins & Tishman, 2022). Thinking abilities are a necessary but insufficient condition for CT to occur and it is useful to distinguish between thinking abilities and thinking dispositions (Tishman & Palmer, 2006). The latter is a, “tendency toward a particular pattern of intellectual behavior” (Perkins & Tishman, 2022) and are formed by routinely engaging in patterns of behavior and thinking (Tishman & Palmer, 2006).

For this study, a three-step task (appendix 1) for analyzing artworks was created: step 1) observe: students describe what they see and what details they notice; step 2) investigate: students write questions about aspects of the artwork whose meaning they wonder about; step 3) interpret: students write their ideas about the meaning or message of the artwork and their reason/s for thinking so. In this way, students will analyze artworks throughout the semester by completing the three-step art analysis worksheet and sharing their ideas, questions, and opinions with classmates in English.

This three-step task encourages students to ask many questions about the artworks that they analyze. According to Paul and Elder (2005), the asking of questions is the driving force that propels the thinking process forward and they add that the ability to ask effective questions is a precondition to being an effective thinker. Through regular practice with this activity, students can develop the habit of asking questions about things they wonder the meaning about. Moreover, CTS developed in the context of analyzing art can transfer to non-art contexts (Tishman & Palmer, 2006).

**Methodology and Teaching Environment**

The students involved in this study are first-year university students in the Department of Intercultural Studies at Yamaguchi Prefectural University. All students in the Department of
Intercultural Studies are required to take the first-year English course *Advanced English*, which meets twice a week for 90 minutes each class. The first-year students are separated into three levels (A, B, and C) based on TOEIC scores. For this study, the A and B classes participated in the art analysis activity described in this paper and students in the C class served as the control group.

A 12-question survey in Japanese was administered at the beginning of the fall semester and a 20-question survey will be administered at the end of the fall semester to obtain feedback and to measure the effects of the classroom activities by comparing the data from the two surveys. 68 first-year students participated in the 12-question survey at the beginning of the fall semester. This paper is being written prior to the end of the fall semester and therefore the data has not yet been collected from the second survey. Therefore, the details of the survey design and results will be presented in an upcoming paper once the data collection and analysis has been completed.

The key research questions comprising this study are:

1) Will students perceive the art analysis activity as useful for developing CTS?

2) Will the study of art lead to any changes to students’ learning preferences, attitudes, or motivation in an EFL context?

**Classroom Procedure**

Throughout the semester, the art analysis task will be carried out a total of six times. The six artworks that were chosen for this activity are “Separation” by Edvard Munch (1896), “New Kids in the Neighborhood” by Norman Rockwell (1967), “At the Crossroads” by Hugo Simberg (1896), “Girl Before a Mirror” by Pablo Picasso (1932), “Beauty Viewing Cherry Blossoms at Night” by Katsushika Oi (1850), and “The Therapist” by Rene Magritte (1937). The six artworks were selected on the basis of having a meaning or message that is obscure and/or open to multiple
interpretations and thus likely to stimulate deep thought in the students and lead to the exchange of a variety of opinions and ideas.

The first ten minutes of the class is devoted to a weekly vocabulary quiz, which leaves approximately eighty minutes available for the art analysis activity. First, the teacher spends a few minutes to review students’ ideas about the previous artwork that students had analyzed. The purpose of this is to remind students of some of the interesting ideas that they had discussed previously and also so that students who were absent from that class would have a chance to see the artwork—and hear some of their classmates’ ideas—that they had missed. Next, a color printout of the artwork along with the art analysis worksheet (appendix 1) is passed out to each student. First, students are given time (approximately five minutes) to complete step 1 of the worksheet in which they describe in English the objects and details they notice in the artwork. The teacher emphasizes to students that they should not include their ideas or opinions but rather just focus on objectively describing in English what they see in the picture. Next, students are asked to share what they wrote with the classmate sitting next to them. Then, the teacher calls on a number of individual students to share with the class one of the details that they noticed in the artwork.

For step 2 of the worksheet, students are asked to write questions about aspects of the artwork that they wonder the meaning about. First the teacher shares a model question to help guide the students, then students are given time (approximately five minutes) to write down their own questions. Next, the process from step 1 is repeated in which students share their questions with the classmate sitting next to them, and finally the teacher calls on a number of individual students to share one of their questions that they wrote down.

For step 3, students are given time (approximately ten minutes) to write down their ideas and opinions about the message or meaning of the artwork. The teacher tells students that there
are no right or wrong answers and that there are often multiple ways to interpret the meaning or message of artworks. While students are writing down their ideas for step 3, the teacher writes the following three questions on the board: 1) What do you think the meaning or message of the artwork is and why? 2) How does the artwork make you feel and why? 3) What do you like or dislike about the artwork and why? Then, students are instructed to discuss question 1 by sharing their answer that they wrote on the worksheet and to also discuss questions 2 and 3 with their partner if they have time to do so. After having students discuss the questions with a classmate for a few minutes, the teacher asks students to stand up and change partners so that they can exchange their ideas and opinions with another classmate. This process is repeated, and in total, students discuss with three or four of their classmates before being asked to return to their seats. Next, the teacher has the students ask their partner, “Who told you something interesting?” which gives students an opportunity to share one or more of the interesting ideas that one of their classmates told them. Finally, the teacher calls on individual students to share their answers that they wrote down.

The three-step art analysis task created for this study is partly based on the DAE (Describe-Analyze-Evaluate) Model that is used to help “foster self-awareness of personal and cultural assumptions, promote the appreciation of cognitive complexity, and the importance of frame-shifting when encountering the unfamiliar” (Nam & Condon, 2010). A key difference between the DAE Model and the three-step art analysis task is that the former does not involve the writing of questions. A commonality between the two is that they both seek to keep the mind as objective as possible at the first stage of the process in order to forestall the natural temptation of making a snap judgement or having an immediate subjective reaction.
Conclusion

The data collection has not yet been completed, and thus no conclusions can be made regarding the effectiveness of the classroom activities described in this paper. However, based upon the author’s classroom observations, the students were actively engaged with the art analysis task and seemed to enjoy it. The author was impressed by the depth of ideas and variety of interpretations of the artworks by students. This study represents a preliminary attempt to use art in the EFL classroom to encourage the development of CTS and the author is hoping to develop follow-up activities that can broaden and deepen the level of student analysis such as by providing supplemental materials that explain background information regarding the context in which the artwork was created and its critical reception. Lastly, the author would like to examine ways to test the claim by Tishman & Palmer (2006) that CTS developed in the context of analyzing art can transfer to non-art contexts.
References


### 3 Step Process for Analyzing the Painting

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<tr>
<th>Step 1</th>
<th>Observe: Describe what you see in the painting and what details you notice</th>
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<td></td>
<td>(観察：絵に見えるものや気づいたことを書きましょう)</td>
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<th>Step 2</th>
<th>Investigate: Write questions about things in the painting that you are wondering about</th>
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<td>A)</td>
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<td>B)</td>
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<td>D)</td>
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<th>Step 3</th>
<th>Interpret: Give your opinion about the meaning of this painting and your reasons why</th>
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<td></td>
<td>(解釈：この絵の意味について、あなたの意見とその理由を書きましょう)</td>
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Gaming Instructional Material for Exploration Activities in Information I

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Abstract: In Japan, the "Period for Integrated Studies (PIS)" is mandatory at each grade level to perform cross-curricular exploration activities to cultivate problem-solving ability. However, this opportunity has not been fully utilized to achieve its purpose. To rectify this, I proposed the New Backward Design method. This method requires teachers to design PIS lessons to prompt learners to evaluate policies to achieve United Nations Sustainable Development Goals, to set its sub-problem for exploration activities in each subject area, and to redesign the subject curriculum to prepare for the exploration activities. I have already developed instructional materials for mathematics and science, but in this study, I design the same for information study to clarify cooperation and discrimination of roles between subjects.

Introduction

The Reason Why Exploration Activities in Japan have not been Successful

In school education globally, the development of problem-solving ability is emphasized. In Japan, since the revision of the National Course of Study (NCoS) in 1998, the "Period for Integrated Studies (PIS)" for performing cross-curricular exploration activities to cultivate problem-solving ability has become mandatory at each grade level. In addition, junior high school and high school mathematics, science, and social studies have also required exploration activities at the end of each unit or grade. However, these efforts have not yet achieved their initial goals (Central Council of Education 2016). Also, in the latest NCoS, revised in 2018, the term “exploration activities” is no longer found in the science section and PIS can be replaced by some credits of inquiry-based study of science and mathematics. These are compromises that go against the steps toward reform and are clear retreats.

I believe that the cause of this issue is that the subject curriculum is designed to conduct subject-specific entrance examinations. It is unreasonable to expect students to integrate their learning outcomes on their own without improving the curriculum. Few students may be able to do so without clues but teachers cannot design and guide exploration activities, nor can they reform the curriculum, because they cannot utilize or integrate learning outcomes. The problem settings of exploration activities that have been exemplified in textbooks so far are only those that are convenient for applying the outcomes of subject learning and those that are unrealistic and useless in real life. (Mizuno and Matsuda 2020).

The Warp and Woof Model of Problem-solving and the New Backward Design Method

Matsuda (2020) proposes the New Backward Design method to improve this issue. In this method, the main purpose of school education is set for citizenship education. Then by setting the learning goal to foster the ability to evaluate administrative policies, corporate services, and products aimed at achieving the United Nations Sustainable Development Goals (SDGs), such activities will be implemented during the PIS. In the subject exploration activities, to prepare for PIS activities, students work on sub-problems that focus on utilizing the learning outcomes of each subject. In mathematics, the focus is on quantitative evaluation of policies, while in science, the focus is on examining the scientific reliability and validity of the data used in proposals. Regular classes of subjects will be designed to prepare for such exploration activities.

Citizens have not required the ability to propose policies but rather the ability to evaluate policies and discuss pros and cons, demand improvement measures, and think about self-defense measures. This is because experts should play the role of considering policies and services mainly. Matsuda (2015) also proposed the Warp and Woof Model of Problem-solving that can be used commonly in all subject exploration activities. The model consists of problem-solving procedures described later, a general strategy (ways of viewing and thinking) in each subject area to be utilized in the procedure, and domain-specific knowledge (internal knowledge to be remembered

I have already developed instructional materials for exploration activities in mathematics and science based on the New Backward Design method. These instructional materials were developed by improving those developed by students in my teacher promotion course (Kamizato et al. 2021) based on Kobayashi et al. (2006)’s study on water quality improvement measures for Lake Kasumigaura. Nutrient salts containing nitrogen and phosphorus cause the deterioration of water quality in lakes, and the main sources of these are livestock manure and sewage, food waste, and wastewater from households and business establishments.

As a measure to reduce nutrient salts from livestock manure, it is necessary to sell the excess livestock manure, that has been sprayed as fertilizer on one's farmland, to the outside of the region. However, as there are costs involved, a measure to generate biogas for electricity and fertilizer from livestock manure can be considered to earn money. However, it is necessary to subsidize the initial investment with taxes. A measure to reduce the nutrient salts emitted from households is to improve the functionality of sewage treatment facilities. However, low-performance sewage tanks were purchased by each household, and a subsidy is required to renew them to high-performance ones. Even with the above two policies, new nutrient salts will flow into the lake. Therefore, to drain the accumulated nutrient salts, it is necessary to dredge using taxes.

Matsuda’s Instructional Material for Exploration Activities in Mathematics and Science

In mathematics, students learn how to quantitatively evaluate policies for choosing better ones. Simply deciding on one from all is not always a better choice. Kobayashi et al. (2006) conducted a simple cost-benefit analysis, but each policy has an upper limit on the budget that can be invested. Therefore, depending on the size of the budget, a mixed solution combining multiple policies will be selected.

However, the instructional materials of Matsuda (2022) evaluated livestock manure treatment (biogas power generation), which supports profitable projects for private companies, in a completely different way from the other two policies. The former simulates a method of calculating the amount of subsidy so that the project does not derail, on the premise that the subsidy will be collected as tax revenue. The others are simulating a subsidy system to promote the upgrading and renewal of sewage treatment facilities to reduce the dredging cost which is not cost-effective but needs to be done to a certain extent in the long term.

Matsuda and Asano (2021)’s instructional material for science focuses on sewage treatment among the three policies, and allows learners to evaluate the reliability and validity of an estimation method of the flow diagram in which the process and amount of nutrient salts generated, treated, flowing downstream, and removed are shown. No matter how good a mathematical evaluation is, it is meaningless if the data is incorrect. In science education so far, thinking about experimental and observation methods for collecting necessary data has been emphasized. It is fine for professional education that trains scholars and engineers. However, it is impossible for citizens to spend money and make an effort to come up with measurement methods on their own and how to make reliable estimates using open data is more important. Of course, it is difficult for citizens to make all the estimates initially. However, the policy should show any supporting data, and people need to be able to critically consider it.

In the instructional material, learners critically examine the estimation method of Kobayashi et al. (2006), examine an easier and more reliable estimation method, and consider improvement measures for elements that are ignored and points of contradiction in the model.

Purpose

In this study, based on the above results of developing instructional materials in mathematics and science, I will design an instructional material for exploration activities in information study with a common topic to promote the integration of learning outcomes in each subject area into PIS by experiencing three instructional materials. Because the compulsory credit for information study is only two credits (70 hours), it is necessary to clarify the division of each role of mathematics, science, and information study, and to clarify the required learning activities and contents that should be focused on in information study. Accordingly, to clarify the concrete instructional plan, a lesson was designed as gaming instructional material.
Required and Appropriate Learning Activities in Information Study

**Expected Activities in PIS**

In 2019, Japan's energy supply comprised 6% nuclear power, 18% renewable energy, and 76% fossil fuels. This power source composition ratio is based on the shut-down of many nuclear power plants due to the accident at the Fukushima Daiichi Nuclear Power Station. In 2010, before the accident, nuclear power accounted for 29%, renewable energy 10%, and fossil fuel 61%. At that time, the ratio of hydropower to renewable energy exceeded 80%, but in 2019, more than 40% was hydroelectric power generation, and the rest was new energy including biomass.

Among new energy, solar and wind power are emphasized, and they are criticized as unstable power sources because they are weather dependent. However, biomass and geothermal have the advantage of being able to obtain stable electric power, and as pumped-storage power generation and storage batteries, by using them in a complementary manner to unstable new energy sources it is possible to provide a stable power supply. The conversion of livestock manure into biogas, proposed by Kobayashi et al. (2006), uses this biomass to generate methane gas and generate electricity. Methane gas is the main component of liquefied natural gas (LNG), but renewable energy has completely different effects on global warming from fossil fuels.

The raw material for biomass is not limited to livestock manure, but the amount of energy contained in food waste from households and business establishments, such as hotels and food sales, is greater than in livestock manure. Food waste is also related to the food loss problems of the SDGs, and if incinerated, it will generate CO$_2$ and NO$_x$, which will increase the environmental burden. According to Kunimatsu et al. (1989), because the amount of food waste generated at households and businesses establishment can be estimated from the population and sales, the cost of collecting garbage and power loss due to transmission can be reduced in a densely populated city.

However, the conversion of the current garbage disposal method from incineration to biogas power generation needs to be evaluated from multiple perspectives, including improvements in facilities and operating costs, electricity bill revenues, energy self-sufficiency rate, and greenhouse gas emissions. It should also be noted that the current garbage incineration facilities also generate electricity and cover the electricity in the facilities. As mentioned, it is also necessary to evaluate the effects of using it in combination with other new energy power generation.

However, these quantitative evaluations are similar to Matsuda's (2022) instructional material for mathematics and are the application of the learning outcomes of mathematics, not information study. In addition, it is through the application of the learning outcomes of science that learners will verify the quantity and quality of biomass raw material able to be procured in the assumed area and estimate how much methane gas and by-products (fertilizer, chemical environmental load, etc.) can be generated or reduced. It is conceivable to replace the case of livestock manure in Kobayashi et al. (2006) with garbage data for verification.

Although the NCoS stated that "understanding methods for modeling events in society and nature, and methods for evaluating and improving such models through simulation" is included as content of information study, it is required to carefully interpret this statement. First of all, modeling is abstraction and symbolization, and learning methods for modeling events in society and nature should be done in social studies and science. Debates and financial games are simulation methods in social studies, and science experiments are methods of simulation in science. Of course, there are also simulations using computers, such as the study of computational physics and the CAD of electric circuits. However, that is learning science, not information study. It is apparent that using any 70-hour information study classes for other subject areas is nothing more than a waste of time.

**Appropriate and Information-Study-Specific Activities Different from Other Subject Areas**

The purpose of information study is to learn the utilization of information technology. Especially, it is more important to think about information systems for solving social problems, not for utilizing information technology to improve the effectiveness and efficiency of individual problem solving. Effective use of social information systems can help eliminate the wasteful use of taxes and improve fairness. However, it is not always possible to freely choose whether to use or not to use it, and there are concerns about the digital divide and many problems in the handling of personal information.

Even for biomass power generation using food waste, it can be expected that the policy effect will be enhanced by introducing an information system. However, personal information may be leaked in unexpected
Designing an information system means thinking about how to use machines to replace and automate the tasks of persons monitoring and controlling the flow of goods and money, communicating that information with each other, controlling devices, and depositing and withdrawing money. Information that has been collected manually will be collected by sensors as much as possible, transmitted through communication networks, and temporarily stored in databases if necessary. It may be required to control the machine or update anyone’s bank account data. Thus, it can be said to replace the target event with concepts such as information collection, processing, storing, transmission, and control. This is the meaning of modeling in information study.

However, simulations that examine whether the modeled system design functions well or whether there is a risk of occurring problems tend to be understood as corresponding to programing. However, it is impossible to create a large-scale program in the 70-hour information study classes, and even if examining an issue with unmatured programing skills, it is uncertain whether the issue occurs through an error in the model or a bug in the program. As for the ability required for citizens, it will be required as simulation thinking to examine the effects and issues by analogy from well-known systems. Therefore, to solve this kind of problem in the exploration activities in information study, it is important to learn typical information systems useful for an analogy and to practice the use of analogical thinking while in regular classes.

Concrete Design of the New Instructional Material

Presenting the Problem and Goal-Setting Process

Even in instructional materials of mathematics and science, it is the experts who make policy proposals, and the policy content and its support data are clearly stated to the learners in the presenting-the-problem task. Even in the instructional material, the information system proposed by the policy needs to be clearly stated in the problem. If the problem to be dealt with is an actual policy, including that in the past, the problem can be presented by quoting it. However, if it is a virtual problem, it is the teacher's responsibility to present it. In any policy, the proposed system is undeveloped and conceptual. Teachers are also not experts in designing information systems, so they only need to contain enough information to promote students' thinking. As mentioned, it is assumed that students will be encouraged to think by analogy, so it would be better to present a virtual system as a problem by referring to the system that becomes the basis of analogy. In the instructional material, instead of presenting all the information initially, the necessary information will be presented in sequence according to the following problem-solving process.

The following are assumed to be the purposes of introducing information systems into biogas power generation. The first is power generation control, which is indispensable when biogas power generation is used to compensate for the decrease in solar and wind power generation. Although power generation control can be done by using only real-time information, it is better to utilize weather forecast information such as sunshine forecasts and wind direction and power forecasts to control power generation more stably. Moreover, in power generation control, it is important to match supply and demand rather than constantly supplying a certain amount of power, so it is necessary to utilize information on demand forecasts.

The second is the control of biogas storage. Since the gas storage facility has an upper limit on the amount of storage, the amount of gas to be generated is determined from the current storage amount and demand forecast considering the number of days required for gas generation, and then the amount of raw material to be input to the gas generation facility is determined. Fertilizer is produced as a by-product of biogas generation. If that is disposed of, it may affect the environment, so it needs to be stored until sold, and an inventory management system is required. The third is a system for improving the efficiency of raw garbage collection. The decisive difference between food waste being used for power generation and incineration is that, in the latter case, it is sufficient to dispose of it immediately after collection, but in the former case, it is necessary to temporarily store it until it is necessary rather than immediately generating and processing from the necessity of gas storage control. Of course, if the generated gas is liquefied, the capacity will be 1/600, so it is also conceivable to immediately generate and process. However, considering that the liquefaction process also consumes electricity and that the removal of moisture contained in the food waste affects the gas generation efficiency, it is beneficial to store it as food waste for a certain period. Thus, although it is related to the assumption described later, since the most suitable storage place is a household, garbage collection is performed irregularly, and it is conceivable that the collection cost can be reduced.
In current waste disposal in Japan, except for recycled waste, it is mainly classified into burnable and non-burnable waste. In biogas power generation, only food waste among the burnable garbage is used as a raw material. Naturally, the quality of raw materials is important and requires the cooperation of households and business establishments. Household waste is collected free of charge, so a cooperation fee will be required to obtain cooperation in classification, storage, and management. Therefore, the fourth subsystem that evaluates, manages, and distributes information on the amount and quality of resources provided and the amount of the cooperation fee to pay for each food-waste provider is required.

Garbage disposal is usually carried out by local governments, but power generation is carried out by private companies. Therefore, biogas power generation and garbage collection would also be carried out by private companies. However, garbage collection companies and power generation companies are not necessarily the same. As with residential solar power generation, each household must be able to choose a company for selling garbage. In this case, the garbage collection companies would establish how much garbage was collected from which households, and pay a cooperation fee according to the amount of garbage collected from the revenue sold to the power generation company. In large-scale apartment buildings and commercial facilities, it is possible to collect garbage with a disposer. In this case, the transaction would be between the building manager and the power generation company, and the tenant would receive a discount on rent and a management fee. Since it is a transaction between business operators, there is no need to handle personal information, and it is not subject to this problem.

In the case of individual houses, small-scale apartment houses, and commercial facilities, some kind of garbage collection technology is required. However, measures against bad odors and water removal are not the problems of information technology. Here, it is assumed that a garbage collection box will be developed that can guarantee a certain quality as a raw material for biogas. Some local governments subsidize the purchase of compost to reduce household waste emissions. The garbage collection box is also assumed to be purchased by the local government and lent to individuals. However, a deposit will be necessary, and if it is no longer needed due to moving, for example, the deposit will be returned if there are no problems after inspection. In addition, when the box expires, it will be replaced free of charge. To operate such a system, the fifth subsystem to manage boxes is assumed to be introduced.

The above five subsystems have been listed, but among these, the first and second systems are plant control systems, not social information systems that affect individuals. It is not a problem for citizens to express pros and cons, and the solution is mainly the application of mathematical modeling. Therefore, it will not be the subject of this instructional material.

However, from the third to fifth systems affect the households that provide garbage, so citizens must consider the pros and cons and the choice of an operating company. The system to be constructed requires not only reliability but also confidentiality such as personal information and collection records. For example, it is necessary to consider that the collection information on food waste can be an index of the home status depending on the analysis.

Generating Alternative Process

When considering the system by analogy with an existing system, the third system, the collection service, may be based on a courier pick-up service. Just as couriers have in-store pick-up, garbage being collected at dedicated garbage stations is also conceivable. Using this method, unlike couriers, only the contents of the box are collected. Therefore, when collecting at the station, it is not necessary to have each household bring full boxes, and it is collected if the specified amount is accumulated throughout the station.

As a basis for a different analogy, there is a normal garbage collection method. It is a method of visiting each household by deciding on a regular collection date. This method can be less cost effective with frequent collections. However, less frequently, households with full collection boxes will dispose of their food waste as combustible waste. To avoid that, it is still necessary to install garbage collection stations as mentioned above.

The fourth system for managing information on garbage collection and cooperation fees needs to be linked to the third system, but it manages information after collection. An automatic metering and billing system of electricity may be useful as a reference. The electricity power meter automatically measures the amount of electricity used, but before using an automatic meter, it was done manually. After that, the fee was calculated according to the contract contents and debited from the bank account. In recent years, mail-in notices have been charged, and customers access the Web to confirm the usage fee and billing details. In the case of garbage collection, the major difference is that the customer becomes the seller rather than the buyer. Recently, electricity rates have been changed monthly, but if the price of biogas and its electricity sales fluctuates from time to time, it is necessary to change the cooperation fee accordingly. In addition, if the quality of garbage can be evaluated at the time of collection, it is also conceivable to reflect this in the cooperation fee. They will depend on what sensor is attached to the garbage collection box.
In another similar system, there is a point service that gives points according to the purchase price. The purchase price corresponds to the collected amount, and the points correspond to the cooperation fee. The point card is identified by the ID number recorded on the card, and personal information is not handled. The collection box plays that role. As a result, the garbage collection company does not have to handle personal information.

The fifth box management system will be similar to car leasing services. It is unsanitary to reuse garbage containers used by others, so rental cars and car sharing are not appropriate. Other similar examples may include a long-term contract for mobile phones in which the main unit price is included in the monthly usage fee. As mentioned above, the biggest factor that affects the quality of garbage is moisture. If this can be removed and recovered, the efficiency of garbage collection, storage, and gas generation will increase. To realize processing functions and quality inspection functions for that purpose, it will be costed accordingly, and the management of the box will be important for ensuring the reliability of garbage quality information. However, in that case, the box means not only a literal container but also an entire device that stores the container.

Three types of subsystems are examined, but in the actual instructional material, various designs are considered, such as whether to let learners think about all three types or choose one and then treat the other as a transfer problem. In addition, although two types of systems were presented for each, it is possible to set either type of system or two types of systems as proposed systems in policies.

Rational Judgment Process

In the first generating alternatives process, the focus is on understanding the proposed systems. Proposers often do not explain the issue themselves. Therefore, citizens need to critically examine whether there is an issue or not. That is the purpose of this process. In the generating alternatives process, I have shown two similar types of systems, but the actual explanations are not always based on such an analogy. In that case, the learners themselves need to recall an appropriate similar system and use it as a reference for examining the problem. Of course, if they cannot recall such a similar system, they need to search for information, select the appropriate system, and utilize it as external knowledge. To save that cost, regular information classes should teach general-purpose typical systems that can be used for various problems as internal knowledge.

The first consideration in a social information system is the handling of personal information. If a company holds a variety of personal information and if information exchange occurs between multiple companies then the risk of leaked information increases concurrently. This is because if the information to be exchanged is not enough to identify an individual, the risk of incorrect amending and unauthorized access also increases.

For example, if collection at home is not a prerequisite, the collection company only needs to manage the individual ID of the box, and personal information is not required. If fraudulent use is anticipated, it would be better to register the information of the box's ID and the user's ID in the box. In addition, it is necessary to store the usage history required for the fifth system and the history of the quantity and quality of the collected garbage in the box so that the user can check it. The purpose is similar to enabling checking whether the information is correct by comparing the credit card usage history with the receipt. There will need to be a way for the user to trace whether the collection company has delivered it to the gas generation company.

The station system blurs the distinction between household garbage and business waste. Regarding garbage disposal, household garbage is covered by taxes, and business waste is borne by the business establishments, but when collecting it for power generation, there is no need to distinguish between households and business establishments due to taxes. However, if garbage can be disposed of free of charge, quality control is important because there is a risk that other garbage will be mixed with raw garbage, causing a decrease in quality. Accordingly, it may be necessary to distinguish between boxes for households and business establishments.

The principles are the same for the home collection method, but collection companies could collect address and name information, and since they can read the ID information of the box, it is also possible to associate such information. The law restricts anyone from doing anything, which means that nothing violates the law unless it is stipulated by the law. Therefore, if we think that we should not allow the association of such information, we need to enact such a law. However, if we can choose to collect individually or bring a box to the station, there may be no need to limit it by law because self-defense measures are provided. However, some people cannot take self-defense measures, which may cause disparity problems.

In recent years, there have been incidents of stealing automobiles by using special equipment to operate engines. If a device that reads a personal ID is bootlegged, there is also a risk that bank account and credit card information will be stolen from the user's web page. Considering such risks, a management system on the reading device will also be necessary.
From the Second Generating Alternative Process to Derivation Optimal Solution Process

It is necessary to consider various risks and verify whether countermeasures have been devised, and if insufficient, to consider system improvement plans, legislation, and self-defense measures as alternatives. From the second cycle, after conducting such activities, it should be considered in a rational judgment process whether the examined measures are really effective and whether new problems will occur. After careful consideration, the final decision on whether the introduction of information systems should be allowed (or not allowed) should be done from several proposals. At that time, deciding the priority of each proposal is desirable because it is necessary to consider mathematical cost-effectiveness when selecting the final plan. However, it is not necessary to make the final decision in the exploration activities of information study.

Future Perspectives

In this paper, I proposed the design of exploration activities in information study for prompting learners to critically examine the merits and demerits of social information systems by using analogical thinking. It is important to discriminate between appropriate activities for information study with activities required to be performed in mathematics or science. In the future, it will be necessary to put the proposed instructional material into practice for actual high school students and verify the effects and issues.

References


5 Minutes On K-12 Online Learning With…

A Thematic Analysis of Advice from Experts

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Abstract: In Spring 2020, a series of interviews with a variety of stakeholders in K-12 online learning were posted to the Virtual School Meanderings blog. The series provided advice to teachers on how to provide continuity of learning or to parents on how to structure learning at home during emergency remote learning. Portions of these interviews were analyzed to generate five themes related to guidance these experts would provide to classroom teachers during this emergency period.

Introduction

While some have differentiated what is currently happening from online education by using the term “remote instruction” (Barbour et al., 2020; Hodges et al., 2020), the truth is most people – particularly in the general public – did not see a difference. Regardless of terminology, many teachers found themselves unprepared for the challenges of using online content and tools to provide their students effective and meaningful learning experiences.

An unfortunate reality is this challenge has been foreseen by the field for quite some time. Fifteen years ago Smith et al. (2005) found that only 15% of K-12 teachers have been trained to teach online. More recently, Kennedy and Archambault (2012) found that only 1.3% of the 522 universities surveyed indicated they had some form of field experience related to K-12 online
teaching. Four years later, Archambault et al. (2016) replicated that study with a larger sample of 1,017 unique institutions, where responses were received from 363 programs; but only 11% or 40 of those universities indicated they had any focus on K-12 online teaching. Given the events of the past three school years, these are significant shortcomings in teacher preparation.

In addition to the lack of focus on K-12 online learning in teacher preparation in general, the reality of how few faculty members – both full-time and contingent – exist who have a background in the field. For example, Arnesen et al. (2019) were able to identify 356 journals articles published between 1994 and 2016 written by 384 distinct authors, while Hu et al. (2019) reported there were 123 different authors of the 51 articles published in the first four years of the *Journal of Online Learning Research*. Similarly, there were only 87 distinct authors in both editions of the *Handbook of Research on K-12 Online and Blended Learning* (Ferdig & Kennedy, 2014; Kennedy & Ferdig, 2018). Even if there were no overlap in the authors from these three sources, it would only represent enough faculty to place one at each institution for less than 60% of the teacher education programs identified by Archambault et al. (2016). It is because of this reality that there is a need for resources that feature those who have expertise in the field.

Beyond the scarcity of teacher educators with expertise in the field, there is also a general lack of resources available for those who would be interested in incorporating this content into their own teacher education program. During the mid-2000s Iowa State University (ISU) secured state and federal funding to create “Good Practice to Inform Iowa Learning Online” online teaching cases and “Teacher Education Goes Into Virtual Schooling” online facilitation scenarios (Davis, Demiraslan, et al., 2007; Davis, Niederhauser, et al., 2005). Personally, as a faculty member at Wayne State University I created Michigan-focused online teaching case studies and
online facilitation scenarios (Barbour & Unger, 2014). However, one wonders whether faculty are aware those resources are available. These are just some of the reasons why ad hoc resources that teacher education faculty can incorporate into their own teacher preparation courses, such as the “5 Minutes on K-12 Online Learning With…” videos, are so important for those who have expertise in the K-12 distance, online, and blended learning to create and share openly.

In mid-March 2020 we began reflecting on the media interviews we had completed related to the K-12 education system, emergency remote instruction, and the pandemic. Those reflections led to the conclusion that there were a lot of individuals in the field of K-12 distance, online, and blended learning who had advice based on their years of experience about how to teach and support learning at a distance. Given the reality of the abrupt transition to emergency remote teaching, there was an assumption that most teachers would welcome this kind of advice.

The lead researcher began the blog [blinded] in March 2005. The purpose of the blog has always been a space to play with ideas and post items related to K-12 distance, online, and blended learning. As such, the blog itself had a consistent and steady following, with entries posted to the blog being viewed somewhere between ~2,000 to ~12,000 times a month or ~20 to ~400 times per day. One of the features of the blog was the ability to host audio and video segments, which made it a natural location to post a series of short video interviews with experts in the field providing teachers with guidance on how to navigate this sudden transition.

**Methods**

Over a six-week period the lead researcher interviewed 27 individuals in the field of K-12 distance, online, and blended learning. The interviewees included veteran classroom and online teachers, independent evaluators, online school leaders, change agents, government officials, university faculty, and/or researchers – with most interviewees being described in multiple ways.
The interviews ranged from 6-18 minutes, were each individual was asked three questions with no follow-ups.

1. Tell me about yourself.
2. There are teachers all around the world who now finding themselves having to use online tools and curriculum for the first time. Do you have any advice for them?
3. We also have parents whose children are learning at home for the first time. Do you have any guidance for them on how to support their child’s learning?

The interviews were posted in an unedited fashion.

The transcripts from these interviews were analyzed using an inductive approach involving scanning the data for categories and relationships within individual transcripts and between transcripts (LeCompte & Preissle, 1993). More specifically, the four stage process using a table format and the search and replace features of MS Word outlined by Ruona (2005) by utilized. Stage one focused on preparing the data by transcribing each interview and then formatted into a separate six column table. Stage two called for a familiarization of the data by listening to the interviews and reading the transcripts, while stage three was to code the data. Finally, stage four was focused on generating meaning by merging all of the coded files into a single document, then organize the coded into potential categories for the purpose of generating themes.

Results

Those who were interviewed fell into three categories: (1) professors or researchers at the university/college level; (2) teachers or former teachers in a K-12 educational setting; and (3) administrators or former administrators in a K-12, university, and/or online educational setting (e.g., school, non-profit). The interviewees hailed from numerous countries, but were primarily
from United States of America, Canada, United Kingdom, and New Zealand. Based on their responses to the second question, five general themes were identified.

The first theme identified by interviewee responses centered around synchronous learning; many respondents indicated that synchronous learning was important for maintaining student engagement and wellbeing. The responses indicated that the lack of traditional face-to-face learning, which most educational stakeholders had never been without before, needed to be addressed. The use of phrases such as “developing rapport” and “building community” emphasized the need of synchronous learning to both address an academic, as well as social emotional, function.

The second theme identified by many interviewees was strongly associated with the need for synchronous learning; respondents noted that making connections with students and parents was especially important in the distance learning process. It was acknowledged that parental and student buy in was key to a successful, remote academic environment. Personal connections, often achieved in an intimate in-person classroom setting, now needed to occur from afar. These responses indicate that successful remote learning goes beyond mastery of academic concepts and following a specific curriculum; parental and student support of the overall educational environment is paramount. Phrases such as “giving them a voice” and “create any kind of semblance of normalcy” acknowledges that educators alone cannot create a sustainable educational environment – it takes parents, and students, directly involved in the educational process itself.

The third theme was the acknowledgment by many interviewees that technology, and its proper use, was critical to a successful distance learning environment during the pandemic; respondents noted that experimenting with new technology, seeking out online educational
resources, and “keeping things simple” regarding technology was important. The responses regarding technology indicate that technology need not be complex to be effective; online resources need not be from a specific source, nor provided by a specific entity, to have educational value. Phrases such as “broad landscape of tools” and “keep it simple” acknowledges that a variety of educational tools, and the simplicity of those tools, are important parts of creating an approachable educational environment that can be accessed by a variety of participants. Technology is not a direct substitute for good instruction. The employment of the phrase “using technology as a toy instead of a tool” indicates that technology shouldn’t be utilized just for the sake of utilizing technology; instead, technology should be a modern resource used by educators to further learning in the remote classroom.

The fourth theme identified by interviewees was making learning as individualized as possible; respondents noted that making learning individualized and meaningful was important during the educational process. Most respondents did not feel that distance learning could be implemented in a “one size fits all” model. The employment of the phrases “tailoring the learning experience for them” or “we want them to develop their own interests” indicates that learning, even from afar, needs to keep in mind the individualistic learning needs of students; it was emphasized that remote learning need not dilute the unique needs and desires that students harbor.

The fifth theme identified was that remote learning is not the same as emergency learning; respondents noted that there was a difference between emergency teaching (i.e. lack of training, lack of technology/resources) and well established remote teaching with a tailored pedagogy and curriculum. Given that most educators had little to no experience teaching remotely, it was emphasized by respondents that not all distance education is truly effective
education. Many respondents felt the need to note that not all instruction, especially during the early days of the pandemic, were reliable indicators of successful distance learning. The employment of the phrases “emergency teaching” or “we’re aiming for good enough” demonstrates that respondents felt exceptional distance learning goes beyond just “teaching online” per say; ongoing professional development, active course design, engaging technology, are all important aspects of a successful distance learning program.

Conclusions and Implications

Barbour et al. (2020) proposed the following model to better understand the K-12 education response to the pandemic.

*Figure 1.*

**Multiple Phases of Education Response to COVID-19**

**Phase 1:** Rapid Transition to Remote Teaching & Learning

North America and many other regions transition to fully remote teaching and learning in just 3 - 4 weeks, with huge reliance on synchronous video (e.g. Zoom, MS Teams, Google Meet).

**Phase 2:** (Re) Adding Basics

Institutions must (re) add basics into emergency course transitions: course navigation, equitable access including lack of reliable computer and broadband, support for students with disabilities, academic integrity.

**Phase 3:** Extended Transition During Continued Turmoil

Institutions must be prepared to fully support students for a full term, and be prepared for online delivery - even if starting as face-to-face.

**Phase 4:** Emerging New Normal

Unknown levels of online learning adoption in new normal, but likely higher than pre-2020.

Institutions must have new levels of eLearning infrastructure - technology and support - to reliably support students.

Phase 1: Rapid Transition to Remote Teaching and Learning – Institutions making an all hands on deck movement to remote delivery, often relying on synchronous video, with massive changes in just four weeks.
Phase 2: (Re)adding the Basics – Institutions must (re) add basics into emergency course transitions: course navigation, equitable access including reliable computer and broadband, support for students with disabilities, and academic integrity.

Phase 3: Extended Transition During Continued Turmoil – Institutions must be prepared to support students for a full term, and be prepared for online delivery – even if starting as face-to-face.

Phase 4: Emerging New Normal – This phase would see unknown levels of online learning adoption, likely higher than pre-COVID-19 days, but institutions would have new levels of technology and support to reliably support students. (p. 3)

The first series of “5 Minutes On K-12 Online Learning With…” blog entries were focused on providing advice for teachers and parents as they began Phase 1 and, to a lesser extent, transitioned into Phase 2.

However, as the 2019-20 school year drew to a close, many educational leaders began to consider the next school year. Phase 3 is described by many as a ‘toggle term’ or ‘toggle year,’ where a school is able to switch from in person learning to remote learning as “states of lockdown and openness, depending on their sense of epidemiological data and practical feasibility” persist (Alexander, 2020, para. 32). Inherent in this phase is the need to ensure the appropriate planning and preparation is in place that the quality of the learning experience is the same regardless of which modality the teacher is forced to use. While the five themes generated from this first series of “5 Minutes On K-12 Online Learning With…” could serve as useful for teachers heading into future school years, it would also be a logical transition to focus a new round of interviews on the two things that educational leaders needed to be deal with: (1) how to finish out the current school year and what impact that may have on how they open the coming school year, and (2) what to do to ensure that when the system has to shut down again due to local flare ups or a second wave, the toggle from in person learning to remote learning would be done in a more seamless way.
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Applying Transformational Anti-Oppressive Organizational Practices in Higher Education

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Abstract: Applying qualitative, narrative illustrations this workshop presents an approach rooted in feminist leadership principles and anti-oppressive pedagogy. The focus is on the development of skills to facilitate critical conversations and create meaningful self-introspection with the intention of fostering learning environments that support the interrogation of social issues that affect work in the field. Case examples will be shared to demonstrate how to apply in different educational settings.

Keywords: critical conversations, liberatory practice, introspection

Social work educators are experiencing a watershed moment in our society that has put a spotlight on social issues affecting our society, health inequities, as well as race and identity politics. We need to construct our classroom environments to support brave conversations where varying views on political dynamics, racialized events, power, oppression, and privilege can be interrogated allowing for an iterative process of co-creating meaning and understanding. The social work profession is built on evidence informed theories that have given social workers foundations to understand individual development while at the same time have perpetuated oppressive, discriminatory ideologies and practices. Social Work educators engaged in teaching and preparing social workers to enter the workforce must rise to the challenge of engaging all students in mastering Council of Social Work Education (CSWE) required competencies related to anti-oppressive practice while facilitating critical conversations that arise in classrooms.

A New Phase of Awakening and Reckoning

Social justice, a crucial aspect of social work code of ethics (NASW, 2022) is a fundamental component of the Council on Social Work Education Policy and Accreditation Standards (EPAS)
Significant shifts and additions have been proposed for the 2022 (EPAS), including the infusion of Anti-Racism, Diversity, Equity, and Inclusion (ADEI) (CSWE, 2021, p.5) requiring educators to apply anti-oppressive practice lens as they advance social work graduates into the workforce (Bussey et al., 2021; Stevenson, Alexander, Thomas, Richardson, Turnage, Clarke, & Wood, 2022). These changes reflect a movement in academia in which educators strive to interrogate curriculum and programming, and explore the deeply rooted, intertwined areas of social work education entrenched in white supremacy. Central to this movement is educating students about white privilege while simultaneously engaging them in their knowledge development requiring educators to engage in critical conversations, posing the most difficult issues to engage in for educators (Boatright-Horowitz, et. al., 2012). COVID and racial unrest sparked an awakening, requiring Social Work educators to revise their curriculum to reflect cultural awareness and infuse anti-oppressive practices to content delivery. An integrated, collaborative comprehensive approach, involving micro, mezzo and macro practices with, students, faculty, administrators, and staff, is integral to achieve an anti-oppressive organizational shift. Embarking on this organizational shift requires commitment to a long sometimes challenging iterative process.

So, how to proceed? “We view cultural consciousness as an ongoing and dynamic developmental process with no endpoint—one that requires active, critical, and purposeful engagement on the part of the social worker entering the helping relationship.” (Azzopardi et al., 2016, p. 287). Rooted in feminist leadership principles and newfound urgency, one social work department’s approach shows promising signs of meaningful transformations for faculty, staff, and students. A major assumption of the approach is to value richness of intersectionality and the profound role of power and oppression in the fields we work in. Reflective micro level practices involve;
1) interrogating one’s own intersectional self by identifying, understanding, and moving beyond implicit biases. Mezzo level practices that promote an anti-oppressive organization shift include 2) engaging in pedagogical activities that build one’s capacity to facilitate classroom discussions which interrogate social issues that affect our client systems through critical conversations, and 3) providing community building spaces to promote inclusivity and belonging. Macro level practice begins with understanding one’s organizational commitment and programmatic evaluation of policies and practices with an anti-oppressive lens.

**Conclusion**

Educational programs across the country are coming face to face with the complexities of revising their curriculum to reflect cultural awareness and infuse anti-oppressive practices to content delivery. Educators must integrate their practices to improve the experience of the diverse student bodies. The purpose of this proposed workshop is to disseminate insight and wisdom gained from one department’s journey to embrace this moment in hope and solidarity. This presentation will review critical theoretical perspectives and applied practice of one approach a department of higher education took to create true change in faculty staff, and students’ experiences. The workshop accompanying this paper described each of the key components of the approach, including, attention to intersectionality, implicit bias, thoughtful and strategic facilitation of critical conversations and assessment of departmental policies and practices with a larger context. Activities for audience members include processing and think critically about how to apply some concepts to their own educational settings.
References


Driving the ATLAS Value Path: Building Capacity through Organizational Knowledge Capture and Transfer

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Title: Driving the ATLAS Value Path: Building a Team Learning Library through Organizational Knowledge Capture and Transfer

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Driving the ATLAS Value Path: Building Capacity through Organizational Knowledge Capture and Transfer

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Abstract: The ATLAS Value Path is a framework designed to direct and manage workplace learning through organizational knowledge capture and transfer. The practice is used to guide teams through the process of creating profiles, identifying and assessing skill gaps, developing cross-functional peer training, and creating a repository of training tools and resources.

The ATLAS Learning System

The ATLAS Learning System provides leaders and learners with a collection of maps and tools to successfully navigate their way around their world of learning, build capacity among their teams, and achieve their various individual and team learning goals.

The ATLAS Assessment Instrument is the basis upon which the ATLAS Value Path has emerged. “Assessing The Learning Strategies of Adults (ATLAS©)” is a self-scoring, valid, and reliable instrument that 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, academia, medicine, armed forces, and leadership. (Conti, Kolody, 1998). The ATLAS Learning system is used to promote individual learning as well as to enhance team dynamics and synergy through shared understanding of others’ learning and relationship preferences.

ATLAS Learning Preference Groups. ATLAS learners are categorized into three major preference groups, each with a set of commonalities and general characteristics. The ATLAS toolkit provides instruction on how to learn to use specific strategies that are not naturally in one’s set of
preferences. The more sophisticated and diverse our learning strategy toolkits become, the more proficient we become in learning to identify and apply the appropriate “tools” or learning strategies to improve skills and competencies. (Conti, Kolody, 1999).

**ATLAS Learning Preference Groups**

**GROUP 1: Navigators** – Prefer structure, planning, organization, routine, consistency, clarity; detail-focused; results-oriented

**GROUP 2: Problem Solvers** – Prefer environment of experimentation & possibilities thinking; self-efficacy (ability to figure it out as they go along)

**GROUP 3: Engagers** – Value interpersonal connection; Prefer calm environment where they can make a difference & make meaningful connections; high EQ; self-aware

**ATLAS Learning Preference Groups**

The **ATLAS Value Path** guides the process of designing effective learning experiences to leverage knowledge capture and transfer in the workplace. This peer-to-peer training process is based on established cognitive principles; evolving neuropsychology; and powerful, evidence-based learning strategies to direct and manage workplace learning. Facilitated sessions are delivered to intact teams with the purpose of learning how to “Drive the ATLAS Value Path” to effectively create a highly-skilled workforce by building bench strength through organizational knowledge capture and transfer.

The framework is used to guide a team through the process of creating team and task profiles, identifying and assessing skill gaps, developing cross-functional peer training, and creating a team learning library of peer training tools and resources. The foundation of the ATLAS Value Path is a
zoned analysis based on a thorough role assessment to determine the scope and granularity of content. These analyses then systemically inform the remaining segments of the framework in the selection of peer training delivery modes, learning activities, and evaluation metrics.

**Organizational Knowledge**

In the constructivist view, adult learners in the workplace construct knowledge based upon their own knowledge and experience, including confidence in their past experience solving problems (English, 2008). Further, knowledge is unique to the mind that knows it, and a high level of responsibility for learning is placed upon the learner. Facilitators (not instructors) engage active learners who question, exchange, and challenge to construct knowledge and embed it within what they already know – informing a unique learner worldview. Davenport and Prusak (1998) have provided the following cursory definition of organizational knowledge:

Knowledge is a flux mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms. (p. 5)

**Knowledge Structures.** Ley (2020) treats knowledge structures as a subset of artefacts, including specialized tasks, business forms, processes, or other objects that mediate learning amongst employees. In this way, “knowledge structures [are] to be created and matured in workplace practices, and provide strong guidance for working and learning” (p. 332). There are mature and widely accepted knowledge structures, as well as emergent or new knowledge structures that connect distributed learners. A purchase order, safety procedure or quality system all bring the specialized knowledge of individuals into an organized relation with one another.

These structures serve as mechanisms from which distributed learning clusters around the artefact and facilitates the socio-cultural dimension of knowledge transfer or capture. When diverse individuals apply themselves to a mutual challenge that is mediated by a knowledge structure, creative abrasion
may occur and new ideas become emergent (Leonard & Sensiper, 1998). As noted above however, mutual trust and employer expectation communicated via accountability structures, performance management systems, job descriptions, and compensation plans all shape perceptions of employer expectation related to the sharing of knowledge in the workplace.

**Workplace Learning**

Workplace learning not only enhances individual competencies, but also unites individuals in ways that enhance self-awareness, social connection, and shared values. Value to the organization includes less re-learning, fewer mistakes and broad capacity-building. The capture of constructed knowledge in this way builds-up the capacity and resilience of the organization. (Leonard, Swap and Barton, 2015). The overarching goal of workplace learning is to enhance, transform, and grow individual capacity; however, this desired transformation occurs only when learning is sustained and changes are integrated into one’s day-to-day practice (McNeil, 2012).

**Organizational Learning Cultures.** Organizations are cultures (Bates, 1982). They are not the buildings, logos, products, services, organizational charts or legal charters which constitute the contemporary organization. The daily negotiation of what culture is within a specific organization provides the rationality, legitimation, and motivation to achieve the knowledge transfer and capture required for learning. Schein (1999) defines culture as a “pattern of shared tacit assumptions that was learned by a group… considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems” (p. 27). Schein (2010) notes learning culture acts on beliefs and values, including active problem solving and a commitment to the learning process, faith in people, and trust that the external environment can be managed. There is an acknowledgement of human potential that trainers and leaders hold for their students and learning communities (Corrigan, 2013). Characteristics of leadership required to develop learning culture include perception and insight, motivation, emotional strength, awareness of and ability to change cultural assumptions. Schein (1999;
2010) refers to psychological safety as a fundamentally important characteristic of organizational culture if learning (and knowledge transfer) is to take place.

**Driving the ATLAS Value Path Model**

This 4-step framework described below is a practical, fit-for-purpose model provided to practitioners and workshop facilitators to guide teams through the process of building capacity on a team through knowledge capture and transfer of organizational knowledge through peer-to-peer training. This process requires an upfront investment of time in bringing intact teams together in order to achieve a richer gap analysis and identification of training needs.

![Driving the ATLAS Value Path Diagram](image)

The ATLAS Value Path is a valuable framework for leaders as it increases understanding of individual learning preferences and provides strategies to leverage strengths, develop competence, and work together as a team to create value and deliver on expectations. Continuous improvement in the
workplace is all about learning. It’s how employees grow, develop, and build competencies. The workplace is an environment in which we’re continually learning. We learn about new technologies, new policies, and new processes. We learn about others and we learn about ourselves. And often, the learning curve is steep and the rate of change is rapid. This 4-step process culminates into a Team Repository of Peer Training documents.

**Knowledge Capture:** When building our Team Repository, we ask ourselves two basic questions to capture both tacit and declarative knowledge:

1. Where does the tacit knowledge exist that we need to capture so that knowledge or wisdom isn’t lost when that person leaves or moves to a new role?
2. What are the tasks that we perform on our team that should be documented so that we can standardize and replicate them consistently?

**Knowledge Transfer:** When we go about transferring knowledge, teaching a team member a process, or onboarding a new team member, how can we be sure that employees are all receiving the same aligned message regardless of who is “teaching” the process? Documenting the tasks into a Team Learning Library using the ATLAS Value Path ROAD Peer Training template ensures that everyone receives the same consistent message.

**Creating a Peer Training Repository**

The ATLAS peer training process can help you and your team to both save time and increase quality of results when peer training new and existing team members. By following the ATLAS Value Path, you and your team can incrementally develop your peer training “bank” over time, making it easier for members of your team to step in and support each other’s growth over time. The process begins with a group analysis of the duties and tasks required within a role which are then developed using the ROAD Peer Training templates and stored within the Team Learning Library.
Creating a Peer Training Repository

Prioritize your list by asking the following questions:

- Which skills/knowledge/quality/consistency gaps cause the most stress for people on our team?
- Which skills/knowledge/quality/consistency gaps have the greatest potential to increase productivity, profits, safety and/or ability to deliver on our individual and team goals if addressed/eliminated?
- Which training templates are we most excited to improve/create?

For any Road Atlas or map to be functional, one must be able to do 3 things: 1) identify your current location -- “You are here”; 2) locate the desired destination; and 3) identify the desired route to get to the destination. We use this same strategy with our ROAD Peer Training Template. We: 1) first identify our current state, level of knowledge, or learning gap regarding the subject; 2) identify our training goal or competency; and 3) develop the ROAD Template to plan the desired route to the learning goal.

The ROAD Peer Training template incorporates ATLAS Learning Strategy Preferences, established cognitive principles; evolving neuropsychology; and powerful, evidence-based learning strategies to direct and reinforce workplace learning acquisition and retention. The ROAD 4-Step Peer
Training Process described below guides us through activities we can incorporate in our training to stimulate the learner’s self-talk, optimize each step of the training process, and make the learning experience memorable, effective, sustainable, and fun! Use this template each time you want to transfer knowledge to your team, and you will gradually create a repository of lessons your whole team can use to save time, improve results, and ensure consistent messaging and alignment of processes long-term. In other words, everyone receives the same training, no matter who delivers the content.

### ATLAS ROAD to Learning Training Template

<table>
<thead>
<tr>
<th>R</th>
<th>Rationale: Identify “WHY” this lesson is important. How will you make this lesson meaningful to the learner? What difference will this lesson make to the learner? What will the learner be able to do/be/ or have with the knowledge or skill obtained in this lesson? (Opens the brains receptors to Engage in learning.)</th>
<th>LEARNER REACTION *</th>
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<tr>
<td></td>
<td>“This is Important.”</td>
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| O | Organize: HOW will you transfer this concept or skill to the learner in a sequenced way that makes sense to the learner? Consider demonstrating vs. just “telling.” (Supports learners to Navigate the learning process and retrieve learning when needed.) | “This is in a logical order. I know where to “file” it for future recall.” |

| A | Activate: How will you involve the learner in the lesson? What activity can you include to make the lesson FUN or NOVEL and, therefore, memorable? (Gets learners excited to experiment and Problem Solve how to use what they’re learning.) | “This is Interesting / Fun” |

| D | Do/Demonstrate: How will you help the learner build confidence and competence? Repetition is key to learning retention. Create activities and accountability for the learner to practice using the content. (Requires learners to Engage with, Navigate and Problem Solve as they apply their learning in real situations.) | “I Can Do This.” |

| Reflection: (What went well? Any surprises? Changes for next time?) | |

* The Learner Reaction column identifies the “self-talk” and neuropathway development each element of the ROAD Training Template sparks.
Completing the ATLAS ROAD to Learning Training Template

STEP 1: Rationale

During this step we provide the “why” or the reason for learning. We describe the purpose of the lesson in a way that conveys “This is important” to the learner. We can do this by explaining what the learner will be able to do with the learning and what could happen if they don’t learn and/or apply these skills. When we know the purpose for learning something and why it is important for us, others and/or the organization, research shows that this causes us to focus and pay attention in preparation for learning. In short, when we know why learning something matters, we naturally “lean in to learn.” This act of focusing is the first step to ensuring learning occurs.

STEP 2: Organize Content

When we present content in a sequenced way, the learner is able to more easily follow the flow and “file” it away for long-term retention and recall. When designing your peer training session, be sure to consider the knowledge or skill level of the learner, and start from there to ensure they have the prerequisite knowledge for the learning to make sense. Help the learner file or recall the new information by identifying how to store the content. E.g. “When I complete this task, I need to remember to include these 5 elements.”

STEP 3: Activate

We know that content is more readily retained when the learner considers the experience fun or interesting. This requires that we avoid passive listening and instead create activities that provide learners with the opportunity to engage with the skills, practice what they’ve learned, and experiment with adapting it to their style and situation. It is important to present content in new or novel ways as this causes the learner to feel that “This is interesting.” So don’t just lecture or give information to read. Present the content in a novel way by including music, interesting visuals such as cartoons, unusual pictures, storytelling, games and fun quizzes, or interactive demonstrations.
STEP 4: Do or Demonstrate

Feelings of pride and satisfaction that come from the learner seeing the results of their efforts help to reinforce learning and creates a tendency to more readily return to the topic or task. This creates a reward in the form of the feeling of “I can do this” that helps to calm the mind and build learner confidence and enjoyment regarding the content.

The more we practice intentionally including these aspects in our practice of peer training, the more effective the transfer of knowledge. This ultimately saves time and money, improves results, and adds value for both individual contributors and the organization.

As you consistently design your peer training using all 4 steps in the ROAD Peer Training Process and use the template on the following page to create your Team Learning Library, you will increase the impact, results, sustainability, and return on investment of time spent developing and delivering peer training on your team.

Conclusion

In today’s fast-paced world of constant change, developing the capacity within ourselves and our teams for quick learning and sustained retention helps to survive disruption, drive innovation, and foster a culture of continuous improvement. Modelling a growth mindset and a commitment to lead learning positively impacts team results, performance, and productivity.

References


An Empirical Analysis of the Effects of Instructional Leadership on Teacher Professional Learning and Classroom Goal Structures

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Abstract

In this study, we examined whether instructional leadership was a direct predictor of classroom goal structure (i.e., mastery and performance goal structure). We also asked whether this relationship was mediated by teacher professional learning. Findings indicated that instructional leadership was a strong positive predictor of mastery but not performance goal structure and that this relationship was mediated by teachers’ professional learning. These findings illuminate new pathways through which instructional leadership benefits teacher practice. Relevant theoretical and practical implications are discussed.

Keywords: instructional leadership, professional learning, classroom goal structure, structural equation modeling
An Empirical Analysis of the Effects of Instructional Leadership on Teacher Professional Learning and Classroom Goal Structures

Background & Objective

Given the crucial roles of teachers in educating students, it is important to understand the potential antecedents of the classroom climates teachers sustain during instruction. By adopting the concepts of classroom goal structure (i.e., mastery and performance goal structure) to theorize classroom climates, we explored how principals’ instructional leadership and teachers’ professional learning are related to teachers’ emphasis on two distinct types of goal structure. Specifically, we designed this study to examine the following research questions (RQs):

RQ1: Is principal’s instructional leadership directly associated with classroom goal structures?

RQ2: Is teacher professional learning directly related to classroom goal structures?

RQ3: Is principal’s instructional leadership associated with teachers’ professional learning?

RQ4: Does teacher professional learning mediate the relationship between principal’s instructional leadership and teachers’ classroom goal structures?

Method

Sample

We employed survey reports that the research team administered to 1,001 teachers from 25 schools in a suburban district located in a Midwestern state in the United States. The average total years of teaching experience was 15.7 (SD = .33). Among teachers, 68.7% of them were female, 68.2% of teachers reported to have a graduate degree (i.e., master’s or above), and 2.3%
of them reported that they are ethnically minority. While 45.8% teachers worked in elementary schools, 25.2% and 29.0% of teachers reported to work middle and high schools, respectively.

**Measures**

We adopted well-validated scales to construct our focal variables. To be specific, *principal’s instructional leadership* was constructed with 14 items developed by Goddard and colleagues (2015, 2019). This scale consists of six sub-dimensions (i.e., principals’ leadership; knowledge of curriculum, instruction, and assessment; involvement in curriculum, instruction, and assessment; flexibility; visibility; culture), which demonstrates high reliability ($\alpha = .86$). For *teacher professional learning*, we adopted a scale developed by Li and colleagues (2016). It includes five items and demonstrates high reliability ($\alpha = .90$). Our main dependent variables, *classroom goal structures*, were constructed by a widely referred scale called, Patterns of Adaptive Learning Scales (PALS) (Midgley et al., 2000). In PALS, classroom goal structures were operationalized with two distinct goal structure types which are mastery and performance goal structure. Mastery and performance goal structures were measured with four items ($\alpha = .88$) and five items ($\alpha = .79$), respectively.

**Research Design**

We first conducted confirmatory factor analyses (CFAs) for our main measures. We then estimated structural equation models (SEMs) to examine the relations among principal’s instructional leadership, teacher professional learning, and classroom goal structures. Finally, we conducted a procedure with 1,000 bootstrapping samples to examine the significance of the mediating role of teachers’ professional learning.
Results

We first conducted the correlational and demographic statistics of our focal variables including principal’s instructional leadership, teacher professional learning, mastery and performance goal structure (Table 1). Before running the main structural equation model, we ran the full measurement model because our focal variables were all latent constructs. We included instructional leadership, teacher professional learning, and mastery and performance goal structure as latent constructs in our full measurement model. We confirmed the acceptable model-fit indices ($\chi^2 = 2206.99$, $df = 299$, $p < .001$; CFI = .929, RMSEA = .018, SRMR = .046) as well as all significant and substantial standardized factor loadings (above .63) for each latent construct from the measurement model. After confirming the plausible validity of the measurement model, we built the final SEM model. We included covariates from teacher level (i.e., gender, race, graduate degree, teaching years) and school level (i.e., academic level, title I status) in our final SEM model. The final SEM model demonstrated acceptable model-fit indices ($\chi^2 = 1005.29$, $df = 290$, $p < .001$; CFI = .938, RMSEA = .055, SRMR = .046). The main standardized path coefficients are presented in Figure 1.

The final SEM results indicate that instructional leadership and teacher professional learning were directly associated with teachers’ adoption of mastery goal structure ($\beta = .21$, $p < .001$), but not performance goal structure ($\beta = .09$, $p = .059$). Principal’s instructional leadership was positively and significantly associated with teacher professional learning ($\beta = .49$, $p < .001$). Teacher professional learning was significantly related to teachers’ adoption of mastery goal structure ($\beta = .22$, $p < .001$), but not performance goal structure ($\beta = -.01$, $p = .774$).

To test the significance of potential mediating roles of professional learning between instructional leadership and classroom goal structures that teachers build and sustain during the
instruction, we conducted the 1,000 bootstrapping procedures while running the final SEM model (Table 2). The bootstrapping result indicates that teacher professional learning significantly mediated between instructional leadership and mastery goal structure (standardized indirect effect: .11, $p < .001$, CI [.05, .17]), but not performance goal structure (standardized indirect effect: -.01, $p = .776$, CI [-.06, .04])

**Discussion**

Our findings provide relevant theoretical and practical implications. Theoretically, our findings re-confirm the direct impact of principal’s instructional leadership on teachers’ professional learning in schools (e.g., Liu & Hallinger, 2018; Vanblaere & Devos, 2016). Also, our results imply the positive influence of principal’s instructional leadership and teachers’ professional learning on teachers’ emphasis of students’ genuine learning and growth rather than their normative performance. This finding adds to the current line of research on goal structures which mainly focused on its impacts rather than investigating potential school organizational factors that can take roles as antecedents of classroom goal structures. Lastly, our results demonstrate that teacher professional learning is a key mechanism through which principals’ instructional leadership influences the learning climates teachers establish in their classrooms.

Practically, the findings of this study emphasize the importance of continuing efforts for developing school principal’s instructional leadership capability in order to promote teachers’ learning and in turn their adoption of a growth-oriented classroom climate. Thus, professional development opportunities should be actively presented for principals to continuously improve their expertise as instructional leaders at schools. In this sense, curriculums in principal preparation programs should be designed to improve principal candidates’ instructional expertise and how it can be adopted in actual schools.
References


### Table 1

**Correlations and demographic statistics of focal variables**

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<td>1. Principal’s instructional leadership</td>
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<tr>
<td>2. Teacher professional learning</td>
<td>.45***</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Mastery goal structure</td>
<td>.24***</td>
<td>.18***</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>4. Performance goal structure</td>
<td>.06</td>
<td>.04</td>
<td>-.03</td>
<td>-</td>
</tr>
<tr>
<td>Mean</td>
<td>4.65</td>
<td>5.00</td>
<td>5.09</td>
<td>2.75</td>
</tr>
<tr>
<td>SD</td>
<td>1.13</td>
<td>.90</td>
<td>.80</td>
<td>1.11</td>
</tr>
<tr>
<td>Minimum</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Maximum</td>
<td>6.00</td>
<td>6.00</td>
<td>6.00</td>
<td>6.00</td>
</tr>
</tbody>
</table>

*Note.*** p < .001, SD = standard deviation*
Table 2.

*Standardized indirect effect through teacher self-efficacy and 95% confidence interval*

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Mediator</th>
<th>Dependent variable</th>
<th>Indirect Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Standardized estimate</td>
</tr>
<tr>
<td>Principal’s instructional leadership</td>
<td>Teacher professional learning</td>
<td>Mastery goal structure</td>
<td>.11***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Performance goal structure</td>
<td>-.01</td>
</tr>
</tbody>
</table>

*Note.*** p < .001.*
Figure 1

Path diagram from the final structural equation model

Notes. *p < .05, **p < .01, ***p < .001. All path coefficients are standardized estimates. Items of each latent construct and error variance are not presented for clarity. Dashed lines represent non-significant paths.
Examining the Relationship between Academic Optimism and Student Achievement: A Multilevel Approach

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Examining the Relationship between Academic Optimism and Student Achievement: A Multilevel Approach

Abstract

Employing an original sample of 10,464 students nested in 97 diverse, high poverty elementary schools, we found that academic optimism was a positive and significant predictor of differences among schools in mathematics and reading achievement and that our full models explained 82.8% and 90.2% of the variation among schools in these outcomes, respectively. We also found that about half of the variation among schools in academic optimism was not explained by school demographic characteristics.
Examining the Relationship between Academic Optimism and Student Achievement: A Multi-Level Approach

Academic Optimism is a construct developed by Hoy and colleagues (2006) that integrates collective efficacy beliefs, academic emphasis, and faculty trust in students and parents. The construct provides a comprehensive picture of the types of school social features that influence the shared beliefs, behaviors, and resiliency of organizational members in pursuit of learning goals. Initial studies suggest academic optimism is a positive predictor of student achievement even after controlling for student socioeconomic status (e.g., Hoy et al., 2006; Smith & Hoy, 2007). However, past studies have not included student ethnicity in statistical models utilized to test the effect of academic optimism on student achievement, even though research and state achievement data show gaps among students of color and Anglo students that are substantial. In addition, the effects of academic optimism have yet to be studied in schools serving large proportions of Latinx students living in poverty. Finally, we sought to determine whether academic optimism is simply a product of school characteristics outside the control of teachers and leaders (e.g., school poverty, student ethnic composition) or whether it might be explained, at least in part, by other factors, including those teachers and school leaders can influence.

Therefore, the intent of this study was threefold. First, we examined the connections across the theoretical underpinnings of collective efficacy beliefs, academic emphasis, and faculty trust to determine whether there was a common theory that could provide a conceptual foundation for academic optimism as a construct. Second, we designed this study to produce a more rigorous test of the effect of academic optimism on student achievement by including student ethnicity and proportional school-level ethnic composition variables in our models as
controls. Third, we sought to determine the extent to which academic optimism was predicted by school contextual characteristics that teachers and leaders could not directly influence. We employed multilevel regression to test the relationship between academic optimism and student achievement, controlling for student and school demographic background. The relationship between school academic optimism and school context was tested by employing multiple regression analysis.

Before developing our measures and statistical models, we analyzed the distinct but related theoretical frameworks underpinning collective efficacy beliefs, academic emphasis, and social trust. This analysis indicated that each emphasized social norms as a powerful influence on group member behavior. In other words, whether it is the norm to believe in their collective capability, to value academic success, or to be trusting, such shared expectations influence the choices school members make. Therefore, we adopted normative press as a key sociological feature explaining how academic optimism may impact school member decisions and therefore school outcomes including student achievement. Next, we explain the method we employed to test the following formal hypotheses:

H₁: The greater the degree of academic optimism characterizing schools, the greater their level of student achievement.

H₂: School demographic characteristics significantly predict differences among schools in the level of academic optimism characterizing schools.
Method

Our sample was comprised of 10,464 students nested in 97 diverse, high poverty elementary schools. To construct our measure of academic optimism, we aggregated teacher data to the school level (i.e., each school level item score was the mean of all the teacher scores in that school for that item). Cronbach’s alpha was strong for collective efficacy beliefs, academic emphasis and teacher trust and exploratory factor analysis yielded good to strong validity support for each measure. Next, we found both a strong Cronbach’s alpha and 2nd order exploratory factor analysis evidence to support the reliability and validity of the academic optimism construct theorized by Hoy et al. (2006).

Results

We began our analysis with our work by constructing factors for our measures of academic emphasis, collective efficacy beliefs and trust. These were then subjected to a 2nd order factor analysis. As shown in Table 1, there was strong factor analytic support for combining these three measures into a single measure of academic optimism with factor loadings ranging from .76 to .96. Next, we examined the teacher, school and student level descriptive statistics reported in Tables, 2, 3, & 4. As shown, the mean academic optimism score was slightly above the scale midpoint indicating that on average across all schools, faculties were slightly optimistic. The vast majority of the teachers were female and about two-thirds were White, with over 80% of the teachers having 10 or fewer years of experience. Over half the students were of color with 40% receiving a subsidized lunch.

Insert Tables 1, 2, 3, & 4 about here

Using the academic optimism measure described above, our multilevel models showed that even after holding constant student and school characteristics including poverty and
ethnicity, academic optimism was a positive and significant predictor of differences among schools in student mathematics and reading achievement. As reported in Tables 6 & 7, a one (1) standard deviation (SD) increase in academic optimism was associated with an increase of .07 SD in mathematics and .11 SD in reading achievement. Moreover, after accounting for the effect of academic optimism on differences among schools in student achievement, neither school rate of student poverty nor the proportion of students of color were significantly related to academic achievement. Our final models explained 82.9% and 90.2% of the total between-school variance in mathematics and reading achievement, respectively.

**Insert Tables 6 & 7 about here**

Next, we tested school characteristics as predictors of variation among schools in academic optimism. As shown in Table 8, we found that about half of the variance in academic optimism was predicted by conditions over which educators had no direct control, particularly school poverty and the proportion of students of color served. The other 50% of the variation in academic optimism was unrelated to school demographic background.

**Discussion**

We found support for our first hypothesis that academic optimism predicts differences among schools in student learning. Indeed, our full model accounted for over 80% of the between school differences in mathematics achievement and over 90% of the between-school differences in reading achievement. Given this, school leaders have ample reason to emphasize positive interpretations of local events and to work in ways that build a trusting and confident school community focused on students’ academic success.

Because we also found that as much as half of the variation in academic optimism among schools was unrelated to school demographics. Thus, it is possible that the level of academic
optimism characterizing schools may result partly from the quality and types of professional practices in which school members routinely engage. To determine whether this is true, future researchers may wish to study whether there are types of teacher and school leader practices that develop academic optimism.

Table 1. Academic optimism factor matrix

*School Academic Optimism Component Matrix*

<table>
<thead>
<tr>
<th>Academic Optimism Facets</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Collective Efficacy (Constructed of 12 Items)</td>
<td>0.955</td>
</tr>
<tr>
<td>Academic Emphasis (Constructed of 5 Items)</td>
<td>0.757</td>
</tr>
<tr>
<td>Faculty Trust in Students and Parents (Constructed of 10 Items)</td>
<td>0.924</td>
</tr>
</tbody>
</table>
Table 2. Teacher demographics.

*Teacher Demographics (n=3,106)*

<table>
<thead>
<tr>
<th>Teacher Item</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>2832</td>
<td>91.2%</td>
</tr>
<tr>
<td>Male</td>
<td>182</td>
<td>5.9%</td>
</tr>
<tr>
<td>Unreported</td>
<td>92</td>
<td>3.0%</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American</td>
<td>28</td>
<td>0.9%</td>
</tr>
<tr>
<td>Asian</td>
<td>66</td>
<td>2.1%</td>
</tr>
<tr>
<td>African American</td>
<td>224</td>
<td>7.2%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>515</td>
<td>16.6%</td>
</tr>
<tr>
<td>White</td>
<td>2027</td>
<td>65.3%</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>9</td>
<td>0.3%</td>
</tr>
<tr>
<td>Other</td>
<td>70</td>
<td>2.3%</td>
</tr>
<tr>
<td>Unreported</td>
<td>167</td>
<td>5.4%</td>
</tr>
<tr>
<td><strong>Years At Current School</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5 Years</td>
<td>1753</td>
<td>56.5%</td>
</tr>
<tr>
<td>6-10 Years</td>
<td>750</td>
<td>23.9%</td>
</tr>
<tr>
<td>11-20 Years</td>
<td>331</td>
<td>10.6%</td>
</tr>
<tr>
<td>21-30 Years</td>
<td>62</td>
<td>2.3%</td>
</tr>
<tr>
<td>31+ Years</td>
<td>10</td>
<td>0.3%</td>
</tr>
<tr>
<td>Unreported</td>
<td>200</td>
<td>6.4%</td>
</tr>
<tr>
<td><strong>Total Years Exp.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5 Years</td>
<td>857</td>
<td>27.7%</td>
</tr>
<tr>
<td>6-10 Years</td>
<td>796</td>
<td>25.5%</td>
</tr>
<tr>
<td>11-20 Years</td>
<td>823</td>
<td>26.5%</td>
</tr>
<tr>
<td>21-30 Years</td>
<td>324</td>
<td>10.4%</td>
</tr>
<tr>
<td>31+ Years</td>
<td>103</td>
<td>3.4%</td>
</tr>
<tr>
<td>Unreported</td>
<td>203</td>
<td>6.5%</td>
</tr>
</tbody>
</table>
Table 3. School-level descriptive statistics.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Optimism</td>
<td>0</td>
<td>1</td>
<td>-4.36</td>
<td>2.14</td>
</tr>
<tr>
<td>School Size</td>
<td>727.29</td>
<td>192.24</td>
<td>253</td>
<td>1288</td>
</tr>
</tbody>
</table>
Table 4. Student-level descriptive statistics.

**Student Level Descriptive Statistics**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>5th Math Score</td>
<td>9609</td>
<td>731.90</td>
<td>95.86</td>
<td>222</td>
<td>893</td>
</tr>
<tr>
<td>4th Math Score</td>
<td>9997</td>
<td>682.30</td>
<td>94.44</td>
<td>169</td>
<td>842</td>
</tr>
<tr>
<td>5th Reading Score</td>
<td>9500</td>
<td>734.41</td>
<td>89.72</td>
<td>175</td>
<td>904</td>
</tr>
<tr>
<td>4th Reading Score</td>
<td>9241</td>
<td>674.26</td>
<td>101.43</td>
<td>117</td>
<td>853</td>
</tr>
<tr>
<td>Low SES</td>
<td>10464</td>
<td>0.40</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>SOC African American</td>
<td>10464</td>
<td>0.17</td>
<td>0.37</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>SOC Hispanic</td>
<td>10464</td>
<td>0.36</td>
<td>0.48</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Female Students</td>
<td>10462</td>
<td>0.49</td>
<td>0.50</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

*Low SES (Free or reduced lunch = 1 and others = 0), SOC African American (SOC African American = 1 and other ethnicity = 0), SOC Hispanic (Hispanic Status = 1 other ethnicity = 0). Female students (Female students = 1 and male = 0).
**Table 5. School-level correlations.**

**Multi-Level Independent Variable Correlation Matrix**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4th Math</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th Reading</td>
<td>.493**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female Status</td>
<td>-.025*</td>
<td>.026*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low SES</td>
<td>-.260**</td>
<td>-.237**</td>
<td>.009</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC African A.</td>
<td>-.175**</td>
<td>-.098**</td>
<td>-.007</td>
<td>.124**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC Hispanic</td>
<td>-.170**</td>
<td>-.164**</td>
<td>.013</td>
<td>.421**</td>
<td>-.335**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School Size</td>
<td>.113**</td>
<td>.038**</td>
<td>.005</td>
<td>-.163**</td>
<td>-.066**</td>
<td>-.076**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Academic Opt.</td>
<td>.293**</td>
<td>.208**</td>
<td>-.012</td>
<td>-.449**</td>
<td>-.190**</td>
<td>-.293**</td>
<td>.372**</td>
<td>1</td>
</tr>
</tbody>
</table>

**Correlation significant at the 0.01 level *Correlation significant at the 0.05 level (2 tailed).**
Table 6. Academic optimism as a predictor of school-level mathematics achievement.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Std. Error</th>
<th>Std. Beta</th>
<th>df</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>281.75</td>
<td>6.08</td>
<td>-0.03</td>
<td>6039.62</td>
<td>46.37</td>
<td>0.00</td>
</tr>
<tr>
<td>Within Schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th Math Score</td>
<td>0.67</td>
<td>0.01</td>
<td>0.66</td>
<td>9234.74</td>
<td>83.71</td>
<td>0.00</td>
</tr>
<tr>
<td>Low SES</td>
<td>-11.44</td>
<td>1.80</td>
<td>-0.06</td>
<td>8865.84</td>
<td>-6.34</td>
<td>0.00</td>
</tr>
<tr>
<td>SOC Hispanic</td>
<td>-10.73</td>
<td>1.89</td>
<td>-0.05</td>
<td>8861.88</td>
<td>-5.67</td>
<td>0.00</td>
</tr>
<tr>
<td>SOC African A.</td>
<td>-15.98</td>
<td>2.26</td>
<td>-0.06</td>
<td>8929.18</td>
<td>-7.09</td>
<td>0.00</td>
</tr>
<tr>
<td>Female</td>
<td>-3.53</td>
<td>1.37</td>
<td>-0.02</td>
<td>9176.21</td>
<td>-2.58</td>
<td>0.01</td>
</tr>
<tr>
<td>Between Schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academic Opt.</td>
<td>6.77</td>
<td>1.74</td>
<td>0.07</td>
<td>117.24</td>
<td>3.90</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Table 7. Academic optimism as a predictor of school-level reading achievement.

**Multi-Level Analysis Predicting Reading Achievement**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Std. Error</th>
<th>Std. Beta</th>
<th>df</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>464.91</td>
<td>8.38</td>
<td>-0.34</td>
<td>419.37</td>
<td>55.46</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Within Schools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4th Reading Score</td>
<td>0.39</td>
<td>0.01</td>
<td>0.45</td>
<td>8421.75</td>
<td>46.00</td>
<td>0.000</td>
</tr>
<tr>
<td>Low SES</td>
<td>-22.77</td>
<td>2.08</td>
<td>-0.12</td>
<td>7159.19</td>
<td>-10.94</td>
<td>0.000</td>
</tr>
<tr>
<td>SOC Hispanic</td>
<td>-15.84</td>
<td>2.18</td>
<td>-0.08</td>
<td>7046.99</td>
<td>-7.28</td>
<td>0.000</td>
</tr>
<tr>
<td>SOC African A.</td>
<td>-13.85</td>
<td>2.56</td>
<td>-0.06</td>
<td>6950.21</td>
<td>-5.40</td>
<td>0.000</td>
</tr>
<tr>
<td>Female</td>
<td>12.41</td>
<td>1.60</td>
<td>0.07</td>
<td>8449.38</td>
<td>7.77</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Between Schools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academic Opt.</td>
<td>9.88</td>
<td>1.52</td>
<td>0.11</td>
<td>113.27</td>
<td>6.50</td>
<td>0.000</td>
</tr>
<tr>
<td>School Size</td>
<td>0.02</td>
<td>0.01</td>
<td>0.03</td>
<td>82.94</td>
<td>2.04</td>
<td>0.044</td>
</tr>
</tbody>
</table>
Table 8. Predicting academic optimism.

<table>
<thead>
<tr>
<th>Predicting Academic Optimism Descriptive Statistics (n 97)</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Optimism</td>
<td>0.00</td>
<td>1.00</td>
<td>-4.36</td>
<td>2.14</td>
</tr>
<tr>
<td>4th Grade Math</td>
<td>708.96</td>
<td>51.25</td>
<td>596.96</td>
<td>826.30</td>
</tr>
<tr>
<td>% Low SES</td>
<td>46.49</td>
<td>30.55</td>
<td>2.80</td>
<td>94.50</td>
</tr>
<tr>
<td>% SOC African American</td>
<td>15.39</td>
<td>14.50</td>
<td>1.00</td>
<td>83.90</td>
</tr>
</tbody>
</table>
A STUDY OF TEACHER TRUST IN CLIENTS AND STUDENT ACHIEVEMENT IN
TEXAS SUBURBAN SCHOOLS

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ABSTRACT

The teacher trust in clients construct embodies the collective level of teacher trust in students and parents. While teacher trust in clients has been recognized as a positive predictor of student achievement controlling for student demographics, previous studies have not tested the effect of teacher trust on student achievement in suburban elementary schools with large and diverse student populations. This study examined the relationship between teacher trust in clients and student achievement. It also examined collective teacher trust in relation to school demographics.

The primary purpose of this study was to determine the relationship between teacher trust in students and parents in relationship to student achievement in reading and mathematics. The secondary purpose of the study was designed to determine if demographic variables had an impact on teacher trust and student achievement. The conceptual framework of trust was based on relationships within and between social groups.

Using a sample of 10,464 students nested within 97 participating elementary schools with a large and diverse student populations located in suburban public school districts in South Texas, the researcher determined the level of teachers’ trust in students and parents. Analysis indicated that teacher trust in students and parents reported higher levels of achievement on the Texas Assessment of Knowledge and Skills controlling for student ethnicity, economic disadvantaged status, prior achievement, and school size. The within school variance in mathematics achievement explained by the multilevel model was 46%, whereas the within school variance in reading achievement explained by the multilevel model was 24%. The results of the multilevel analysis revealed that between school variance in mathematics achievement explained by the multilevel model was 81%, while the between school variance in reading
achievement explained by the multilevel model was 90%. Additionally, the multiple regression analysis indicated that only 72% of the variance in teacher trust was explained by student demographics. Thus, student achievement might be improved through systematic efforts to develop teacher trust in clients. The results of this study suggest improving relationships between teachers, students, and parents can have a positive impact on student performance in reading and mathematics achievement.

**Keywords:** trust, relationships, climate, clients, achievement, multilevel modeling
A STUDY OF TEACHER TRUST IN CLIENTS AND STUDENT ACHIEVEMENT IN TEXAS SUBURBAN SCHOOLS

Purpose of the Study

Establishing a trusting learning environment is a key element to student achievement. Trust is a primary component of human learning (Rotter, 1967). Much of what children learn in schools is based on verbal and written statements. Obviously, teaching is more than disseminating information. Children are motivated and inspired to learn based on what happens in the social exchanges between the teacher and student. Students who don’t feel safe will engage in self-protecting strategies rather than learning. Thus, student safety comes at the cost of student achievement. Students who do not trust their teachers to keep them safe and communicate with them honestly will be at a disadvantage when it comes to learning (Tschannen-Moran, 2004).

The primary purpose of this study was to investigate the possible connections between teacher trust in clients and student achievement at participating elementary schools located in suburban school districts in South Texas. In order to conduct the investigation, the researcher collected data from 100 elementary schools participating in the study to strengthen the design related to two major variables: teacher trust in students and parents and student achievement. The secondary purpose of the study was to identify other demographic variables such as gender, ethnicity, and socioeconomic status associated with teacher trust in clients and student achievement. These findings have promising implications regarding the relationship between teachers, students, and parents and student success in schools.
Significance of the Study

Trust is an important component for explaining student achievement and school success. As a result, further research needs to be conducted. According to L. Lambert, Walker, Zimmerman, Cooper, M. Lambert and Gardner, building trusting relationships is “the backbone of community-building in schools” (1995, p.6). Given that individuals begin relationships by first building a sense of trust in others, relationships between teachers and clients are critical to building effective schools (Schmuck & Schmuck, 1997). Speck (1999) argues that trust is a key ingredient to developing a learning community. School communities comprised of principals, teachers, students, and parents cannot function without trust, much less experience success.

With the current accountability demands of the Texas Education Agency to increase student achievement, school leaders should be aware of factors that contribute to trusting relationships between teachers, students and parents, thereby providing opportunities for these relationships to develop and grow. The significance of teacher trust in students is currently being investigated. In previous studies, teacher trust in students and parents had a significant and positive effect on student achievement (Goddard, et al., 2001; Hoy, 2002).

Rationale for Hypotheses

Previous studies found that teacher trust was a positive predictor of student achievement while controlling for socio economic status and proportion of minority students (Goddard et al., 2001). Hoy’s study (2002) revealed that faculty trust in clients produced a stronger influence on achievement than did socio-economic status. Subsequent studies also supported a positive relationship between teacher trust in clients and student achievement in reading and mathematics (Bryk & Schneider, 2002; Tarter & Hoy, 2004; Tschannen-Moran, 2004; Goddard et al. 2009; Goddard, Tschannen-Moran, & Hoy 2001; Hoy, Smith, & Sweetland, 2002). While all the
aforementioned trust studies were conducted at the elementary level, none were conducted in
diverse suburban elementary schools located in Texas.

**Research Questions**

In this study, the following research questions will be answered:

1. What is the relationship between teacher trust in students and parents as measured by the
   Omnibus T Scale to student achievement in math as measured by the Texas Assessment of
   Knowledge and Skills in Texas suburban elementary schools?

2. What is the relationship between teacher trust in students and parents as measured by the
   Omnibus T Scale to student achievement in reading as measured by the Texas Assessment of
   Knowledge and Skills in Texas suburban elementary schools?

3. Do demographic variables affect teacher trust in clients on student achievement as
   measured by the Texas Assessment of Knowledge and Skills in Texas suburban
   elementary schools?

4. Does school size affect teacher trust in students and parents on student achievement as
   measured by the Texas Assessment of Knowledge and Skills in Texas suburban
   elementary schools?

**Method**

This section of the paper describes the sample, procedures, instrumentation and statistical
 techniques employed to test our hypotheses.

**Sample**

A nonrandom sampling technique was used to collect data. The researcher employed
convenience sampling to collect elementary school data in order to obtain a representative
sample of suburban elementary schools (Gay, 2006). Survey participants included PK-5th grade
teachers at 100 participating elementary schools in four suburban districts and one other central city district. Initially, the researcher contacted 8 school districts by phone and email to participate in the study. Upon receipt of the research application, five school districts approved the study. The three districts choosing not to participate did so due to new instructional initiatives and community demands to increase student performance. Three of the five participating school districts encouraged all school principals and faculties to participate in the study. Although approved at the district level, two of the participating districts indicated that campus principals would need to give permission for the Texas A&M Study of School Organization and Instructional Practice (TSSOIP) survey to be collected. The sample included participants consisting of certified teachers from each participating school district. Following district approval, school principals were contacted by phone and email to schedule a time to survey their teachers during regularly scheduled faculty meetings. Of the possible 164 elementary schools in the participating districts, 100 agreed to participate in the study.

**Procedures**

Following International Review Board (IRB) approval, the researcher and colleagues participating in the TSSIOP administered surveys at 100 of the elementary schools participating in the study. Data were collected from participating teachers employed during the 2010–2011 school year. The data were gathered during a 9 month period from October 2010 to April 2011. Data was collected at regularly scheduled faculty meetings at a mutually agreed upon time between the researcher and the campus principal. The purpose of the study was explained in general terms and anonymity was guaranteed. Teachers participating in the study were randomly given one of three forms (A, B, or C) of the TSSIOP survey. As the teachers completed the surveys during the faculty meetings, the researcher collected them and placed them in an
envelope to ensure confidentiality. Virtually every teacher in attendance responded to one of the instruments. No attempt was made to gather data from faculty who were absent from the meeting. In order to identify the corresponding schools of the completed surveys, a coding mechanism was arranged to identify the participating elementary schools and their assigned school districts. In addition to survey data, participating school districts provided three years of student achievement data including elementary TAKS reading and math results from 2008–2011 accompanied by student demographic data. All student data were completely anonymous, as all student identification numbers were masked. Upon conclusion of this study, a report will be sent to each Superintendent of participating school districts to share the results of the investigation.

**Instrumentation**

The researcher employed the TSSOIP data set to measure teacher trust in clients during the 2010-2011 school year in 100 participating suburban elementary schools in Texas. The TSSOIP contained 100 items measuring teacher trust, teacher efficacy, transformational leadership, instructional leadership, and academic optimism. Along with the leadership staff within Education Administration and Human Resources Development department at Texas A&M University, the survey was developed. The researcher and colleagues tested the survey in six campuses across Texas. The survey contained one instrument scale to be used in this study including the Omnibus T-Scale measuring faculty trust in clients (Hoy & Tschannen-Moran, 2003).

**Statistical Techniques**

In order to investigate the effects of teacher trust on student achievement, diversity, and school size, the researcher utilized several statistical procedures. The researcher performed a factor analysis to determine whether or not teachers made a distinction between trust in students
and parents. Descriptive statistics including frequencies, means, and standard deviations on all independent and dependent variables were examined at the student, teacher, and school levels. Correlation analyses were conducted to determine the direction and strength of the relationships among the independent variables used in the data analysis. A stepwise backward elimination method was conducted to allow the researcher to determine the model with a “best fit” to the data (MacNally, 2000). Given the nature of the nested data structure (i.e. students nested within schools), a multilevel regression model was used to test the relationship between teacher trust and student achievement in reading and mathematics while controlling for student demographics and school size. To assess the relationship between school context and teacher trust in students and parents, the researcher conducted a multiple regression analysis in which trust was predicted by school demographic composition.

Factor Analysis

Factor analysis was used to determine construct validity. The researcher conducted a factor analysis on all 10 trust items to determine if teachers made a distinction among trust in clients. This data reduction technique allowed the researcher to reduce the 10 items of the teacher trust scale into a single variable. Based on the factor analysis of the trust items, one component was extracted with an eigenvalue of 7.68. A single factor emerged for all 10 items of teacher trust in students and parents, loading at .81 or higher. Based on this factor loading, it is clear that the trust items integrate well together. The single factor explained 76.79% of the variance in teacher trust in clients items. These findings parallel the theoretical model developed by Hoy and colleagues. The factor analysis results reported in Table 1, provided evidence that teacher trust in clients is a single construct uniting the concept of teacher trust in students and teacher trust in parents.
Multilevel Analysis

The primary analytical technique employed to test the main hypothesis of this study was multilevel modeling. Due to the nested structure of students, schools, and districts, educational researchers and social scientists have used hierarchical modeling frameworks to measure relationships at each level and across levels (Raudenbush & Bryk, 2002). Multilevel modeling also known as Hierarchical Linear Modeling (HLM) allows the researcher to address unit of analysis problems when attempting to study the effects of organizational characteristics on individual level variables (Raudenbush and Bryk, 2002). Educational researchers use the multilevel modeling framework because of its distinct ability to examine variance within and between school predictors and because of its precise estimation of standard errors (Heck & Thomas, 2000). This data analysis technique accounts for the interdependence of students within the same schools.

In this study, a multilevel model was adopted to explore the relationship of teacher trust in clients and student achievement in mathematics and reading, while controlling for student ethnicity, gender, economically disadvantaged status, prior achievement, and school size. The dependent variable, student’s achievement outcome (i.e., Math and Reading), is at the student level while the measure of teacher trust in clients and school size were at the school level. In this study, 10,406 students were nested within 97 schools.

Findings

Based on the results reported in Table 2, teacher trust in clients was significantly and positively related to student achievement in math. All independent variables were statistically significant at p-value of .05. Teacher trust in students and parents was a statistically significant
predictor for student’s math achievement outcome ($\gamma_{02} = 5.64$, $p < .001$). Thus, a one standard deviation change in teacher trust in clients represents a 5.64 point change in a student’s scale score on the 5th grade TAKS test. Prior achievement in math was also a significant predictor ($\gamma_{02} = .67$, $p < .001$) of 5th grade math achievement outcome. Economically disadvantage ($\gamma_{03} = -11.46$, $p < .001$), African American ($\gamma_{04} = -15.99$, $p < .001$), Hispanic ($\gamma_{05} = -10.73$, $p < .001$), and female status ($\gamma_{05} = -3.53$, $p < .001$) were all negatively related to mathematics scores. African American status had the biggest effect size on student achievement in math. In comparison to their White peers, African American students on average scored -15.99 scale points lower on the 5th grade state math exam. Hispanic students achieved more than 10 scaled points lower on the 5th grade TAKS test than their White peers. Economically disadvantaged students scored on average -11.46 points lower on the 5th grade TAKS math test than students who did not receive a free or reduced price lunch. Finally, female students averaged -3.53 scale points lower on the state math exam than their male peers.

**Insert Table 2 about here**

Based on the results reported in Table 3, teacher trust in clients was significantly and positively related to student achievement in reading. All independent variables were statistically significant at $p$-value of .05. Teacher trust in students and parents was a statistically significant predictor for student’s reading achievement outcome ($\gamma_{02} = 10.40$, $p < .001$). Prior achievement in reading ($\gamma_{01} = .39$, $p < .001$), female status ($\gamma_{06} = 12.36$, $p < .001$), and school size ($\gamma_{07} = .014$, $p < .001$), were also significant positive predictors of 5th grade reading achievement. In contrast, economically disadvantaged students ($\gamma_{03} = -22.24$, $p < .001$), African American students ($\gamma_{04} = -13.36$, $p < .001$) and Hispanic students ($\gamma_{05} = -15.26$, $p < .001$) scored lower in mathematics than
their White and non-poor student counterparts. Finally, although school size ($\gamma_0 = .01$, $p<.001$) was statistically significant, the standardized beta (.01) was not substantively important.

**Insert Table 3 about here**

In sum, the multilevel analysis revealed that a positive relationship exists between a schools’ level of teacher trust in clients and student achievement in mathematics (Table 2) and reading (Table 3) while controlling for student ethnicity, gender, economic disadvantaged status, and school size. In both reading and math, the relationship of economic disadvantage and student ethnicity on student achievement were greater than the effects of teacher trust. Whereas a one standard deviation increase in teacher trust was associated with a 5.64 scaled score increase in student math achievement on the TAKS math test, the effect of African American ethnicity was a -15.99 scaled score decrease. Economic disadvantage and Hispanic ethnicity were associated with scale scores reductions of -11.46 and -10.73 respectively. Whereas a one standard deviation increase in teacher trust resulted in a 10.40 scaled score increase in student reading achievement on the TAKS reading test, the effect of economic disadvantage was a -22.12 decrease. Both, Hispanic ethnicity at -15.28 and African American ethnicity at -13.36 had a negative effect on academic achievement while female students experienced a 12.36 positive effect on the reading test and a -3.53 negative effect on the math test. While this study confirmed that student demographics including ethnicity and socioeconomic status have a greater effect on student achievement than teacher trust in clients, are controlled by the school campus. Although student demographics cannot be controlled, a school’s level of teacher trust in students and parents can be developed by the school organization. Thus, student achievement might be improved through systematic efforts to develop trust.
Discussion

In this section we discuss the theoretical and practical implications of our findings.

Theoretical Implications

There is a growing interest in the importance of trust in interpersonal relationships as well as high functioning organizations. Transaction costs increase in a climate of distrust, as actors seek to protect their interest and guard against opportunistic behavior on the part of other actors (Whitney, 1996). In the forward to *The Trust Factor* (1994), Deming wrote that “trust is mandatory for optimization of a system”. Without trust, there cannot be cooperation between people, teams, or departments. Ouchi (1981) perceived trust to be fundamentally critical to schools. Without trust, site-based decision-making, teamwork, and collaboration are likely to be fraught with communication issues that undermine work group effectiveness. Knowledge of trust and how to create trusting relationships are critical to creating a positive learning community.

Covey (1989) stated that, “Trust is the highest form of human motivation. It brings out the best in people” (p. 178). Without trust, there is little opportunity to build permanent success. Students are dependent on teachers and teachers are dependent on students making both parties vulnerable and in need of trusting relationships. An understanding of the conditions and processes that enable teachers and students to learn to trust and cooperate is critical as schools increasingly are faced with changing expectations including state and federal mandates for student performance in reading and mathematics.

Trust is multifaceted and complex. Hoy and Tschannen-Moran (1999), recognized vulnerability, benevolence, reliability, competence, honesty, and openness as a single construct representing trust in schools. These facets of trust are dependent upon the experiences and
vulnerabilities of relationships between teachers, parents, and students. These relationships are reciprocal and dependent upon one another. School leaders must provide opportunities for teachers to build rapport with their students and parents. When teachers establish trusting relationships, students feel comfortable taking learning risks. Flip Flippen, founder of Capturing Kids’ Hearts stated, “If you have a child’s heart, you have his head.” Trust has been described as the “foundation of school effectiveness” (Cunningham & Gresso, 1993). Student outcomes flourish when teachers have caring relationships built on trust and respect with their students and parents.

Hoy (2002) found that faculty trust in clients was positively related to student achievement as a whole. He theorized that trusting others is an essential component of human learning because learning is a cooperative process, whereas distrust makes learning virtually impossible. Rotter (1967) argued that trust is fundamental to all human learning. When students don’t feel safe, they practice self-preservation rather than learning. Therefore, students lacking trust in their teachers are reluctant to take the risks involved in learning new concepts and skills. In situations of distrust, student safety comes at the expense of student achievement. Thus, students become disengaged in the learning process.

Practical Implications

Open collegial school structures promote trust and enhance relationships. School principals have opportunities to help build a school culture & climate characterized as being open, honest, benevolent, competent, and reliable. Therefore, when school leaders provide collaborative processes and opportunities to work together, trust is more likely to be established and organizational efficiency improved (Tschannen-Moran, 1998).
Vibrant interpersonal relationships between teachers and students inspire children to learn. Young (1998) found that trust among parents, students, and teachers have been specifically linked to increasing the achievement of at-risk students. This study suggests that trusting relationships between teachers, students, and parents have a positive effect on student achievement. School administrators must establish an open school climate in which students feel comfortable taking learning risks and parents are encouraged to partner with teachers. Using practices that encourage more parent-school engagement can foster stronger perceptions of trust. Given that trust is reciprocal, trusting behavior by school faculty invite trustworthy behaviors by parents. A positive school climate that promotes trusting relationships is achieved in several ways.

In schools with an trusting school climate, the relationship between parents and school faculties are characterized by two-way communication, cooperation, and collaboration (Vosler-Hunter, 1989). Collaboration between parents and teachers involves shared responsibilities and rights. Both, parents and teachers, are viewed as equal contributors to the education process. Collaboration is achieved by mutual respect, open communication, shared two-way information, shared decision making, and mutually agreed-upon goals. In a study conducted by Dunst, Johanson, Rounds, Trivette, and Hamby (1992) both families and educators identified trust as a vital component of effective parent–school relationships and academic success.

Open school climates promote relationships between teachers and parents that are sustainable to address the ongoing needs of students. Weiss and Edwards (1992) described this type of trusting relationship as ongoing; not an isolated meeting to resolve a concern. Teachers and school staff should make an effort to build relationships with parents based on positive experiences. All too often, the first contact a parent has with teachers and school personnel is in
a crisis situation in which the student has violated school rules. Adams and Christenson (2000) suggested that the nature of parent-teacher interactions was a better predictor of trust than was the frequency of the interactions. Their study revealed that parents desired a strong relationship between home and school including communication and shared information. By initiating parent communication and involvement, teachers and school staff can create a partnership with parents to enhance student learning and success. School administrators should ensure teachers have sufficient time to communicate and interact with parents by limiting the number of teaching demands placed on teachers. School principals can maximize teacher collaboration by building time for professional learning communities during the school day, limiting the number of required faculty meetings, and eliminating redundant paperwork.

In addition to an open school climate, school organizations are more effective and efficient when enabling school structures are present. Adler (1999) defined an enabling bureaucracy as an organizational structure designed to emphasize usability. School principals can design campus structures as either enabling or hindering. The optimal choice is clear. Enabling school structures allow for flexible relationships among school professionals encouraging problem solving, active participation, explicit communication, and trust (Adler, 1994; Adler, 2000; Adler & Borys, 1996; Adler, Goldofias, & Levine, 1998; Hoy & Sweetland, 2000, 2001). Enabling structures also benefit relationships with parents. School policies and procedures that exclude parents could have long term effects on parent-school relations (Adams, Forsythe, & Mitchell, 2009). Formalized structures that treat parents as outsiders could diminish trust.

The principal personifies the structure of the school. A decentralized leadership approach is usually well received by teachers. Principals should utilize open communication,
understanding, and thoughtful problem solving as opposed to rules, regulations, and policies (Geist & Hoy, 2004). An enabling structure helps, rather than hinders, the mission of teaching and learning. Covey (1990) asserted that trust is essential for productive work environments because it fosters effectively functioning bureaucracy. Likewise, Fukuyama (1995) recognized trust as an essential component for sustaining efficient organizations. In schools with low levels of trust, high transaction costs are incurred for frequent monitoring of contractual obligations. Enabling school structures provide an environment in which trust can flourish and grow among all stakeholders.

Conclusion

Previous researchers (Hoy & Tschannen-Moran 1999; 2003; Bryk & Schneider, 2002; Tarter & Hoy, 2004; Tschannen-Moran, 2004; Goddard et al. 2009; Goddard, Tschannen-Moran, & Hoy 2001; Hoy, Smith, & Sweetland, 2002) constructed a measure of teacher trust in clients to predict student achievement. This study confirmed previous research results indicating that teacher trust in clients is a significant predictor of student achievement in reading and math in select Texas suburban elementary schools with diverse populations. In addition to extending the research on teacher trust, all research questions posed in this study were answered. Using a large and diverse sample of suburban elementary schools in Texas, teacher trust in clients predicted student achievement in both reading and mathematics. This study also provided evidence that teacher trust in clients is not completely explained by school contextual factors. Thus, teacher trust in clients can be nurtured by strengthening the relationships between teachers, students, and parents and developing a trusting school culture in which all students succeed. Trusting cultures ultimately create environments that support student achievement and have a positive impact on

Although trust is multifaceted and complex, school leaders can positively impact student achievement by creating opportunities for trusting relationships to occur. When administrators create an open school climate, teachers and parents work together to meet the needs of all students. Effective school organizations enable school structures by including teachers and parents in the decision making process. Although school leaders face the challenges of high stakes testing, unfunded mandates from legislators, and dwindling financial resources, high levels of teacher trust in clients should support educators in their undertaking of improving student achievement in reading and mathematics for all children.
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Table 1. Teacher trust factor loadings.

<table>
<thead>
<tr>
<th>Scales</th>
<th>Component Matrix</th>
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<tbody>
<tr>
<td>T1 – Teachers in this school trust their students.</td>
<td>.858</td>
</tr>
<tr>
<td>T2 – Teachers in this school trust the parents.</td>
<td>.905</td>
</tr>
<tr>
<td>T3 – Students in this school care about each other.</td>
<td>.843</td>
</tr>
<tr>
<td>T4 – Parents in this school are reliable in their commitments.</td>
<td>.924</td>
</tr>
<tr>
<td>T5 – Students in this school can be counted upon to do their work.</td>
<td>.923</td>
</tr>
<tr>
<td>T6 – Teachers can count upon parental support.</td>
<td>.910</td>
</tr>
<tr>
<td>T7 – Teachers here believe that students are competent learners.</td>
<td>.854</td>
</tr>
<tr>
<td>T8 – Teachers here think that most parents do a good job.</td>
<td>.927</td>
</tr>
<tr>
<td>T9 – Teachers can believe what parents tell them.</td>
<td>.927</td>
</tr>
<tr>
<td>T10 – Students here are secretive.</td>
<td>.816</td>
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</table>
Table 2. Final multilevel model for mathematics.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Std Error</th>
<th>Beta</th>
<th>DF</th>
<th>T</th>
<th>Significance</th>
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<tr>
<td>Intercept</td>
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<td>Prior Math</td>
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<td>83.83</td>
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<td>Trust</td>
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<td>.000</td>
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<tr>
<td>AA</td>
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<td>-2.58</td>
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Table 3. Final multilevel model for reading.

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<th>DF</th>
<th>T</th>
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<td>1.99</td>
<td>84.63</td>
<td>1.99</td>
<td>.050</td>
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Train the Trainer: Landscape and Assessment Tools for Implementing a Culturally Relevant Mentoring Model for Women of Color in the Professoriate

Paper #790

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Abstract

Research shows that implementing culturally relevant mentoring (CRM) at institutions of higher education can improve the climate in which women of color (WoC) in the professoriate are engaged to achieve scholarly success. The institutional culture and climate, coupled with mentor competency, plays a critical role in implementing a CRM model. Fostering a network of leaders, mentors, or educators primed to impact institutional excellence through engagement, discussion, and evaluation for sustainable mentoring models to support WoC in the professoriate should be intentional. Studies further show that a train-the-trainer mentoring model is a successful practice for establishing and sustaining this network supported by mentoring pedagogical knowledge. This work captures a review of terms and definitions for mentoring and CRM with further discussion on recruitment and selection strategies for building a mentoring network. More importantly, proven components for a mentor training module for enhancing the mentoring network are presented. Mentoring alliance assessment tools are suggested and can be tailored to fit particular institutional climates. In conclusion, this work seeks to build a community of scholars versed in how to offer culturally relevant training to a network of mentors, evaluate assessment tools and tailor to an institutional climate, and implement culturally relevant mentoring as part of the institutional strategic plans to recruit, retain, and promote women of color in the professoriate.

Keywords: culturally relevant mentoring, women of color, assessments, justice, equity, diversity, inclusion, mentee, Black indigenous people of color, higher education
Introduction

The Florida Alliance for Graduate Education in the Professoriate (FL-AGEP) is a collaboration of three Historically Black Colleges and Universities (HBCUs), one Hispanic Serving Institution (HSI), and two Historically White Institutions (HWIs): Bethune-Cookman University (HBCU), Florida A&M University (HBCU), Florida International University (HSI), Florida Memorial University (HBCU), University of South Florida (HWI), and Virginia Tech (HWI). These six diverse institutions leverage their resources to conduct a mixed-methods research study about an intensive professional development research program. The goal is to increase the number of Floridian doctoral dissertators, postdoctoral scholars, and early career faculty women of color (WoC) in science, technology, engineering, and mathematics (STEM) disciplines who matriculate successfully into and within the professoriate. This work includes implementing evidence-based activities such as mentoring, research bootcamps, research symposia, and professional development to address institutional and individual challenges to success. By centering women’s intersectional identities within a multi-pronged professional development intervention, the FL-AGEP catalyzes the way in which WoC (e.g., American Indian/Alaska Native, Asian, Black or African American, Hispanic, Native Hawaiian/Other Pacific Islander) cultivate relationships with senior colleagues and peers leading to increased opportunities for securing and persisting in STEM faculty positions (Mack et al., 2013).

However, faculty WoC encounter a number of challenges in higher education. They are less likely to be promoted to full professor (Hurtado & Figueroa, 2013) at Historically White Institutions (HWI) when compared to their White counterparts. Organizational culture, gender, and race related issues continue to impact access to mentoring for women and underrepresented groups (Gibson, 2006), specifically in STEM fields. The National Academy of Science ([NAS],
2013) reports that the lack of mentoring is one of the many challenges that faculty WoC face in higher education. As a result, WoC doctoral students and postdoctoral scholars feel less interested in pursuing tenure-track faculty positions (Gibson et al., 2015). According to Mack et al. (2013), women in the STEM fields accounted for “3.6%, 2.5%, and 1.2% of all assistant, associate, and full professors.” Despite efforts to increase diverse representation in the professoriate, WoC comprise only 2.94% of tenured and 5.54% of tenure-track STEM faculty (NCSES, 2021). Cultural and institutional barriers to the STEM disciplines continue for women in higher education. The lack of senior faculty WoC to serve as role models and mentors is another contributing factor that results in women leaving higher education positions (Hurtado & Figueroa, 2013). Buzzanell et al. (2015) found that university mentoring programs fall short in meeting the needs of minority women faculty because they often lack culturally relevant approaches. Research shows that implementing culturally relevant mentoring (CRM) at institutions of higher education can improve the success of WoC in the professoriate (Adams, 1998a; Adams, 1998b; Adams, 2002; Buzzanell et al., 2015; Thomas, 2014). The institutional culture and climate, coupled with mentor competency plays a critical role in implementing a CRM model (Sood, 2021). As such, this workshop offers training to a network of leaders, mentors, or educators primed to impact institutional excellence through engagement, discussion, and evaluation for sustainable mentoring models to support WoC in the professoriate.

**Purpose and Objectives**

Mentoring is an “intentional relationship focused on developing self of relatively unseasoned [learning partner/mentee] through dialogue and reflection; an implicit focus on development of the next generation in context of interpersonal relationships” (Hall, 2002, p. 147) cited in Knippelmeyer and Torraco (2007). Mullen et al. (2008) cautioned that formal mentoring
relationships “not only potentially compensates for situations bereft of faculty bonding but also better positions college leaders to meet their goals of retention and success while generating widespread cultural change” (p. 45). In view of this literature, the (FL-AGEP) mentoring model focuses on the development of emerging scholars in the academy to increase the number of WoC in STEM disciplines.

The purpose of this work is to train a network of leaders, mentors, or educators primed to impact institutional excellence through engagement, discussion, and evaluation for sustainable mentoring models to support WoC in the professoriate. Studies show that a train-the-trainer mentoring model is a successful practice for mentoring pedagogical knowledge (Goff et al., 2020; Goff et al., 2021; Hudson, 2013). The work is supported by the following objectives: (1) To review terms, definitions for mentoring and CRM; (2) To discuss and reflect on, recruitment and selection strategies for building a mentoring network; (3) To lay out the components for a mentor training module for enhancing the mentoring network; and (4) To tailor mentoring alliance assessment tools to fit institutional climates. As a point of reference, the NSF funded FL-AGEP Alliance Mentoring and Engagement Plan is used as a guide (FL-AGEP, 2021). The authors have over 230 years of combined experience in mentoring, networking, and training with exclusive activities with implementing a CRM model for WoC in the professoriate.

The Conceptual Framework For Culturally Relevant Mentoring (CRM)

Overview of Culturally Relevant Mentoring

A framework and institutional climate for CRM designed to assist WoC is predicated on a mentoring continuum framework (Thomas et al., 2022b). The culturally relevant mentoring continuum framework in Figure 1, is centered on culturally relevant mentoring, mentors (senior scholars), recruitment strategies for the academy, mentor CRM training, assessment and
accountability, and longitudinal development opportunities.

**Figure 1**

Culturally relevant mentoring continuum framework

For this particular framework, the focus is on the developmental continuum of WoC scholars in the academy, more specifically at the doctoral candidate, postdoctoral, and early career faculty stages. Establishing, sustaining, and strengthening this framework has the potential to assist in the nurturing and mentoring of WoC and Black, Indigenous and people of color (BIPOC)s for success in higher education.

Based upon two foundational concepts from Ladson-Billings’ *Culturally Relevant Pedagogy*, cultural competence and socio-political consciousness (Ladson-Billings, 1995), culturally relevant mentoring actively recognizes and embraces cultural contributions, mentoring interactions/alliances, cultural competence, and strategic dialogue of critical consciousness and equity to empower individuals. “Culturally responsive” and “culturally relevant” are often viewed in the literature foundationally as synonymous (Mass Mentoring Partners, 2016), but for practical
application in a framework, “culturally responsive action focuses on strategies and practices, while 
**culturally relevant action empowers** to implement shared, equitable, and just strategies that 
directly impact quality of life (Thomas et al., 2022a). A CRM approach includes supporting career 
and psychosocial connections. CRM fosters an alliance foundation where mentors are trustworthy, 
genuine, supportive, intentional, and culturally aware (Edney & Norris Allen, 2019). Mentors 
provide pathways to opportunity and help mentees attend to their psycho-social needs. For 
example, the FL-AGEP Alliance uses three strategies for CRM to include (Thomas et al., 2022a):

1) mentee(s) to Senior Scholar;
2) several mentees to Community of Senior Scholars; and
3) peer/ladder mentoring by women of color for women of color.

To complement the scholarship and culture of the FL-AGEP women of color mentees, 
mentors (senior scholars) are skilled and experienced mentors who are guided by their learned 
experiences, cultural awareness (field and gender), psychosocial connections, reflective style and 
philosophy, and continuous engagement in the higher education and political arena. These mentor 
characteristics are attributes leaders and educators should consider when recruiting scholars to a 
CRM community.

The following strategies were utilized across the FL-AGEP Alliance to recruit a network 
of mentors:

**Strategy 1:** Outreach to mentors (senior scholars) across Florida’s State-University-
System (SUS) to communicate goals of the FL-AGEP Alliance and extend an invitation to 
become a mentor.

**Strategy 2:** Partner with State and Regional under-represented minority (URM) 
fellowship programs to engage mentors (senior scholars).
**Strategy 3:** Promote and highlight engagement of mentors (senior scholars) through social media, feature activities/programs and mentee/mentor accomplishments in social media, e.g., Twitter, Facebook, Newsletter, program website, etc.

**Train-the-Trainer to Lead a CRM Community for Faculty WoC**

(Mentor Training Components)

One of the first steps to building a community for CRM is to establish objectives that align with the strategic plans of the institution or organization, such as those presented below (Figure 2). These objectives will guide the community to move toward a common goal and successful outcomes.

**Figure 2**

Objectives For Community For Faculty WoC

Secondly, in terms of CRM, it is critically important to emphasize the institutional/organizational “Why” for having a mentoring alliance and the focus on CRM. Leaders/educators should provide an overview of program activities, expectations, and desired outcomes to the community of mentors (senior scholars) recruited to be part of the alliance. In addition, define the philosophy that supports CRM and key terminology and encourage mentors...
to share individual experiences in effective mentoring relationships when the leader/educator brings the community of mentors together to participate in a mentor training session. Some training strategy topics are 1) solving mentoring dilemmas as a community, 2) contemplating mentoring topics for discussion with mentees, 3) sharing resources, and 4) brainstorming direct and indirect tactics for moving the model forward toward sustainability. By creating the community, leaders/educators should aim to promote, support, and advocate for broadening participation when seeking to nurture women of color in the professoriate.

As a leader/educator, if you are the trainer or lead mentor, it is important to leverage the Community of Mentors (senior scholars) and offer the components presented in this work to assist with the four Ps of mentoring (Adams, 1996; Adams, 1998a; Adams, 1998b). The four Ps are process, permission, protection, and planning and are further defined as follows:

PROCESS – strategies (“how-to) for problem solving.

PERMISSION – the okay to function; to try out new ideas.

PROTECTION – shields from outside attacks; creates a trusting environment.

PLANNING – provides support for a mentoring alliance plan.

This provides a pathway for mentors to give mentees an edge and some leverage in navigating the climate in which the mentee is trying to succeed as a scholar.

Sustaining the Community Model

A CRM community can be inclusive of a network of mentors and mentees, resource unit leads, administrative advocates, and external partners. Once the community has been established, an overview provided, and training accomplished, one of the vital steps is crafting a plan to sustain the community model. An approach from the FL-AGEP Alliance is presented below (Figure 3) and is inclusive of:
A. Recruiting, selecting, and training mentors (senior scholars)

B. Providing multiple forms of mentoring anchored in CRM through network mentoring, peer/ladder mentoring, and online/virtual mentoring.

C. Fostering an environment and climate for longitudinal mentoring for long term impact to the institution/organization through membership/partnership with National Center for Faculty Development and Diversity, mentee seminar talks, writing groups, and faculty development mini sessions, and research symposiums and tracking. Longitudinal development opportunities include networking and mentoring and allow participants to engage across the institution and with partner institutions to give invited research talks, lectures, and/or workshops for longitudinal faculty development.
D. Establishing a myriad of assessments regarding mentor/mentee alliance accountability measures, roles and expectations of the community, and success indicators for effective mentoring.

**Assessment and Accountability** (Assessment Tools - Evaluation)

Key components of sustaining the community model are assessment and accountability. It should be noted that an assessment should also include the evolution of training components as the literature and new research surrounding CRM and mentoring progress.

Assessment and accountability measures include assessment tools to aid in establishing a mentoring plan. Assessment tools may include:

- Mentor Engagement (Senior Scholar) Assessment
- Mentee Readiness Assessment
- Mentee Expectation Assessment
- Mentee Skills Assessment
- Mentoring Action Plan
- Mentoring Program Resource Material(s)/Links

One particular tool that is essential to the community is the Mentoring Action Plan, which assists mentors/mentees in agreeing on mentoring goals, action steps, and responsibilities; establishing meeting times, best forms of communication, confidentiality, and feedback style; and planning for continuous reviews and assessments. To help facilitate the development of a mentoring action plan, mentors (senior scholars) should have mentees complete an Expectation Assessment and Skills Assessment and schedule a meeting to begin the process. Mentors (senior scholars) are encouraged to help mentee(s) set realistic, focused, and aspirational (long term) goals.
Both mentor (senior scholar) and mentee should keep a copy of this action plan for progress checks toward the accomplishment of goals and expectations, as well as use the SMART approach to establish effective goals (DaivD, 2016; Sheridan et al., 2015).

- S: Specific
- M: Measurable
- A: Achievable
- R: Results-oriented
- T: Time based

Using a suggested template (Figure 4), mentors and mentees will establish SMART goals (mentee leading this effort) and reach an understanding of expectation of accomplishing the goal(s) with specific actions and activities for mentees.

Social Science Research Implications

Social science research is an investigative process of an underlying issue that results in new knowledge for societal progress and change (Sociology Group, 2023). As such, our social science research team investigated the CRM model in the context of an online research bootcamp designed for academic women of color in the STEM fields. CRM is known as a factor that can influence the achievements of women of color in the STEM fields (Adams, 1998a; Adams, 1998b; Adams, 2002; Buzzanell et al., 2015; Thomas, 2014). To understand how the CRM influenced participants’ achievements, the social science research team conducted focus groups with 35 FL-AGEP
dissertators, postdoctoral researchers, and early career faculty who identified as women of color in STEM. Data collection procedures entailed six 60–75-minute focus groups via Zoom web conferencing with 4-7 participants in each group. Focus group interviews as a data collection method acknowledged the practical nuances of mentoring relationships in STEM disciplines are necessary to address the cultural needs of academic women of color (Howell et al., 2020). Focus group data was recorded and transcribed verbatim. To analyze the data, the research team applied open, focused, and axial coding (Saldaña, 2021). Axial codes were then categorized into themes. Four themes emerged from this analysis: (1) creates counterspaces for holistic support; (2) aids emerging scholars in defining their research agendas; (3) stimulates productivity; and (4) expands one’s mentoring network. Further, these findings illuminate the efficacy of the CRM model on academic women of color in STEM. In the next section, we discuss the achievements that resulted from CRM.

The Impact of CRM and Success Stories of Women of Color in Stem

In addition to administering research bootcamps (RBCs) and symposia, offering memberships to the National Center for Faculty Development and Diversity (NCFDD), and providing growth and development opportunities, these four FL-AGEP Alliance activities are coupled with tracking and monitoring the progress of dissertators, post-doctoral researchers, and early career faculty FL-AGEP scholars.

Our previously mentioned social science research study indicates that CRM is contributing to the success of the FL-AGEP scholars. To add to these findings, the FL-AGEP Alliance sought to track the progress of the FL-AGEP Scholars nearly nine months after the summer 2021 RBCs hosted by USF, FIU, and FAMU, the intensive week-long intervention that matches senior scholar mentors with the FL-AGEP Scholars. The results of the questionnaire confirmed the impact of the
CRM-centric RBC activities and revealed that the FL-AGEP Scholars were promoted, received awards and grants, professionally trained, and published to name a few. Figure 5 details the overall impact of the FL-AGEP activities. The majority of the FL-AGEP Scholars’ reported that their scholarly contributions were in presentations, conference proceedings, and proposals.

**Figure 5**

FL-AGEP Impact

The impact of the CRM-centric activities was just a few of the achievements that were communicated as part of the FL-AGEP Alliance dissemination plan. Newsletters featuring the success stories of the FL-AGEP scholars were also a means of communicating their rich experiences, accomplishments and success. The information is disseminated among the FL-AGEP stakeholders in the hopes of other institutions throughout the State of Florida and beyond adopting the model to increase the number of faculty women of color in STEM in the professoriate.
Conclusion

This one-of-a-kind train-the-trainer session was designed to leave participants with action items to implement culturally relevant mentoring as part of institutional strategic plans to recruit, retain, and promote women of color in the professoriate. The expected outcomes were:

1. For participants to be versed in how to offer culturally relevant training to a network of mentors
2. For participants to evaluate assessment tools and tailor to their institutional climate
3. For participants to reflect on recruiting strategies for a network of mentors (Reflection prompts, e.g., recruitment strategies used and share best practices)

Throughout the session the attendees responded to a list of nine questions referenced below. A jamboard was used to capture attendee responses and a presentation of the analysis will be presented at a future conference. Role playing as mentee and mentor in small group discussions was another exercise to engage the attendees.

1. How do you define justice?
2. How do you define equity?
3. How do you define diversity?
4. How do you define inclusion?
5. Does your institution or organization include justice, equity, diversity, and inclusion (JEDI) in the strategic plan? If yes, give an example. If no, share one recommendation that you will make to leadership at your institution or organization.
6. How many (what %) faculty women of color are at your institution/organization? In STEM?
7. Based on CRM, can you list resources that are available to faculty women of color in your institution/organization?

8. What are some state and regional programs to engage Black indigenous people of color (BIPOC) participants in your programs?

9. Can you think of ways to incentivize women of color mentors (senior scholars) to participate in this community?

At the close of the 90-minute session, attendees were asked to complete a Mentor Engagement Assessment google form to determine their level of readiness to step into the role as a trainer for culturally relevant mentoring. As of this publication, 100% of the responses indicate attendees are committed to CRM and as a result will receive a certificate of achievement. Future plans include discussing an online CRM training certificate program to increase the number of faculty women of color in the professoriate.

Therefore, it has been observed and documented that CRM can assist in creating a culture that enables and establishes an environmental climate where developing individuals, particularly women of color, is recognized and valued. Overall, leaders and educators who are skillful and trained in CRM can preserve, share and pass on academic and professional protocol, knowledge and skills that provide opportunities for empowerment and self-determination, which transcends age, ethnicity, gender, generation and race.
References


Acknowledgement

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An Action Research Study: How do Values and Faith Affect Students’ Views on the Nature of Science?

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Abstract

As a college-level science instructor at a private, Christian university, I have encountered many students who exhibit a great deal of theological knowledge and religious faith. A number of these students have shared with me how they appreciate having been raised in a home with Christian values, and then being given the opportunity to express those values freely within an educational setting amongst their peers. While I am required to teach scientific concepts in a way that adheres to Christian principles, it never ceases to amaze me how many students initially question my faith, values, and motives as an instructor when explaining various scientific concepts, such as evolution. As a result, I find myself trying to deconstruct false notions and pretenses learned previously through hearsay by my students and attempting to show them that religion and science can coexist and even complement one another. Therefore, this study aimed to determine (1) how values and faith affect students’ views on the nature of science (NOS), (2) what preconceived notions or misconceptions of scientific topics may prevent students from viewing science and religion as compatible, and (3) how teachers can more effectively and accurately teach NOS in a way that coexists with religious principles. A group of students from the senior class at a private, Christian high school in the American Midwest were recruited to participate in four NOS-related activities while receiving explicit NOS instruction. In addition, students completed an open-ended questionnaire, pre- and post-NOS instruction, that addressed their thoughts on NOS-related topics, as well as questions that explored their views on scientific and religious compatibility. Exit slips completed after each activity, along with students’ verbal commentary, were also used in the data collection process. Results showed, in both pre- and post-NOS instruction, that the students’ values and faith substantially affected their views on NOS, which may in turn prevent them from learning about or discussing certain science-related
topics. Results also showed, pre- and post-NOS instruction, that 17% of respondents believed that science and religion were moderately compatible, or compatible depending upon the topic. Eighty-three percent of respondents felt that science and religion were substantially compatible and that one could use science as evidence of God’s creation. Student commentary, in relation to controversial science topics, showed that students were most concerned with evolution, gender identity, and Covid-19 vaccines. While evolution was repeatedly mentioned as a controversial science topic, students lacked any knowledge of micro- or macro-evolution, which alluded to the fact that they had received incomplete or missing information during past instruction on the topic. Students’ commentary would also indicate that how a teacher teaches something is just as important as what is being taught. Therefore, not only should a teacher be armed with accurate and complete information, but also encourage students to actively participate in the learning process by asking questions and challenging or disputing information that they may not agree with. Based upon our findings, teachers should equip themselves with accurate, complete, and factual information in an attempt to increase scientific literacy and decrease misconceptions that students may hold regarding religious and scientific compatibility.

Keywords: nature, science, NOS, religion, values, faith
WATER SAFETY EDUCATION
OF JAPANESE ELEMENTARY SCHOOL STUDENTS

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² Keio Yochisha Elementary School
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Abstract: Japan is surrounded by the sea so that drowning accidents in the sea and rivers occur every year. It is necessary to establish water safety education in open waters in elementary school swimming education. We report the new water safety education for the elementary school.

“En-Ei” event

Many Japanese elementary schools held summer camps with “En-Ei” events (Fig.1). Sometimes a long-distance swim is held to test the progress of a swimmer's swimming ability. On the other hand, in a group swim in formation, the better swimmers pay attention to the weaker swimmers, the weaker swimmers face their own abilities, and the faster swimmers swim slowly to match the speed of the weaker swimmers, all the while facing nature (Kimura & Yano, 2013). By challenging the limits of their own strength and stamina in the midst of the greatness of nature, children can examine themselves and learn the greatness of the group (Miyake & Saijo, 2006). This is a different form of education from the four modern swimming races in the pool (Kimura & Yano, 2013).

Fig.1 “En-Ei” in 2019(Team swim in formation)
Water Competence

It is estimated that about 240,000 people drown annually worldwide, making drowning the third leading cause of death among unintentional accidents (WHO, 2021). Drowning is also one of the major causes of death among children and adolescents (WHO, 2014).

In Japan, there will be 1,547 drowning victims in 2020, 176 of whom are children under junior high school age (National Police Agency Community Safety Bureau, 2021). In 2020, the largest number of people involved in marine accidents due to marine leisure activities will be unable to return home, followed by falls into the sea and drowning, with these three categories accounting for more than half of the total number of accidents (Japan Coast Guard, 2021).

Water competency means being able to anticipate, avoid, and survive common drowning situations, as well as being able to recognize and provide assistance to those in need (Fig.2). It includes water safety awareness, basic swimming skills, and helping others (Water Safety USA, 2022). The importance of Water Competency, the qualities and abilities necessary for safe activities in and around water, has been advocated from early on (Moran et al., 2012, Stallman et al., 2017).

Fig.2 Water Competence
Lack of education on swimming and water safety management skills is considered one of the greatest risks for drowning, and there is an urgent need to improve education on basic swimming skills (swimming ability) training, safety management in the water environment, and age-appropriate rescue methods (WHO, 2017). Brenner et al. (2003) point out that water safety education needs to be provided to children and youth. It is important that Water Competence skills can be demonstrated in open waters, not in a pool (Moran et al., 2012). Basic water skills such as floating, standing, turning, breath control, and propulsion above and below the surface of the water may be essential in the event of a water hazard (Stallman et al., 2018, Asher et al., 1995).

We report on the plan and implementation method of the new “En- Ei” camp with water competence education in open water.

“En-Ei” camp of Keio Yochisha Elementary school

Keio Yochisha Elementary school has one of the oldest history of “En-Ei” camp in Japan, dating back to 1892 (Fig.3). However, after a swimming pool was built in the school in 1957, swimming classes were conducted in that pool and “En-Ei” camp ended. The reason behind this is that the Shiun Maru ship collision triggered the construction of swimming pools in elementary schools across Japan, and after that, swimming classes were held in schools (Table 1).

Fig.3 “En-Ei” camp in 1899
Table 1. History of Japanese swimming education and Keio Yochisha elementary school

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1874</td>
<td>Keio Yochisha Elementary School was founded</td>
</tr>
<tr>
<td>1892</td>
<td>&quot;En-Ei&quot; camp started</td>
</tr>
<tr>
<td>1955</td>
<td>Shiun Maru ship collision (168 students were dead)</td>
</tr>
<tr>
<td></td>
<td>Schools started swimming class</td>
</tr>
<tr>
<td>1957</td>
<td>Keio Yochisha Elementary School constructed Pool</td>
</tr>
<tr>
<td></td>
<td>&quot;En-Ei&quot; camp ended</td>
</tr>
<tr>
<td>2012</td>
<td>&quot;En-Ei&quot; camp restarted</td>
</tr>
<tr>
<td>2024</td>
<td>150th Anniversary of Keio Yochisha Elementary School</td>
</tr>
</tbody>
</table>

“Throw away stopwatches”

Change of grade system at swimming class.

We changed the content of our swimming classes from the four-style swimming competition to Water Competence, and along with that, we changed our grade system. We are currently implementing these grading systems in the school pool however we plan to implement them in open water in the future.
### 9 & 10 years old

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<th>Style</th>
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<th>Girls</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>☆</td>
<td>100m Individual Medley</td>
<td>2'01&quot;0</td>
<td>2'11&quot;0</td>
</tr>
<tr>
<td>2</td>
<td>☆☆</td>
<td>50m Free Style</td>
<td>51&quot;0</td>
<td>54&quot;0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50m Breaststroke</td>
<td>61&quot;0</td>
<td>64&quot;0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50m Backstroke</td>
<td>60&quot;0</td>
<td>64&quot;0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50m Butterfly</td>
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<td>67&quot;0</td>
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### 11 & 12 years

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<tbody>
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<td></td>
<td>50m Breaststroke</td>
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<td>50m Backstroke</td>
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<td>50m Butterfly</td>
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Fig. 4 Grade system before 2021
<table>
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<th>Task</th>
<th>criteria</th>
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<tbody>
<tr>
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<td>☆</td>
<td>25m Head Up Breaststroke</td>
<td>Within 12 strokes</td>
<td>get eyes above the water surface</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25m Treading Water</td>
<td>put hands on your head, Frog kick, Eggbeater kick</td>
<td>get eyes above the water surface, go forward or backward</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Underwater swim</td>
<td>20m</td>
<td>not diving nor push off the wall</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25m Head Up Crawl</td>
<td>Within 20 seconds</td>
<td>get eyes above the water surface</td>
</tr>
<tr>
<td>2</td>
<td>☆☆</td>
<td>25m Head Up Breaststroke</td>
<td>Within 15 strokes</td>
<td>get eyes above the water surface</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25m Treading Water</td>
<td>Extend your elbows and both index fingers above the water surface</td>
<td>get eyes above the water surface, go forward or backward</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Flutter kick, Frog kick, Eggbeater kick</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Underwater swim</td>
<td>13m</td>
<td>not diving nor push off the wall</td>
</tr>
<tr>
<td>3</td>
<td>☆☆☆</td>
<td>25m Head Up Breaststroke</td>
<td>Within 18 strokes</td>
<td>get eyes above the water surface</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25m Treading Water</td>
<td>Sculling Water, Flutter kick, Frog kick, Eggbeater kick</td>
<td>get eyes above the water surface, go forward or backward</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Underwater swim</td>
<td>10m</td>
<td>not diving nor push off the wall</td>
</tr>
</tbody>
</table>

Fig.5 Grade system after 2022
Synchronous versus Asynchronous STEM Courses: “Design of Algorithms” – A Case Study

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Abstract: When the COVID-19 pandemic arrived in the United States during the Spring 2020 semester, university courses were switched to online delivery in an emergency mode. This most often meant that a teleconferencing platform was used and instructors simply trained a camera on themselves and lectures were delivered “as usual“ without regards to the medium. A much more structured approach – often used later in the pandemic – is the asynchronous format. There is much skepticism among STEM faculty with regards to asynchronous courses for highly analytical topics, but we argue that this delivery method is generally better suited to achieving learning outcomes. The paper gives a case study based on a standard “design of algorithms” course, taught synchronously at the University of Nevada, Las Vegas in Spring 2020 and asynchronously in the following semester.

Keywords: Higher online STEM education, synchronous online education, asynchronous online education, assessment, student learning outcomes.

Introduction and Background

In March 2020, higher education all over the country was switched to online in an emergency mode due to the COVID-19 pandemic. The advanced undergraduate “design of algorithms” computer science course is usually not taught online. It is highly analytical and is a standard capstone course in the ACM Computer Science Curriculum [1]; a standard textbook used in this course is [2]. The learning outcome is to apply computer science theory and software development fundamentals to produce computing-based solutions. (ABET Student Learning Outcome 6: “Apply computer science theory and software development fundamentals to produce computing-based solutions.” See [3].) Before 2020 the course was largely considered best delivered in person. The pandemic changed this abruptly as instructors switched to online delivery on an emergency basis.

The author taught this course in Spring of 2020, and was well-informed about the progression of the pandemic. He had announced to his students at the University of Nevada, Las Vegas, already mid-February that COVID-19 would likely affect the world in a profound way. He had already purchased high-quality webcams with tripods, air pods to freely move in front of a camera, a document camera and a Wacom tablet, had mounted a large white board in his home office, and had purchased two backup MacBooks. And so, he continued to hold lectures remotely though WebEx.

However, there are significant limitations to this format, to name a few: Research indicates that lecture segments should not be longer than 15 minutes, that teleconferencing supports one-to-many communication well, but not many-to-one, and online asynchronous activities are hard to integrate into this format. Additionally accessibility is all but impossible to achieve. Most students demand recordings of live lectures, and thus, in effect, prefer an asynchronous mode even when the course is given in synchronously. There are also technical limitations even with the best of equipment.

The issue of synchronous versus asynchronous delivery has been extensively studied in the literature, e.g. [4-6]. In a recent survey article, Watts [7] concludes: “Even though many studies have been conducted about synchronous and asynchronous interactions, areas remain for future research. As noted earlier,
results of recent studies of the quality and quantity of asynchronous and synchronous discussions related to course grades have been inconclusive, and the authors found it prudent to determine how to more effectively use interaction in specifically supporting deeper learning, and subsequently higher grades.”

During Summer 2020 the author worked on an asynchronous version of the “design of algorithms” course. The author completely revamped the course; he incorporated asynchronous discussion forums, designed interactive asynchronous elements such as quizzes in lecture segments created within the video platform Panopto, added synchronous WebEx office hours, and implemented seminar-style Panopto student presentations. He designed modules which build on one another in a way consistent with an asynchronous approach. Significant work was centered around new appropriate assessment tools. The course was available to students during for the Fall 2020 semester.

This paper gives a comparative study of synchronous versus asynchronous delivery of the same course. Rubrics for student involvement and topic delivery were created. The study was conducted during the author’s sabbatical in 2021 after both courses had been completed.

**Synchronous and Asynchronous Delivery**

Both synchronous and asynchronous teaching modes allow students to participate from a distance without the necessity of in-person on-campus attendance. Both enable communication with the instructor in various ways and can facilitate the creation of a learning community. We summarize (see also Figure 1):

- **Synchronous online course:**
  - Students attend class virtually each week.
  - Communicate with instructors and classmates mainly through Zoom or WebEx.

- **Asynchronous online course:**
  - Students complete weekly course work at any time over a virtual learning environment.
  - Communicate with instructors and classmates through discussion boards as well as other media. (Panopto, Zoom, WebEx.)

![Figure 1: Attributes of Synchronous and Asynchronous Learning.](image-url)
In a high-level STEM course there are a number of drawbacks with synchronous delivery. Video conferencing platforms have technical limitations due to camera resolution, internet bandwidth, and other factors and are not well suited for many-to-one communication [8]. From the student’s perspective there may be reluctance to “interrupt the professor”, the student’s internet connection may be substandard or may fail in real time, or the deliberations seen on the student’s computer screen may be hard to read. Students may request recordings of the lecture, which is nothing more than the “asynchronous poor man’s version” of the lecture. Figure 2 shows such a (substandard) setup.

![Figure 2: A Substandard Synchronous Setup.](image)

In the asynchronous setting things can be structured through various and diverse elements such as discussion boards, video announcements, self-test quizzes, canvas email communication, WebEx office hours (TA and instructor), Panopto student presentations, or student presentation critique boards. Figure 3 shows the introductory module for the course.

![Figure 3: Introductory Module.](image)
As illustrated in Figure 4, an asynchronous presentation does not have to rely on a high resolution camera and students can follow a well-produced asynchronous lecture segment even if their internet connection gives up temporarily.

![Reductions](image)

**Figure 4: Introducing the concept of a “Reduction” in an asynchronous lecture segment.**

STEM instructors in analytical courses generally emphasize development of lengthy formal systems or mathematical proofs. Tools which can be employed include the use of document cameras, Wacom tablets or white boards with two camera systems using split screen technology and with both the writing of the instructor as well as their gestures visible. Note that these technologies could also be used in a synchronous setting but would then require an entire real-time production team, whereas in the asynchronous setting things can be rehearsed, rerecorded and edited by the instructor.

**Learning Communities**

For an asynchronous course the use of appropriate discussion boards is a major contributor to the facilitation of an effective learning community. Another way to engage students is through narrated PowerPoint presentation prepared by the students which are recorded in Panopto. The students are also asked to peer critique these presentations. Rubrics may be provided by the instructor. An example of such a rubric can be seen in Figure 5. Less formal examples of such interactions are short video snippets which are posted to dedicated discussion boards by the instructor, teaching assistants, or the students. Such interactions can foster an effective learning environment to nurture a learning community which is in no way inferior to an in-person learning community.
Evaluation

Two indicators were used as measurement. Mean course evaluation score (MCES) and the results of an ABET questionnaire.

(1) The MCES for Spring 2020 (synchronous delivery) was 4.33 out of 5, whereas the score for Fall 2020 (asynchronous delivery) was 4.74.

(2) Identical ABET assessment tests were given in both courses, the synchronous version towards the end of the Spring 2020 semester and the asynchronous version towards the end of the Fall 2020 semester. The test measured the Student Learning Outcome “Apply computer science theory and software development fundamentals to produce computing-based solutions.” The scores were classified as categories “exceeds expectation”, “satisfactory”, “below expectation”, and “unsatisfactory”. As can be seen from Figure 6, the results were significantly better for the asynchronous version of the course.
Conclusions and Outlook

The case study for this course indicates that asynchronous delivery was superior to synchronous. The author is confident that his results can be generalized to a large set of challenging STEM courses. And the asynchronous web-based format is especially suited for non-traditional students and students with disabilities. The work suggests that asynchronous delivery should be default delivery methods in online STEM education.

References


Acknowledgement

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Knowledge Management, a Path to Technology Innovation:
A Comparative International Case Study of Engineering Companies in
Japan, Ghana, and Northwestern China

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Abstract

A civil engineering company in Northwestern China is facing communication and innovation challenges, preventing it from moving forward as an organization. These issues appear to stem from the challenge of managing knowledge related to technology innovation within the organization (Intelligence Research Group Beijing, 2021). While the company is developing new practices generated in its civil engineering design service, the knowledge is lost because of a lack of knowledge management systems – like no sharing and storage systems in the company (Lee & Choi, 2003). The foundations of Knowledge Management Theory were developed by Drucker in 1970 and are defined by Davenport (1994) as “the process of capturing, distributing, and effectively using knowledge.” It has been proven as an efficient means to create, identify, and share knowledge and best practices in developed countries such as the UK, Japan, and the US (Hackman et al., 2017; Hahn & Subramani, 2000). Nevertheless, it appears Knowledge Management System Development (KMSD) is insufficiently adopted and applied in the construction industry, especially in Northwestern China. This comparative case study aims to explore the successful applications of knowledge management in technology innovation for companies like the one in Northwest China -- by comparing it to two different organizations in different countries. These companies were chosen as part of this research as they provide insights into both macro and micro issues relating to knowledge management. Besides studying the Northwestern Chinese company, researchers selected a similar company in Ghana and a product-specific company in Japan. The Ghana research included a quantitative study of 13 civil engineering companies providing the macro perspective of knowledge management application. A micro view was analyzed through case study research focusing on product development by Sharp technologies in Japan using tools of knowledge management (Hackman et al., 2017;
Researchers compared the results of these two studies' practices to the Northwestern China organization to help call out best practices that could be applied. This comparative case study sought to answer the following research questions:

**RQ1:** How could knowledge management systems improve sharing of technology innovation in an engineering company in Northwestern China?

**RQ2:** How did knowledge management improve sharing of technology innovation in the two case studies compared in this project?

**RQ3:** How did the findings of the two existing case studies compare with the case of the engineering company in Western China?

The comparative case study identified similarities and differences between the three companies in applying knowledge management in technological innovation. To analyze the Northwestern China case, the researchers gathered four kinds of archival data: the company’s website, company promotion brochures, company reports, and annual conference reports. A hand-coding qualitative approach was undertaken to analyze the data based on keywords and themes. For example, in the archival data, 40 times the word “technology innovation” appears in the 2 promotion brochures and 21 company reports but just mentions it with no clear connection to change in the company. These major differences uncovered through this research helped illustrate how the Northwest Chinese organization was applying knowledge management compared to the other two international examples. The Japan case and Ghana case provided a clearer demonstration of knowledge management in approach and practices, but the Northwestern China case revealed the organization was only in the first stage of creating awareness of knowledge management, and additional steps are needed to be taken to fully solve the company’s knowledge management challenges.
References


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Report on the IoT reskilling course development and practice

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Summary
The paper shows course developments and results of the IoT reskilling courses designed by Internet Academy, an IT Web-based school. IoT is short for the Internet of things, in which everything is connected to the internet, making our lives convenient. As an example, IoT administers and improves energy efficiency for home appliances or supply chain performance in factories. On the contrary, we are facing a shortage of IT personnel even though technologies are rapidly advancing. According to recent reports, the global shortage of IT personnel may reach 85 million by 2030. To combat the shortage, the Internet Academy decided to train IT personnel from the beginner level. We developed an IoT curriculum collaborating with the ECHONET consortium, which developed “ECHONET Lite”, which is the communication protocol for home appliances.

Keywords: The Internet of Things (IoT), ECHONET Lite, Reskilling

1 Introduction
The Internet of Things (IoT), in which everything is connected to the internet, makes our lives more convenient. For example, if there is an IoT device such as an air conditioner in your room, you can change the comfortable temperature even if you are far from home. You can check and save energy with your smartphone or PC. That is to say, IoT makes our lives convenient and can reduce energy consumption.

Moreover, the IoT market is expected to grow at a high rate. According to MARKETS AND MARKETS, the global IoT market size will reach USD 650.5 billion by 2026 from USD 300.3 billion in 2021. This will grow at a CAGR of 16.7% during the forecast period [1].

As you can see from the numbers, the demand for IoT is increasing dramatically. On the other hand, the shortage of IT personnel has become a severe problem around the world.

Korn Ferry researched the prediction of the number of IT personnel globally. It showed 85 million IT personnel shortages by 2030 [2]. Furthermore, even IT-developed countries such as the US and China are facing shortages, 6 million in the US [3], 12 million in China [4], 0.79 million in Japan [5] by 2030, and 1.9 million in India [6] by 2060.

How can we tackle this problem? Internet Academy, Japan’s first web school, developed reskilling courses for the IoT curriculum regardless of whether students are beginners. For example, there is a shortage of IT experts in Japan, estimated at 0.79 million people. In contrast, the number of unemployed people in Japan is 1.78 million [7]. It would be sufficient to cover the shortage of IT experts.

Thus, Internet Academy developed the IoT curriculum for beginners to advanced students collaborating with the ECHONET consortium. The organization makes and promotes “ECHONET Lite”, a communication protocol for IoT appliances [8].

Our two reskilling courses, their development, the results, and future developments are discussed in this paper.

2 Course Developments and Practices
2-1. An overview of the curriculum development of the reskilling courses in Internet Academy
There are three reskilling courses in Internet Academy: IoT Basic, IoT Advance, and AI. However, the AI course is still in development. In this document, we would like to explain two IoT courses in detail.

Fig.1 The curriculum development of the reskilling courses in Internet Academy

2-2. The reskilling courses in Internet Academy
There are two IoT courses for reskilling.

The first is the IoT Basic course. The characteristics of this course range from basic web knowledge, such as HTML and CSS, used for making websites, to applied levels, such as Web servers and the IoT. Furthermore, even a beginner can easily move from the beginner level to the applied level simultaneously. Each student has a different situation. That is why the duration of the course depends on the students. Our students tend to learn while working. Considering this, it is designed for students so they can work and learn at their convenience.

Table 1 The reskilling course of Internet Academy, IoT Basic (Ba)

<table>
<thead>
<tr>
<th>Total</th>
<th>41 lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning time</td>
<td>From 82 hours to 164 hours</td>
</tr>
<tr>
<td>Curriculum Contents</td>
<td></td>
</tr>
<tr>
<td>· Homepage A (HTML)</td>
<td>4 lessons</td>
</tr>
<tr>
<td>· Homepage B (CSS)</td>
<td>4 lessons</td>
</tr>
<tr>
<td>· Javascript (jQuery)</td>
<td>4 lessons</td>
</tr>
<tr>
<td>· Web server</td>
<td>12 lessons</td>
</tr>
<tr>
<td>· IoT Application</td>
<td>12 lessons</td>
</tr>
<tr>
<td>Duration</td>
<td>8 months to 1-year</td>
</tr>
</tbody>
</table>

The second is the IoT Advance course. This course can learn what ECHONET Lite is, how to use ECHONET Web API, an application programming interface for the Web, and how to develop IoT applications. This course is designed for someone who has completed IoT basic or IoT app development with JavaScript.

Table 2 The reskilling course of Internet Academy, IoT Advance (Adv)

<table>
<thead>
<tr>
<th>Total</th>
<th>4 lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning time</td>
<td>8 hours</td>
</tr>
<tr>
<td>Curriculum Contents</td>
<td></td>
</tr>
<tr>
<td>· ECHONET Lite for IoT Services</td>
<td></td>
</tr>
<tr>
<td>· Basics of ECHONET Lite Web API</td>
<td></td>
</tr>
<tr>
<td>· Applications of the ECHONET Lite Web API</td>
<td></td>
</tr>
<tr>
<td>· IoT Application Development</td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>2 days</td>
</tr>
</tbody>
</table>

What is ECHONET Lite? ECHONET Lite is a communication protocol that makes it possible for IoT home appliances offered by different manufacturers to interact with each other. For example, two air conditioners A and B were developed by different manufacturers. Normally, they are unable to communicate due to difficult communication protocols. However, IoT devices with ECHONET Lite can communicate with each other. This protocol has already been approved as an international standard (ISO/IEC 14543-4-3) in 2015 [9].

In addition, the number of shipped or scheduled ECHONET Lite-compliant devices is increasing. Fig.2 shows the shipment quantity of ECHONET Lite-compatible products including smart meters from 2013 to 2021. In 2021, 126,308,965 ECHONET Lite-compliant devices were shipped around the world [10].

As mentioned previously, the IoT market is expanding. Fig.2 shows the prediction of the IoT market in Japan. IoT related to smart homes is ranked higher than any other item [11].

For these reasons, ECHONET Lite is expected to help smart homes save energy and everyone can use it globally.

Furthermore, we would like to focus on the features of our IoT curriculum. We carried out an internal investigation to...
understand the trend of reskilling courses in IoT. Table 3 compares the differences among existing IoT curricula in IT-developed countries such as the US, China, India, and Japan [12]. The purpose of this survey is to compare the company’s performance with that of other companies, and its name has been withheld due to the possibility of defamation.

Table 3 shows the distribution of the difficulty level of each curriculum and the skills that can be acquired after the course. This is based on the prerequisites for those who know a particular programming language before taking the course.

We have divided the starting level of study into four categories. These are as follows: Never learned any programming languages at all, Beginner, Intermediate, Advanced.

The basic level defines a student as someone who has learned fundamental programming skills such as JavaScript. Intermediate refers to students who have a basic understanding of Python, C, or other programming languages and can write simple code independently. The advanced level defines a student as someone who is knowledgeable about Java and IoT programming and can write on their own. With these definitions, we tried to develop our reskilling courses.

In general, the purpose of the IoT curriculum is for beginners to learn IoT without having to know programming languages. On the other hand, developers are familiar with IoT with complicated programming languages such as Python, or C because this is a language that has been around for years during IoT development. However, our curriculum uses IoT development with JavaScript. Our IoT curriculum is easy to learn because it is related to basic web knowledge.

Table 3 IoT Curriculum in IT developed countries: The level of difficulty and Course Objectives (Source: Internet Academy, An internal investigation)

Stack Overflow surveyed the most popular technologies: Programming, scripting, and markup languages. Fig.3 shows that JavaScript is the most used programming language among professional developers and people learning to code [13].

In addition, the IoT curriculum at Internet Academy can acquire a wide range of skills related to IoT development even if students have never learned programming languages.

From this perspective, we tried to develop a reskilling course with JavaScript that would be easy to learn for complete beginners.
controller transmits the order to the Demo IoT devices Kit. Third, a wireless LAN router such as Wi-Fi receives the controller’s order. Last, a wireless LAN router sends the order to each IoT device, including the air conditioner, smart meter, and lightning.

3 Result

3-1. As a result of the implementation
In this section, we would like to show you the results of installing our reskilling courses.

There were 858 students who had enrolled in the IoT Basic course since March 2021. In December 31, 2022, there were 369 graduates. In other words, 43% of learners have completed this course in 2022. The Japanese government approved the IoT Basic course as the next-generation reskilling course. That is to say, the number of students has been increasing more and more.

The IoT Advance has been held five times. Overall, 30 students have taken it, and 97% of the students have acquired the ECHONET qualification.

3-2. The result of the reskilling success
Next, as a result of taking our reskilling course, we would like to emphasize how successful our reskilling course is. Fig. 9 shows the result of reskilling success. This survey targets graduates who were unemployed and wanted to change their careers from July 2021 to November 2022.

Before taking our reskilling course, they hadn’t had a job. However, after the completion of our reskilling course, 18.3% of the students successfully changed their careers. Therefore, the reskilling success rate reached 18.3%. Incidentally, the other graduates have been looking for jobs or taking other courses to keep their motivation high.

Fig.9 The result of the reskilling success

4 Discussion

4-1. The level after completion of the reskilling course
This part shows job seekers’ skill levels before and after taking the course. How much have the skills of the graduates changed compared to their skills before taking the course? Fig.10 shows their skills progress. 76% of students started learning at the beginner level. However, after taking the Basic and the Advance, 96% of the students become IT engineer level. Statistically, it is obvious how significant our course is.

Hands-on practice is available online on the web or through a cloud-based video conferencing service. In addition, all participants can operate a virtual demo site for Hands-on practice.
4-2. Graduate Success Story
On that occasion, what kind of graduates’ success stories do we have? Next, we share one of the success stories.

Student A completed IoT Basic. Her goal was to learn IT knowledge related to the IT industry. When she joined Internet Academy, she had never learned how to program. Moreover, job hunting was tough because she was over 40 years old. Job hunting in Japan is difficult due to age discrimination as most companies do not want to invest in employees’ education costs. In addition, she raised her two children by herself.

Facing these difficulties, she never gave up and persevered to learn our course. Finally, she received job offers from three companies. Now, she is working for an event management company as an IT engineer.

5 Conclusion
To sum up, the results show how effective our course is. After taking the Basic and the Advance, 96% of the students become IT engineer level. Our students’ reskilling success rates reach 18.3% after taking our reskilling course. That is to say, students’ chance to change their careers increased dramatically. Considering these figures and the case study, our reskilling program is successful.

However, the most significant thing is continuing and improving our reskilling course for students. By developing and delivering our reskilling curricula, we strive to solve the world’s IT personnel shortage.

6 Future Developments
From now on, we plan to expand our reskilling courses globally to tackle the shortage of IT personnel all over the world. To solve this global problem, we have established three measures to spread our courses.

The first is to prepare English textbooks. As of December 2022, we don’t have an English version. We must develop it by recruiting bilingual instructors or technical writers.

The second is a collaboration with foreign schools and institutions. We promote ourselves by participating in international educational conferences and educational events related to technology to establish relationships all over the world. The third is to develop an IoT learning kit. There are already IoT device kits for demonstration purposes. IoT devices are too big to be set up in every home, and if we allowed students to connect IoT devices in the school from all over the world, it would be a risk to the IT security of each student’s home and our school. These risks and issues we need to consider when developing a learning kit.

To conclude, our IoT reskilling courses and practices are challenging and essential for the future. We have been striving to spread our reskilling courses globally through our practice in Japan.

References


[12] An internal investigation. The purpose of this survey is to compare the company's performance with that of other companies, and its name has been withheld due to the possibility of defamation.


Analysis on College Students Career Decision-making Profiles differences: Comparison of Korean and American

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INTRODUCTION

• For college students, deciding where to enter after graduation is a very important decision in life. If it is not an optimal career path, it can negatively affect individual lives psychologically and financially and indirectly affect society (Gillie & Gillie-Isenhour, 2003). It has been an important focus of many researchers because it is easy to cause stress in individuals due to the heavy burden of career decision making and this stress adds to the difficulty in career decision-making process (Lipshits-Brazilier et al., 2016).

• The decision-making style focuses on personality traits, while the decision-making profile considers all the personalities and circumstances of decision-making behavior. Rather than distinguishing the difficulty of deciding a type of "undecided career course", it is necessary to consider various factors together to understand the characteristics in a more subdivided manner (Lihui et al., 2018). The focus is also on trying to understand the characteristics of different dimensions, considering key factors in career decisions (Gati et al., 2010). Therefore, research on career decision-making has recently been promoted as a multidimensional approach to career decision-making profiles.

Career Decision-Making Profiles

• Career decision profiles describe how individuals approach career decisions, focusing on "how do individuals make career decisions?" while career decisions focus on "where do they interfere with career decisions?" (Gati et al., 1996; Willner et., 2015). Career decision-makings are
relevant to cognitive aspects and to a broad range of attitudes, competencies, and behaviors that individuals use for occupational adaptation (Savickas, 2005) because it is necessary to make decisions without unnecessary delay after considering various information (Gadassi et al., 2012).

RESEARCH QUESTIONS

1) Do Korean and American college students show any difference in career decision profiles?

2) Is there a gender difference between Korean and American college students in career decision profiles?

METHODS

- Data were collected online and questionnaires for Korean college students (100 students) and U.S. State University college students (94 students). The subjects of the study included various majors such as humanities and social, natural sciences, etc.

- This study used SPSS / PC + 22.0 statistical program and used independent two-sample t-test.

RESULTS

- According Table 3, it showed that the level of career decision making was higher among American college students. By subfactor, information collection, information processing, effort injection, and ideal career aspirations were high, while the dependence on others and the desire to please others were meaningfully lower than those of Korean university students.
• Descriptive Statistics and Correlation Analysis

• The technical statistics for 11 sub-factors of Career Decision Profile (CDMP) are correlated. Participants showed that Locus of control (LC), procrastination (PR), speed of making the final decision (SP), depth on other (DO), death to please others (DP), etc. were related each other appropriately.

Table 1. Mean of Career Decision-Making Profile (CDMP)

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>df</th>
<th>Mean difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>M</td>
<td>58</td>
<td>20.224</td>
<td>3.413</td>
<td>-2.327*</td>
<td>192</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>136</td>
<td>21.471</td>
<td>3.417</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2)</td>
<td>M</td>
<td>58</td>
<td>10.69</td>
<td>1.866</td>
<td>-2.181*</td>
<td>191</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>135</td>
<td>11.259</td>
<td>1.569</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3)</td>
<td>M</td>
<td>58</td>
<td>15.19</td>
<td>3.063</td>
<td>0.974</td>
<td>192</td>
</tr>
<tr>
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<td>F</td>
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<td>14.676</td>
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Table 2. Correlation by Career Decision-Making Profile (CDMP) subfactor

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<th>4)</th>
<th>5)</th>
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<td>5)</td>
<td>.235**</td>
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<td>.237**</td>
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<td>8)</td>
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<td>-0.035</td>
<td>.360**</td>
<td>.390**</td>
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<td>9)</td>
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<td>0.008</td>
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<td>-0.053</td>
<td>-0.161**</td>
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The study used independent sample t-test to see if there is a difference in career decision profiles in Korean and American college students. It showed that the level of career decision making was higher among American college students. By subfactor, information collection, information processing, effort injection, and ideal career aspirations were high, while the dependence on others and the desire to please others were meaningfully lower than those of Korean university students.

Table. 3 Difference in Career Decision-Making Profile between Korean and American University Students

<table>
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<tr>
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<th>Mean (SD)</th>
<th>Degrees of freedom</th>
<th>t value</th>
<th>Mean difference</th>
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* p < .05, ** p < .01, *** p < .001
DISCUSSION

• According to the analysis, Korean and American college students showed significant differences in overall CDMP, and American college students’ career decision-making more effectively than Korean college students. By subfactor, information collection, information processing, effort injection, and ideal career aspirations were high, while the desire to please others was meaningfully lower than that of Korean university students.

• Career decision profiles can be interpreted as having a direct impact on CDMP factors because they evaluate multidimensional properties, unlike conventional career decision types.

• Career decision-making studies should consider social and economic situations, which can be said to be a limitation of not considering employment and economic situations, and since there are limitations in representing Korean and American university students in the data collection process, it needs to try to secure representation in a more systematic way in the future.

• This study is significant in that it explored the difficulties in the career decision-making process of college students in multiple dimensions through the career decision-making profile.
Title: On Language Learning and Constructional Relations: The Case of Adjectival Resultative and
         Make-Causative Constructions in English
Author: Akiko Honda
Affiliation: Kobe Women’s University, JAPAN
E-mail address: a-honda@yg.kobe-wu.ac.jp
Topic Area of the Submission: Language Education
Presentation Format: Paper Session

Abstract: This study investigates whether the constructional approach in cognitive linguistics is
effective in helping learners of English as a second language to increase the depth of understanding
of English expressions. This paper deals with two causative constructions in English, adjectival
resultative and make-causative constructions, and argues about a constructional relation between
these two from a usage-based perspective. The idea of relations among constructions can be applied
to language learning for non-native speakers as well as language acquisition for native speakers.
On Language Learning and Constructional Relations:
The Case of Adjectival Resultative and Make-Causative Constructions in English

1. Introduction

Usage-Based Construction Grammar in cognitive linguistics provides the benefit of clarifying how infants’ speech expressions are constructed as grammatical constructions as well as the properties of linguistic expressions. This is a scientific theory of language, which regards construction as the basic unit of language and a paring of form and meaning (Bybee (2010), Croft (2001), Lakoff (1987), Langacker (1987), (1988), (2000), Fillmore, Kay and O’Connor (1988) and Goldberg (1995), (2006), Tomasello (2003)). From the point of view of this approach, meanings, or semantic structures reflect scenes basic to human experience, and thus constructions express events that we human beings frequently experience. Moreover, Construction Grammar has the idea of inheritance links that shows relations among constructions, which are formally and semantically similar to each other (Goldberg (1995: 73)); Goldberg & Jackendoff (2004)). Although each construction is independent and has its own unique properties, they are connected to each other by inheritance links, as shown in Figure 1:

![Figure 1. Constructonal Relations.](image)

All these constructions from A to E are independent and each of them has its own unique properties. For example, Construction A motivates B, C and D, and B motivates Construction E. Seen from the side of Construction E, it inherits from B. That is, Usage-Based Constriciton Grammar approach views the linguistic system as a network of constructions.

This study focuses on adjectival resultative constructions in English such as *He polished his shoes clean*. This sentence means that he polished his shoes causing them to be clean. The form of this construction consists of a subject (X), a verb, an object (Y) and a resultative phrase (Z). The meaning is that X causes Y to become Zstate.

Learners of English as a second language like Japanese students have difficulty understanding resultatives. For example, in the sentence *He kicked the two men unconscious*, some of the students
understand the adjective *unconscious* not as a result state but as a present state. One of the factors contributing to the difficulty in learning can be attributed to the properties of resultatives. This construction is formally a simple sentence structure, whereas semantically it is not a simple but a complex structure. This means that causes and effect events are encoded within a single form in resultatives.

How can they precisely understand what this construction means and use it? Regarding this question, we will show that studying language acquisition and the idea of relations among constructions can provide a key to solving the problem of language learning. In this study, I use the term “acquisition” for native speakers and “learning” for second language speakers.

2. Acquisition of Adjectival Resultatives and Relation to Make-Causatives

In terms of language acquisition, native English-speaking children acquire the *make*-causative construction earlier than the adjectival resultative construction, based on the result of the observation from CHILDES database, as shown below:

**Make-Causative Construction**

(1) a. that makes me happy when you make cream cheese balls. (Kuczaj (2; 09))
   b. when I cry (.) I make you angry. (Kuczaj (2; 09))
   c. turn the light off and make it dark in here. (Kuczaj (2; 10))

**Adjectival Resultative Construction**

(2) a. they knock the rattlesnakes dead. (Kuczaj (3; 05))
   b. and it didn’t even crack my head open. (Kuczaj (4; 01))
   c. somebody knocked the Lone_Ranger unconscious. (Kuczaj (5; 01))

Kuczaj, as shown in (1), at the age of 2;09-2;10 used *make*-causative constructions. In contrast, adjectival resultative constructions were observed after age 3, as in (2). The frequency of utterance of the adjectival resultative construction is lower than that of the *make*-causative construction.

What is noteworthy here is the properties of these two constructions. As we have seen above, the adjectival resultative construction is semantically a complex structure. Unlike resultatives, the *make*-causative construction is a simple structure formally and semantically, and has no verbalization of the specific action that causes the change of state. Thus, the *make*-causative construction requires a by-phrase expression that denotes the means if we encode the causing action as shown in the following examples *she made her hair clean* (*by brushing it / by washing it*). From the point of view of inheritance relations of constructions, the adjectival resultative construction inherits from the *make*-causative construction, as shown in figure 2 (Honda (2019)). In other words, the
make-causative construction motivates or dominates the adjectival resultative construction.

The aim of this study is to ascertain if recognizing the syntactic and semantic relations between these two constructions can advance second language (English) learners’ understanding of adjectival resultatives.

3. Methods and Results
The present study examined English learners’ comprehension of the adjectival resultative construction. I conducted a survey of 36 university students whose native language is Japanese. I divided the students into two groups. Each group consists of 18 students. I gave the students in Group A the prior explanation about the property of form and meaning of make-causative construction and the relation with the adjectival resultative construction, whereas the students in Group B was not given any prior explanation about that. We tested whether they can correctly understand the meanings of three sentences (1. I wiped the table clean. / 2. She cut the parcel open. / 3. He knocked the two men unconscious.).

The result of the survey is as follows: 13 students in Group A correctly comprehended the resultatives, whereas 5 did not. In Group B, only one student correctly comprehended the meaning of this construction.

<table>
<thead>
<tr>
<th></th>
<th>Correct</th>
<th>Incorrect</th>
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<td>Group A</td>
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<td>5</td>
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<tr>
<td>Group B</td>
<td>1</td>
<td>17</td>
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</table>

Figure 2. Inheritance Relation Between Make-Causative and Adjectival Resultative Constructions.

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<tbody>
<tr>
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<td>13</td>
<td>5</td>
</tr>
<tr>
<td>Group B</td>
<td>1</td>
<td>17</td>
</tr>
</tbody>
</table>

Figure 2. Inheritance Relation Between Make-Causative and Adjectival Resultative Constructions.
The percentage of questions answered correctly in Group A is about 72.2%, whereas in Group B it is about 0.06%, as the pie chart shows:

![Pie chart showing percentage of correct and incorrect answers.]

**Figure 3. Percentage of correct and incorrect answers.**

4. **Conclusion**

This study have shown that recognizing syntactic and semantic relations between existence constructions enable second language (English) learners to understand new syntactic structures. The idea of relations among constructions in Usage-Based Construction Grammar can also be applied to language learning for non-native speakers.

**Acknowledgment**

This work was supported by the Japan Society for the Promotion of Science (JSPS) KAKENHI Grant Number JP18K00668.

**References**


Honda, Akiko (2019) On the Acquisition of Adjectival Resultative Constructions and *Make-
Abstract

The purpose of our research project is to investigate whether there are differences in attitudes toward the provision of personal information and learning logs among learners depending on their age, occupation, learning environment, and learning content, and more to investigate whether there is any benefit to the learner in providing personal information and learning logs. For this purpose, we are developing a system that can provide simple quizzes on “LINE,” a free instant messaging app. And we investigate the above purposes through the app.

1. Introduction

Learning analytics (LA) research is rapidly advancing. The target learning activities are not only the information stored in a Learning Management System (LMS), such as browsing contents, taking quizzes, participating in discussions, grade information, and so on, but also the learners' behavior and biometric information through location information acquisition functions of sensor devices and mobile terminals.

When collecting such information, it is necessary to obtain learners’ permission in advance. In addition, when researchers use the information, they must process it anonymously or use pseudonyms.

However, learners are often in a vulnerable position in their relationships with teachers, universities, and researchers, and there may be psychological situations in which they are forced to give their consent. Learners may not fully understand privacy policies, etc. In addition, learning analytics tends to be researcher-driven, and the benefits of providing personal information to the learner may not be presented, and the learner may not actively consent.
2. Research Objectives

We investigate whether there are differences in attitudes toward providing personal information and learning logs among learners depending on their age, occupation, learning environment, and learning content.

In addition, we investigate whether there is any benefit to the learner in providing personal information and learning logs to promote research on effective learning analytics. Moreover, the scope of accumulation and use of personal information and learning logs differs depending on the stakeholders in the learning environment, such as learners, teachers, organizations, learning analytics researchers, and educational material developers.

3. Our Previous System

For this purpose, we have developed a system that can provide simple quizzes on "LINE," a free instant messaging app popular in Japan, Korea, India, and other countries worldwide and available in more than 20 languages. This system provides questions on basic English vocabulary and medical terms, as shown in Figure 1 [1].

![Figure 1 Former System for Learning English Vocabulary](image-url)

In the English vocabulary study system, students answer regarding the Japanese meanings...
of English words. So, it limits the target to most Japanese people. In addition, because it is an orthodox learning format, learning does not continue. Therefore, we need a game-like question format. Moreover, "LINE" is a simple messaging application. Users can only input a few things at a time, and it has few features. So, LINE's original functionality is not easy to provide complicated applications [2].

4. Related Examples of English Vocabulary Learning through Games

There are English vocabulary learning games such as "Hangman," which is said to have originated in the 19th century, and recently, "Wordle," in which players guess a six-letter English word. Previous studies have shown that Hangman has a certain degree of learning effect. In comparison, we have not found any research on the learning effects of Wordle on vocabulary learning. The Wordle system asks questions regardless of the users’ vocabulary mastery level. Users are eager to compete to see if they know English words rather than how many correct answers they can get in the fewest responses.

5. New System

We adopt a question format like Hangman and Wordle for our new system. However, the system selects words based on various lists such as New General Service Lists and learners' English vocabulary levels. Moreover, the number of letters in an English word is flexible.

Figure 2 An Image of the system under development
For implementation, we use "LIFF" (LINE Front-end Framework) [3], a platform that allows running web applications. The web application appears in front of the LINE screen. It is possible to interact flexibly between the user and the web application.

Figure 2 shows an image of the system under development.

**Acknowledge**

This work was supported by JSPS KAKENHI Grant Numbers JP22K18614, JP21H00896, JP18K18677.

**References**


Evaluating the Transfer Effect of Interpersonal Problem-Solving Skills Education for University Students

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Abstract: Okada and Matsuda (2021) redesigned the "human relations" curriculum to develop general problem-solving and metacognitive abilities and created gaming instructional materials for teaching that promotes metacognitive skills in interpersonal problem solving. However, whether students can apply their learning to solve problems in new interpersonal problem-solving situations is unclear. This study aims to verify whether the content learned in lectures transfers to problem solving in new interpersonal problem-solving situations, using a comprehensive exercise assignment.

Introduction

Social skills training (SST) and social skills education (SSE) have attracted attention toward fostering university students’ interpersonal skills in Japan; however, the effects of SST and SSE are not easily transferable. Thus, there is an urgent need to develop teaching methods that enable the transfer and evaluation of learning effects on interpersonal skills development.

The first author has taught "human relations," —a liberal arts subject in humanities and social studies since 2014. These lectures aim to share knowledge about human relationships, including social skills, to enable their application in everyday interpersonal situations. To date, lectures have involved teaching knowledge and skills (instruction) and repeated practice (behavioral rehearsal). Nevertheless, just as SST and SSE, issues with transfer and maintenance exist (Okada & Matsuda, 2021a).

Bruer (1993) identified that problem-solving skills require instructions on general strategies and metacognition. Metacognitive knowledge refers to the knowledge necessary to apply metacognitive skills (monitoring and control), and metacognition encompasses both metacognitive knowledge and skills. In addition, metacognitively aware and informed instructions are required to promote the transfer of general strategies.

Okada and Matsuda (2021a) defined interpersonal problem-solving skills as those that can be used to address conflicts in relationships among university students and defined a model of interpersonal problem-solving skills education based on a general-purpose problem-solving model. Fig. 1 shows the Warp and Woof Model for interpersonal problem-solving skills education. In Fig. 1, the problem-solving script (the warp process) is indicated by rectangles on the left side and contains five sub-processes concerned with problem solving. In each warp process, activities that require students to “collect→ process→ summarize” information are performed simultaneously, using ways of viewing and thinking (shown in the balloon in Fig. 1). The output (shown in the rightmost square in Fig. 1) is produced through warp process activities. Domain-specific knowledge can be classified as internal knowledge requiring memorization (shown as cloud shapes in Fig. 1) and external knowledge that must be referred to (shown as cylindrical shapes in Fig. 1) (Okada & Matsuda, 2019). These three elements correspond to metacognitive knowledge: problem-solving procedures (warp and woof procedures and activities, functions, and output of each procedure), ways of viewing and thinking, and domain-specific knowledge.

Okada and Matsuda (2021a) redesigned the human relations curriculum to develop general problem-solving and metacognitive abilities and created gaming instructional materials (Material 1 and Material 2) for teaching that promotes metacognitive skills in interpersonal problem solving. Okada and Matsuda (2021b) analyzed student log data on gaming materials to examine the educational effects of gaming instructional materials. The results indicated that an effective coaching strategy. Feedback enables students to notice the gap between their own thinking and the model (monitoring) and correct their answers at an
early stage (control). However, whether students are able to apply their learning to solve problems in new interpersonal problem-solving situations, that is, whether they have learned transfers to new interpersonal problem-solving situations, is unclear.

There have been some studies on the evaluation of transfer of learning, such as arithmetic problems; however, most of them have only evaluated the correctness or incorrectness of transfer tasks or have used a self-assessment questionnaire asking “Do you use this in your daily life?” However, the purpose of evaluating transfer effectiveness is to assess whether the new teaching methods (i.e., explicit instruction, model instruction, and metacognitive skills instruction) are successful. Moreover, it is insufficient to simply evaluate whether the transfer tasks are correct or incorrect or to evaluate oneself. If new teaching methods are not successful, it is necessary to identify what is not working and make improvements. Therefore, it is crucial to determine to what extent students have mastered the process of problem-solving thinking, corresponding to the steps taken during their transition.

Figure 1. The Warp and Woof Model for interpersonal problem-solving skills education
(Okada & Matsuda, 2022)

Purpose
This study aims to verify whether the content learned in lectures transfers to problem solving in new interpersonal problem-solving situations, using final assignments given to students who engaged in “human relations” in the 2021 academic year.

Methods
We evaluated the final assignment from the following two perspectives. 1. Evaluation of the thinking process: We evaluated the transfer effect by examining whether students could think in accordance with the problem-solving model they learned. This meant evaluating the transfer effect. 2. Evaluation of the goodness
of the solution: We examined whether the final solution that the students derived in the final assignment was improved by being able to think in accordance with the model. This meant evaluating the adequacy of the model taught in the lecture.

The overall flow of lectures and evaluations was as follows. First, a preliminary survey of interpersonal problem solving was conducted in the first lecture. Next, 14 lectures and three types of gaming instructional materials were given. Finally, a presentation on interpersonal problem solving was given as the final assignment.

1. Preliminary survey
   During the first lecture, a survey was conducted on the following topics using the university’s learning management system: Please recall a time when what you wanted to do and what others wanted to do did not match, were incompatible, or conflicted, and you wondered what to do about it. 1. In what order and what did you think about at that time? 2. What did you finally do in the end?

2. Lectures and Gaming instructional materials
   In the lecture, using examples of interpersonal problem solving, I taught the procedures of problem-solving, domain-specific knowledge, and ways of viewing and thinking, based on the model of Okada and Matsuda (2022). The gaming materials were made available online to each student. Coaching with feedback allowed students to practice applying the knowledge learned in the lectures to new situations.

3. Final assignment (Presentation)
   In the final session of 14 lectures, a presentation (10 min per student) of the final assignment was given. For the final assignment, the students were asked to include examples of interpersonal conflicts that they had experienced in their daily lives and to describe what and how they thought about the process, from goal setting to deriving the optimal solution in accordance with the problem-solving model they had learned in the class.

4. Participants
   Of the 124 (2021) students in grades 1–4 who took “human relations,” 118 gave presentations on their final assignments.

5. How to evaluate the transfer effect
   In this study, we consider that the transfer of learning outcomes is the ability to solve problems in everyday interpersonal problem-solving situations in accordance with the model, which is metacognitive knowledge in lectures. We hypothesized that if students could solve problems in accordance with the model, they would be able to derive more appropriate and optimal solutions. We evaluated the transfer effect on the basis of the four points in Table 1.

<table>
<thead>
<tr>
<th>Table 1. Four evaluation points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

1) Classification of Situations
   In the classification of situations, we classified the situations described by the students as actual events from the Fig.2 perspectives: For example, in a situation where a friend invited the student on a trip but the student was worried about COVID-19, the type of relationship is “Friends,” the generation is “peer,” and the negotiation position is “Reacting to the other’s initiation.”
2) **Assessment of thinking processes**

In the assessment of thinking processes, the thinking process was evaluated using the following rubric (Table 2).

<table>
<thead>
<tr>
<th>Type of relationship</th>
<th>Generation</th>
<th>Negotiation position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Extracurricular activities</td>
<td>Peer (classmates, colleagues, friends)</td>
<td>1 Initiating the negotiation</td>
</tr>
<tr>
<td>2 Part-time job</td>
<td>Older (seniors, employee, boss, teacher)</td>
<td>2 Reacting to the other's initiation</td>
</tr>
<tr>
<td>3 Friends</td>
<td>Parent</td>
<td>3 Opinions are conflicted</td>
</tr>
<tr>
<td>4 Classes (experiment, group work)</td>
<td>Younger (juniors, student)</td>
<td></td>
</tr>
<tr>
<td>5 Family</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Other (relationship with teacher, etc.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 2. Classification of Situations**

<table>
<thead>
<tr>
<th>Table 2. Rubric for evaluating the thinking process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem analysis</strong></td>
</tr>
<tr>
<td>Not analyzing the problem</td>
</tr>
<tr>
<td><strong>Goal Setting</strong></td>
</tr>
<tr>
<td><strong>Generating alternatives</strong></td>
</tr>
<tr>
<td><strong>Rational judgment</strong></td>
</tr>
<tr>
<td><strong>Derivation of an optimal solution</strong></td>
</tr>
</tbody>
</table>
3) **Qualitative evaluation of problem-solving solutions**

In the qualitative evaluation of problem-solving solutions, we evaluated the problem-solving solutions described by the students on the basis of the following points: Whether there were multiple alternatives, whether they were divided into cases, and whether they described the priorities of the alternatives (Table 3).

Table 3. Qualitative evaluation of problem-solving solutions

<table>
<thead>
<tr>
<th></th>
<th>Multiple alternatives</th>
<th>Distinguish between cases</th>
<th>Prioritization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Are students able to combine elements of small unit proposals to come up with alternatives?</td>
<td>Are there multiple alternatives and are the cases of the alternatives divided according to the situation?</td>
<td>Are priorities for alternatives considered?</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4) **Evaluation of the level of problem-solving solutions**

In the evaluation of the level of problem-solving solutions, the level of problem-solving solutions described by students was evaluated using the levels of Interpersonal Negotiation Strategies (Table 4) proposed by Yeates and Selman (1989).

Table 4. Levels of Interpersonal Negotiation Strategies (INS)

<table>
<thead>
<tr>
<th>Developmental level of INS</th>
<th>Social-perspective coordination</th>
<th>Interpersonal orientation of INS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Egocentric and undifferentiated</td>
<td>Other-transforming</td>
</tr>
<tr>
<td></td>
<td>Subjective and unilateral</td>
<td>Self-transforming</td>
</tr>
<tr>
<td>0 Impulsive</td>
<td>Fight; grab; hit</td>
<td></td>
</tr>
<tr>
<td>1 Unilateral</td>
<td>Command; bully; order; tell</td>
<td>Obey; give in; wait for help</td>
</tr>
<tr>
<td>2 Reciprocal</td>
<td>Give reasons; persuade; go first</td>
<td>Ask for reasons; barter; go second</td>
</tr>
<tr>
<td>3 Collaborative</td>
<td>Third person and mutual</td>
<td>Collaborate, reflecting mutual needs and nature of relationship</td>
</tr>
</tbody>
</table>

**Results and Discussion**

1. **Classification of Situations**

Tables 5-1, 5-2, and 5-3 show the classification of interpersonal situations chosen by the students in the preliminary survey and final assignment. Compared to the preliminary survey, the number of “friendships” situations was much higher in the final assignment. This is presumably due to the influence of COVID-19, which restricted students’ activities, such as part-time jobs and experiments.
Table 5-1. Type of relationship

<table>
<thead>
<tr>
<th></th>
<th>Preliminary survey</th>
<th>Final assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Extracurricular activities</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>Part-time job</td>
<td>24</td>
<td>27</td>
</tr>
<tr>
<td>Friends</td>
<td>20</td>
<td>22.5</td>
</tr>
<tr>
<td>Classes (experiment, group work)</td>
<td>15</td>
<td>16.9</td>
</tr>
<tr>
<td>Family</td>
<td>13</td>
<td>14.6</td>
</tr>
<tr>
<td>Other (relationship with teacher, etc.)</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 5-2. Generation

<table>
<thead>
<tr>
<th></th>
<th>Preliminary survey</th>
<th>Final assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Peer (classmates, colleagues, friends)</td>
<td>55</td>
<td>61.8</td>
</tr>
<tr>
<td>Older (seniors, employee, boss, teacher)</td>
<td>19</td>
<td>21.3</td>
</tr>
<tr>
<td>Parent</td>
<td>13</td>
<td>14.6</td>
</tr>
<tr>
<td>Younger (juniors, student)</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 5-3. Negotiation position

<table>
<thead>
<tr>
<th></th>
<th>Preliminary survey</th>
<th>Final assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Initiating the negotiation</td>
<td>35</td>
<td>39.3</td>
</tr>
<tr>
<td>Reacting to the other's initiation</td>
<td>22</td>
<td>24.7</td>
</tr>
<tr>
<td>Opinions are conflicted</td>
<td>32</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>100</td>
</tr>
</tbody>
</table>

2. Assessment of thinking processes

Table 6 shows the results of the assessment of thinking processes. The results showed that 70–90% of the students were able to think according to the procedures of the problem-solving model, even when the subject was an everyday interpersonal problem-solving situation that they had experienced. These results indicate that the thinking process, based on the problem-solving model learned in the lectures, was transferred to new situations to some extent. On the other hand, it was found that some students did not analyze the problem sufficiently or did not fully understand the concept of the process of developing alternative solutions.
Table 6. Assessment of thinking processes

<table>
<thead>
<tr>
<th></th>
<th>Does not meet requirements</th>
<th>Insufficient</th>
<th>Meets the requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Problem analysis</td>
<td>17</td>
<td>14.7</td>
<td>25</td>
</tr>
<tr>
<td>Goal Setting</td>
<td>6</td>
<td>5.2</td>
<td>7</td>
</tr>
<tr>
<td>Generating alternatives</td>
<td>25</td>
<td>21.6</td>
<td>2</td>
</tr>
<tr>
<td>Rational judgment</td>
<td>8</td>
<td>6.9</td>
<td>10</td>
</tr>
<tr>
<td>Derivation of an optimal solution</td>
<td>19</td>
<td>16.4</td>
<td>5</td>
</tr>
</tbody>
</table>

3. Qualitative evaluation of problem-solving solutions

Tables 7-1, 7-2, and 7-3 show the results of the qualitative evaluation of problem-solving solutions. After attending 14 lectures and completing three different gaming materials, 80–90% of the students were able to show that the optimal solution to the final task consisted of multiple alternatives, that it was divided into cases depending on the situation, and that they were able to consider the priority of the solutions.

Table 7-1. Multiple alternatives

<table>
<thead>
<tr>
<th></th>
<th>Preliminary survey</th>
<th>Final assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>No</td>
<td>56.2</td>
<td>50</td>
</tr>
<tr>
<td>Yes</td>
<td>43.8</td>
<td>39</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>89</td>
</tr>
</tbody>
</table>

Table 7-2. Distinguish between cases

<table>
<thead>
<tr>
<th></th>
<th>Preliminary survey</th>
<th>Final assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>No</td>
<td>85.4</td>
<td>76</td>
</tr>
<tr>
<td>Yes</td>
<td>14.6</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>89</td>
</tr>
</tbody>
</table>

Table 7-3. Prioritization

<table>
<thead>
<tr>
<th></th>
<th>Preliminary survey</th>
<th>Final assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>No</td>
<td>88.8</td>
<td>79</td>
</tr>
<tr>
<td>Yes</td>
<td>11.2</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>89</td>
</tr>
</tbody>
</table>

4. Evaluation of the level of problem-solving solutions

Fig. 3 shows the results of the evaluation of the level of problem-solving solutions. After attending 14 lectures and completing three different gaming materials, 85% of the students were able to consider solutions at Level 3 of Collaborate, reflecting mutual needs and the nature of the relationship.
Conclusion and Future Work

The results of this study showed that the thinking process based on the problem-solving model learned in the lectures was transferred to new situations to some extent. The final solution that the students derived in the final assignment was improved by being able to think in accordance with the model. We are also developing a method to evaluate the transfer of learning using gaming materials. In the future, we plan to integrate these results into a more detailed analysis.

References


Acknowledgments

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Study of Home Learning Using AI-type Mathematics Teaching Materials in Junior High Schools

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In this study, We analyzed the open-ended comments of junior high school students in order to investigate how home learning with AI-type mathematics teaching aids should be. As a result, it was found that it is necessary to make the students make a habit of using AI-type mathematics materials on a daily basis by using them in class or assigning them as homework. In addition, it was found that some students do not find time to use AI-type mathematics materials for home study due to the busyness of their daily lives, so it is necessary to consider how to find time to work on this issue.

Keywords: education, elementary school, practice, regular polygons and circles, self-efficacy, individual terminal environment

Introduction

In Japan around 2018, the time spent using digital devices in school classes was the lowest among OECD member countries (Ministry of Education, Culture, Sports, Science and Technology, 2018). However, with the realization of the GIGA school concept, by the year 2022, one terminal per student and a high-speed, high-capacity communication network had been installed in an integrated manner.

One of the learning methods using tablet terminals is the use of AI teaching materials. Qubena is a typical AI teaching material used in Japan (Figure 1). However, at the beginning of the introduction of one terminal per student, some teachers appeared to be perplexed about teaching using ICT (Information and Communication Technology) (Soma, 2021), and there were many teachers who were unable to teach home study from the perspective of local government rules and information morality (Sato et al., 2021). The same may be true for AI teaching materials. In a study conducted by Akabori (2022) on teachers' views of learning and teaching in terms of lesson design, it was found that "thinking for oneself" and "using ICT only after understanding the reasons" as factors that influence "confidence in teaching materials" and "confidence in using ICT" are linked to increasing teachers' confidence in using ICT. The study found that "thinking for oneself" and "using ICT only after understanding the reasons" were linked to increasing teachers' confidence in using ICT. In Japan today, where one terminal per student has been well developed, there are many cases where students bring their own tablet terminals home for study. Therefore, it is necessary for teachers to understand students' opinions about the use of AI materials in order for them to think about it and understand the reasons for using it when they incorporate AI materials in their classes and home study.

The purpose of this study is to compare the opinions of students who have adopted AI-type mathematics teaching materials in their home study with those of students who have not adopted AI-type mathematics teaching materials, and from this, to examine the methods of home study that incorporate AI-type mathematics teaching materials.

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Methods

In September 2021, a questionnaire survey was administered to 115 second-year students (57 boys, 54 girls, and 4 students of unknown gender) at a public junior high school in Tokyo. The target students for analysis were 95 students (48 boys, 46 girls, and 1 student of unknown gender) who did not respond to any of the items in the questionnaire survey. These students were instructed by their teachers to find time to study on their own from June 9, 2021, when Qubena was introduced, to August 31, 2021, the end of the summer vacation period.

The AI-type mathematics teaching material used in this study is Qubena (https://qubena.com). Qubena is an adaptive learning teaching material that realizes effective and efficient learning by analyzing the calculation process and answers of each student during learning, identifying the points that cause stumbling blocks, and automatically guiding the student to the problem he or she should solve (Ministry of Economy, Trade and Industry, 2022). Qubena has three modes: a learning mode in which students themselves determine the scope of their study, a master mode in which they review problems they made mistakes on the learning mode, and a workbook mode in which they are assigned as homework. In this study, the workbook mode, which is assigned as homework, was not used during the period under study.

In order to understand the use of Qubena during the summer vacation, we asked one question, "Q1. During the summer vacation, I worked a lot on Qubena."

Results

Free descriptions of students who have used AI-type math materials

15 out of 95 students responded affirmatively to the question "Q1: During the summer vacation, I worked a lot on AI materials (Qubena)". Table 1 shows the results of the free-response responses for Q2 through Q4.

The results of the free-text responses in Q2 indicate that most of the students who used the AI-type mathematics materials used them as a review for classes and tests (12 out of 15 students, 80%), and one student used them as a preparation for class.
The results of Q3 indicate that the reasons for working with the AI-type math materials were: "I can solve problems that suit me (3 of 15, 20.0%)," "Electronic devices seem more motivating and fun (3 of 15, 20.0%)," and "I can study easily in my own time (2 of 15, 13.3%)."

Furthermore, the results of Q4 indicate that the following measures were taken to encourage students who have not yet used the system: "Include the system as homework (5 out of 15, 33.3%)," "Provide time for students to work on it on a daily basis, such as at school or during gaps (4 out of 15, 26.7%)," and "Teach the good points and how to use the system (3 out of 15, 20.0%). (3 out of 15, 20.0%)."

**Free description of students who have not used AI-type math materials**

80 out of 95 students answered negatively to the question "Q1: During the summer vacation, I worked a lot on AI materials (Qubena)". The free-response statements for each of Q5 and Q6 were analyzed using KH Coder3.

1. **Free description regarding why students did not use AI-type math materials (Q5)**

   The free description to "Q5. Please freely describe why you did not use the AI-type mathematics teaching material (Qubena)" were analyzed by KH Coder3 (Figure 2). Hereafter, the number of "Subgraph:" in the figure is defined as the extracted classified number and is shown as (01).

   (01) The extracted terms are 9. The Jaccard coefficient for "different" and "teaching material" is 0.67. The Jaccard coefficient for "problem" and "solve" is 0.50. Since the student's free description includes the statement "I did not use Qubena because I often studied with different materials", I interpreted this as "the student was using other materials than Qubena for them study".

   (02) The extracted terms are 4. The Jaccard coefficients for "Qubena" and "open" are 0.40. The Jaccard coefficients of "open" and "bug" are 0.33, and those of "bug" and "troublesome" are 0.33. The student's free description includes "It is troublesome to log in to Qubena one by one." and "I did not use Qubena because the tablet was buggy, and the page would close. I did not use Qubena because my tablet was buggy, and the page would close. Therefore, I interpreted that "the students felt that using Qubena was a troublesome task, so they were not motivated to use it".

   (03) The extracted terms are 4. The Jaccard coefficient for "school" and "busy" is 0.40. The Jaccard coefficients for "cram school" and "homework" are 0.40, and those for "school" and "homework" are 0.33. The student's free description included the statement, "I did cram school homework and school homework. Therefore, I interpreted this as "the student was busy with school and cram school homework".

   (04) The extracted terms are 4th the Jaccard coefficients for "motivation" and "wake up," "motivation" and "efficiency," and "handwriting" and "efficiency" are 0.50, 0.50, and 0.33, respectively. One of the student's free descriptions included the statement, "I was not motivated to use Qubena because I felt it was inefficient to answer the questions only by handwriting. In addition, five terms were extracted in (05). The
Jaccard coefficients for "pen" and "writing," "pen" and "touch," "touch" and "response," and "pen" and "response" were 0.67, 0.50, 0.50, and 0.33, respectively. The student's free response was "The response of the touch pen is not good, and the text I write is cut off by the pen". (04) and (05), I interpreted that "the students felt that handwriting on the tablet was inefficient and unresponsive".

From these, three main reasons were considered for the students' not using Qubena.
(1) I was studying using other materials other than Qubena.
(2) Busy with homework at school or cram school.
(3) Students were not motivated to use Qubena because it was too much trouble.

② Free description asking how you would be inspired to use AI-type math materials (Q6)
I analyzed the free description included the statements of "Q6. How do you think they will use AI-type math teaching materials (Qubena)" using KH Coder3 (Figure 3). Hereafter, the number of "Subgraph:" in the figure is defined as the extracted classified number and is shown as (01).
(01) The extracted terms were 7. The Jaccard coefficients for "class" and "first," "first" and "habit," "class" and " positive," and "positive" and "tackle" are 0.33, respectively. The student's free description included the statement, "We will actively use it in class. Therefore, I interpreted this as "use Qubena in class and make it a habit".
(02) The extracted terms were 6. The Jaccard coefficient for "use" and "think" is 0.32. The Jaccard coefficients for "Qubena" and "use" are 0.14 and for "use" and "time" are 0.11. In the students' free descriptions, there were descriptions such as "make time, plan to do ~ minutes a day, etc.". Therefore, I interpreted this as "making time to use Qubena".
(05) The extracted terms were 3. The Jaccard coefficients for "homework" and "give out" are 0.40 and for "give out" and "Cofferdam" are 0.29. The student's free description included the statement, "The teacher gives homework with cofferdam. Therefore, I interpreted this as "Qubena will be compulsorily incorporated as homework".
Comprehensive consideration

analyzed the reasons for each of the students who used and did not use the AI-type math materials. The results of the Q3 question asked to the students who used the AI-type math materials showed that the reason they were able to study easily in their own time (2 out of 15 students, 13.3%) was the reason they were able to work with the AI-type math materials. On the other hand, the co-occurrence network analysis of Q5 for the students who did not use AI-type mathematics materials showed that "I was using other materials than Qubena" and "I was busy with homework at school and cram school" were the reasons for not using AI-type mathematics materials. The results showed that 12 out of 15 (80%) of the students who used AI-type mathematics teaching materials and 75 out of 95 (78.9%) of the students who did not use AI-type mathematics teaching materials were attending a school. This shows that the students who used AI-type mathematics materials may have been able to use Qubena in addition to their homework at school or cram school, even though they were in the same environment as the students who did not use AI-type mathematics materials. On the other hand, it is possible that some of the unused students do not find time for their own study other than homework. Therefore, I think it is necessary to propose a method to help students find time to study on their own.

Summary and Future Issues

The purpose of this study was to compare the opinions of students who have adopted AI-type mathematics teaching materials in their home study with those of students who have not adopted AI-type mathematics teaching materials, and to examine the nature of home study that incorporates AI-type mathematics teaching materials.

The results of the open-ended questionnaire survey revealed that while students who used the system responded that they could easily study in their own time, some students who did not use the system said...
they were "busy" with homework at school or cram school. This suggests that some of the unused students may not be able to find time for their own study other than homework.

As other reasons for not using Qubena, some students answered that the "response" of "touch" and "pen" was poor and that it was difficult to use. Therefore, I believe that it is necessary to propose a learning method that combines the LCD tablet and paper media.

Even more I considered two methods to encourage students who have not used Qubena to use it: "forcing them to use Qubena as homework" and "making them make a habit of using Qubena by incorporating it into their daily routines, such as in class".

As future work, it is necessary to propose learning methods that combine LCD tablets and paper media according to the situation and learning models that consistently use AI-type math materials in class and for home study. In doing so, we would like to focus on "how to incorporate Qubena into classes and homework and make it a habit," which was identified as one of the results of this study.

In this study, AI materials were used only in mathematics in the target schools. In the future, we would like to analyze the relationship between the time spent using AI materials, the percentage of correct answers, and academic performance when AI materials are used in subjects other than mathematics, as well as the characteristics of students who use AI materials across subjects.

Acknowledgements

This study was supported by JSPS KAKENHI (grant number: 21K02739), and Grant of Tokyo Gakugei University “Development of Program to Improve Graduate Students’ ICT Instructional Skills based on Cross-Curricular and Inquiry-Based Classes”

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Development of Career Education Program for Sustainable Community on a Remote Island in Japan

Rumi Yatagawa, Hideaki Kurishima
(Shibaura Institute of Technology)

1. Introduction:

   In recent years, there has been a decline in the population of Japan's local areas, in particular, because of the outflow of younger generations to urban areas. This has raised concerns about the sustainability of local areas. Young people in local areas often leave their hometown for education or job and rarely return. In order to make local areas sustainable, it is imperative that young people plan their careers with an awareness of the relationship between their hometown and their lives.

   The purpose of this study is to make the remote island of “Tanegashima” in Japan, which is expected to have a declining birthrate and an aging population, sustainable. To achieve our purpose, we aim to develop a career education program for junior high school students, who will be the future leaders of their local area, to enable them think about their future and that of their hometown at the same time.

2. Theory:

   To this end, the "backcasting" approach has been found effective. When thinking about their careers, it is important for students to be aware of “what they want to do,” “what they can do,” and “what they have to do” (Komikawa, 2013). Thus, it is necessary to think now about what to do, starting from their future career goals.
"Backcasting" is a way of thinking that sets an ideal future goal and identifies what is to be done to achieve that goal (Ishida & Furukawa, 2018). By setting ideal goals for both their future and that of their local area, and adopting the "backcasting" approach, students can become aware of how they will interact with their hometown in their careers.

3. Development and Practice of Career Education Program:

This program consists of a program centered on the “Future Mayer Workshop”. "Future Mayer Workshop” purpose is to develop future leaders of the local community by teaching them how to thinking for the regional issues that would arise in the future. This educational program is designed for this WS by providing classes to learn about sustainable regions and think about their future. Before conducting the WS, we lectured the students on the idea of “backcasting. Backcasting” is difficult for middle and high school students to understand. Therefore, we devised an educational method to explain the concept of "backcasting" so that even junior high school students can understand it, with the level of difficulty corresponding to their stages of development. Specifically, we put into practice the educational content of thinking about everyday life, and encourages them to consider their own career aspirations through “backcasting.

We set the following three learning objects for this program.

①Think about making Tanegashima sustainable.
②Think about the future of Tanegashima through backcasting.
③Think about their lives and the future of Tanegashima in parallel.

Based on these three learning goals, we created the following educational
program. This program has been created on the premise that it will be implemented in "The Period for Integrated Studies" in Japanese junior high schools (cf. figure I).

<table>
<thead>
<tr>
<th></th>
<th>Contents</th>
<th>Relevance to learning objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Guidance</td>
<td>①, ②, ③</td>
</tr>
<tr>
<td>2</td>
<td>The concept of “backcast thinking”</td>
<td>②</td>
</tr>
<tr>
<td>3</td>
<td>Think about my future self</td>
<td>③</td>
</tr>
<tr>
<td>4~5</td>
<td>Strengths and weaknesses of Tanegashima (2hour)</td>
<td>①</td>
</tr>
<tr>
<td>6</td>
<td>Relationship between SDGs and our lives</td>
<td>①, ③</td>
</tr>
<tr>
<td>7~8</td>
<td>Relationship between climate change and our lives (2hour)</td>
<td>①, ③</td>
</tr>
<tr>
<td>9</td>
<td>Ideal vision of future Tanegashima (thinking by backcasting)</td>
<td>②, ③</td>
</tr>
<tr>
<td>10~14</td>
<td>Future Mayer Workshop (4hour)</td>
<td>①, ②, ③</td>
</tr>
<tr>
<td>15~17</td>
<td>Presentation preparation, group discussion (3hour)</td>
<td>①, ②, ③</td>
</tr>
<tr>
<td>18~19</td>
<td>Presentation (2hour)</td>
<td>①, ②, ③</td>
</tr>
<tr>
<td>20</td>
<td>Reflection</td>
<td>①, ②, ③</td>
</tr>
</tbody>
</table>

4. Research Method:

We measured changes in student’s knowledge and awareness of the island’s existing problems and their careers at three points: before WS (July 2020), immediately after WS (August 2020), and six months after WS (March 2021).

We created a questionnaire to measure change in each ability-based perspective, such as knowledge, skills, and future awareness. The students who participated in all the surveys were 19 Tanegashima Junior high school students.

5. Results:

We found that knowledge of future issues, attachment to the community, and contribution to the community increased significantly immediately after the WS. In
the survey after half a year of the WS, a slight decrease was observed, though we confirmed that the educational effect was maintained (cf. figure 2). In addition, it was confirmed that the percentage of students who want to live in Tanegashima in the future increased after this educational program compared to before it was implemented.

<table>
<thead>
<tr>
<th>Do you want to do work or activities that will benefit Tanegashima in the future?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>very much</strong></td>
</tr>
<tr>
<td>before program</td>
</tr>
<tr>
<td>after WS</td>
</tr>
<tr>
<td>after program</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you want to improve Tanegashima in the future by yourself?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>very much</strong></td>
</tr>
<tr>
<td>before program</td>
</tr>
<tr>
<td>after WS</td>
</tr>
<tr>
<td>after program</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you want to do something useful for the community as a member of Tanegashima?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>very much</strong></td>
</tr>
<tr>
<td>before program</td>
</tr>
<tr>
<td>after WS</td>
</tr>
<tr>
<td>after program</td>
</tr>
</tbody>
</table>
Figure 2: Think about their lives and the future of Tanegashima in parallel

Figure 3 shows the learning effect of backcast thinking. The learning effect of backcasting is high. In particular, they have become able to think about their own careers by "backcasting".

6. Conclusion: —How to maintain the educational effect of WS.

Development of educational methods to raise awareness of society and the
region (Tanegashima), not just about themselves. Don’t make it a one-time educational program. Create a career education program throughout the three years of junior high school according to the developmental stages of the students.

We will continue to improve our career education programs.

Addendum:

This program effort at Tanegashima Junior High School received an award from the Minister of Education, Culture, Sports, Science and Technology in 2021.

Reference:


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      Hideaki Kurishima (kurikuri@shibaura-it.ac.jp)
Research on ICT Utilization Teaching Skills of Beginning Elementary School Teachers in Japan

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Abstract
This study focused on Information and Communication Technology (ICT) utilization teaching skills of beginning elementary school teachers, aiming to clarify how they felt regarding their own ICT utilization teaching skills by using a revised checklist: “The Checklist of ICT Utilization Teaching Skills of Teachers” The results show that beginning elementary school teachers are more negative about their own ICT utilization teaching skills compared to other teachers in Japan.

Keywords: Information and Communication Technology (ICT), Beginning Elementary School Teachers, Teacher Teaching

Introduction
In Japan, teachers are required to improve their ICT utilization teaching skills (MEXT 2020a). In addition, Ministry of Education, Culture, Sports, Science and Technology (MEXT) created “The Checklist of ICT Utilization Teaching Skills of Teachers” to determine the status of teachers’ ICT utilization teaching skills in 2007. The list was revised in 2018(MEXT 2018). To date, MEXT has done annual surveys on teachers nationwide in Japan and published the results.

Furthermore, Yagisawa and Hotta (2016) showed that with one terminal per child, experienced teachers were more diverse in the situations and contents of ICT use than novice ones. From this, it is expected that there may be differences with one terminal per child between novice teachers and experienced ones in their ICT utilization teaching skills.

Therefore, this study aimed to clarify the status and issues of ICT utilization teaching skills of beginning elementary school teachers. The results of beginning teachers were compared with those of teachers nationwide in elementary school using “The Checklist of ICT Utilization Teaching Skills of Teachers.”

Methods
A web-based questionnaire survey was administered between Thursday, May 12th, 2022, and Sunday, May 22nd, 2022, targeting 27 beginning elementary school teachers who became teachers in
April 2022. We focused on four (Table 1) out of 16 items of “The Checklist of ICT Utilization Teaching Skills of Teachers” for which the ratios of positive responses were particularly low nationwide.

The ratios of positive responses were compared, including “3. Can somewhat do” and “4. Can do,” as part of a nationwide survey to compare the result of this survey with that of a nationwide survey of elementary school teachers conducted in 2021 (MEXT 2022) and those of Sato’s survey (2021) targeting university students in a teacher-teaching curriculum.

**Results**

In four items, the ratios of positive responses of this survey were 28.3–43.0 points lower than those of the nationwide survey and 25.0–47.3 points lower than those of Sato’s survey (Figures 1–4). The results show that beginning elementary school teachers are more negative about their own ICT utilization teaching skills compared to other teachers and university students in a teacher-teaching curriculum in Japan.

In “B-3. With the aim of consolidating knowledge and mastering skills, I can have students work on repetitive tasks and tasks appropriate to each student's level of understanding by utilizing learning applications and software” the ratio of positive responses of this survey was 48.1 percent. And that of nationwide survey was 77.4 percent. And also, that of Sato’s survey were 73.1 percent. As a result of comparison of those, that of this survey was 29.3 points lower than that of nationwide survey and 25.0 points lower than that of Sato’s survey.

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**Table 1** Results of “The Checklist of ICT Utilization Teaching Skills of Teachers” for Beginning Elementary Teachers (N = 27)

<table>
<thead>
<tr>
<th>Items</th>
<th>Scales</th>
<th>n</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-3. With the aim of consolidating knowledge and mastering skills, I can have students work on repetitive tasks and tasks appropriate to each student's level of understanding by utilizing learning applications and software.</td>
<td>1. Can hardly do</td>
<td>5</td>
<td>18.5</td>
</tr>
<tr>
<td></td>
<td>2. Can't much do</td>
<td>9</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>3. Can somewhat do</td>
<td>10</td>
<td>37.0</td>
</tr>
<tr>
<td></td>
<td>4. Can do</td>
<td>3</td>
<td>11.1</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>B-4. I can have students effectively use computers (including tablet terminals), software, and so on when students learn to summarize ideas in group discussions, while producing collaborative reports, materials, works, and so.</td>
<td>1. Can hardly do</td>
<td>9</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>2. Can't much do</td>
<td>7</td>
<td>25.9</td>
</tr>
<tr>
<td></td>
<td>3. Can somewhat do</td>
<td>6</td>
<td>22.2</td>
</tr>
<tr>
<td></td>
<td>4. Can do</td>
<td>5</td>
<td>18.5</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>C-3. I can guide students to organize research and ideas and to summarize them in an easy-to-understand manner with sentences, tables, graphs, diagrams, and so on by utilizing word processing software, spreadsheet software, presentation software, and so on.</td>
<td>1. Can hardly do</td>
<td>7</td>
<td>25.9</td>
</tr>
<tr>
<td></td>
<td>2. Can't much do</td>
<td>12</td>
<td>44.4</td>
</tr>
<tr>
<td></td>
<td>3. Can somewhat do</td>
<td>5</td>
<td>18.5</td>
</tr>
<tr>
<td></td>
<td>4. Can do</td>
<td>3</td>
<td>11.1</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>C-4. I can guide the students to utilize computers (including tablet terminals), software and so on to exchange and share their ideas with each other and engage in discussions.</td>
<td>1. Can hardly do</td>
<td>8</td>
<td>29.6</td>
</tr>
<tr>
<td></td>
<td>2. Can't much do</td>
<td>8</td>
<td>29.6</td>
</tr>
<tr>
<td></td>
<td>3. Can somewhat do</td>
<td>6</td>
<td>22.2</td>
</tr>
<tr>
<td></td>
<td>4. Can do</td>
<td>5</td>
<td>18.5</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
points lower than that of Sato’s survey (Figures 1).

In “B-4. I can have students effectively use computers (including tablet terminals), software, and so on when students learn to summarize ideas in group discussions, while producing collaborative reports, materials, works, and so” the ratio of positive responses of this survey was 40.7 percent. And that of nationwide survey was 69.0 percent. And also, that of Sato’s survey were 78.2 percent. As a result of comparison of those, that of this survey was 28.3 points lower than that of nationwide survey and 37.5 points lower than that of Sato’s survey (Figures 2).

In “C-3. I can guide students to organize research and ideas and to summarize them in an easy-to-understand manner with sentences, tables, graphs, diagrams, and so on by utilizing word processing software, spreadsheet software, presentation software, and so on” the ratio of positive responses of this survey was 29.6 percent. And that of nationwide survey was 72.6 percent. And also, that of Sato’s survey were 76.9 percent. As a result of comparison of those, that of this survey was 43.0 points lower than that of nationwide survey and 47.3 points lower than that of Sato’s survey (Figures 3).

In “C-4. I can guide the students to utilize computers (including tablet terminals), software and so on to exchange and share their ideas with each other and engage in discussions” the ratio of positive responses of this survey was 40.7 percent. And that of nationwide survey was 70.1 percent. And also, that of Sato’s survey were 78.2 percent. As a result of comparison of those, that of this survey was 29.4 points lower than that of nationwide survey and 37.5 points lower than that of Sato’s survey (Figures 4).

Figure 1 Comparison of the Positive Response Ratios of Beginning Elementary School Teachers and Nationwide Elementary School Teachers in 2021, University Students in a Teacher-teaching Curriculum (B-3)
Figure 2  Comparison of the Positive Response Ratios of Beginning Elementary School Teachers and Nationwide Elementary School Teachers in 2021, University Students in a Teacher-teaching Curriculum (B-4)

Figure 3  Comparison of the Positive Response Ratios of Beginning Elementary School Teachers and Nationwide Elementary School Teachers in 2021, University Students in a Teacher-teaching Curriculum  (C-3)

Figure 4  Comparison of the Positive Response Ratios of Beginning Elementary School Teachers and Nationwide Elementary School Teachers in 2021, University Students in a Teacher-teaching Curriculum  (C-4)
Conclusions

Sato (2021) showed that the ratios of positive responses of the result of his survey targeting university students in a teacher-teaching curriculum were 5.8 to 17.8 points higher than those of the nationwide survey of elementary, junior high, and high school teachers (MEXT 2020b) in the four items. Uchida (2021) also showed that these ratios were higher than those of the nationwide survey of junior high school and high school teachers (Japan Educational Press 2017) for the four items. He considered that it caused the university students had experiences that they learned about ICT use and they studied with ICT.

The beginning elementary school teachers targeted by this survey also had similar experiences to those of the students. However, the ratios of positive responses of this survey were low targeting beginning elementary school teachers who recently graduated from a teacher-teaching curriculum. Thus, this was opposite to Sato’s (2021) and Uchida’s (2021) findings.

There are two possible explanations for this result. The first is that the “reality shock” affected the self-efficacy of the beginning teachers regarding the ICT utilization teaching skills. The differences between the image that beginning teachers imagined before becoming teachers and the reality constitute reality shock (Matsunaga et al. 2017). The second is that there is a gap between ICT utilization teaching skills that students perceive they have acquired through the teacher-teaching curriculum and those required of teachers in elementary school.

To clarify the above two possible explanations, we would like to conduct a semi-structured interview survey of the beginning elementary school teachers by asking the following questions. “Have you changed your cognition of ICT utilization teaching skills between, before, and after becoming a teacher?”, “Is it useful for you what you had learned in the teacher-teaching curriculum related to ICT use?” and so forth. In addition, it is necessary to investigate why the cognition of the ICT utilization teaching skills of beginning teachers is low, how ICT utilization teaching skills should be in a teacher-teaching curriculum, and how training of beginning teachers on ICT utilization teaching skills should be conducted so that it can be improved.

Acknowledgements

This study was supported by JSPS KAKENHI (grant number: 21K02739), and Grant of Tokyo Gakugei University “Development of Program to Improve Graduate Students’ ICT Instructional Skills based on Cross-Curricular and Inquiry-Based Classes.”
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Review article

The role of accounting information for decision making

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Abstract:

Economic development requires reliable and important information in order to achieve economic decisions from investors, managers, administrators...etc. Also, the development of an accounting system, that can provide reliable information in decision-making, is an important factor.

in accounting, accounting information is considered as a very important factor, due to its important role in the accounting information system related to economic entities, especially for making the needful and right decisions for the business.

reliable and Accurate financial information is an essential element in making decisions because having this kind of information in our hands has a big importance in business management.

on the other hand, accounting information are available for many users, such as stakeholders (managers, employees, suppliers, customers, financial creditors, government and its institutions, the public, the media, etc.). This financial information is not only important and essential for rich investors or worthy businesses only but also for small businesses, this type of information helps to go through the decision-making process step by step, like planning the business and controlling it.

this report aims to provide an overview of what accounting information is, its importance, and how it affects the decision-making process, as having reliable and accurate accounting information is one of the important characteristics that improve the efficiency of decisions taken in commercial and economic entities.

By looking at the opinions of a group of researchers, the importance of high-quality accounting information will be presented and what is the extent of its effect on decision-making by the users of accounting information.

Believe it or not! accounting information is a great and important resource in successful and effective business, and it is essential for its users in terms of its impact on their economic decisions, as it must enjoy accuracy and health in order to obtain the confidence of its user and is useful in knowing the risks that may arise in the future and manage it in a right way and on time.
**Keywords:** Accounting information, decision making, financial information, economic entities, performance.

**Introduction:**

The system of information is made of components or connected elements. The data is collected, and elaborated after receiving it, and then this process gives users the necessary information, usually, it takes documents and reports shape. [1]

To ensure the perfect work conditions in entities like economic companies and others, and to make sure that business operators are making effective decisions, it’s necessary to provide the basic information that will help them make their decisions.

Accounting is an informatic system that works on making reports about the different activities of economic entities, for different parties, it also shows information about the economic conditions and the performance of the entity. This information is registered on time, and it can be read and used by financial users. This information has a big role in the economic system path [2], and most people who are interacting and working with economic units are interested in having the right and updated information, in order to make profitable and successful economic decisions.

We have mentioned the big importance related to accounting information in the accounting field, we can obtain it by specific methods and specific tools that process the economic and financial data, and accounting information has to be true and accurate and complete, because it represents the face of the management process and how it's based, and all the decision-making processes is relying on this accounting information. It means the accounting information has a main role in the economic information system.

Greiner pointed out some ideas as well: [3]

- "*Information do not grow in nature, they are produced, meaning they are symbols deliberately created by social operators*"
- the information represents and induces the attitude and behaviors, and they benefit from compound mechanisms
- Accounting information has several characteristics, including Existence, reporting, provision, and execution
The information may be internal or external.

1. Accounting information:

Accounting information is produced through specialized compositions, internal accounting information takes the shape of specialized functional compartments, and external accounting information takes the shape of independent legal entities, and there are certified people that work on obtaining this accounting information.

Accounting is an informational system that works on studying the effects of economic transactions and discovering financial situations, to inform the users of the accounting information, and this information gives us the basis for evaluating the organization by internal and external users. Also, Accounting information has two main kinds: financial and managerial: [4]

- Financial accounting information: it's for external users, such as investors and the government, and is shown through financial statements (balance sheet, profit and loss, and cash flow statement).
- Accounting information related to management is for internal users or the entity's management and has information on the costs of the products, according to how big is the business or the profitability per product.

Presenting accounting information has to be able to supply the users with all the listed above. Also, accounting information, according to its role in helping users to make decisions, is classified into three types of accounting information: [5]

1. Accounting information that is provided within the economic entity and its regulatory framework.
2. Accounting information that is in the form of a budget and is used in planning, evaluation and decision-making.
3. Additional accounting information that is additionally equipped by the economic entity in order to improve the quality of the chosen decision.

Users who are related to accounting information, have three kinds of information activities: [6]

- searching for specific information that isn't published to the public.
- analyzing and processing the information in order to predict financial and economic analysis.
- making retrospective analysis, which is an analysis of previous performance.

2. Characteristics of Accounting Information

In order for have useful accounting information presented to users, it must have some characteristics, which are: [7,8]
1. Understand: the information must be easy to perceive and comprehend for users, and users are also supposed to have knowledge, albeit simple, of accounting vocabulary and the world of economics.

2. Objectivity: Accounting information will be presenting the most recent events, which helps users in evaluating events in a timeline (the past, present and future.)

3. Appropriateness: Accounting information must be able to provide a solution or assistance in financial and economic analyses.

4. Reliability: Accounting information must present the true picture of events and processes, free from material errors and biases.

5. Ease of access: Accounting information must be accessible to users at the required time and easy to access.

6. Speed: the speed at which information reaches the user from the accountant.

In light of the current economic developments for companies and the development of market dynamics, their development has consequently led to the evolution of economic and financial information, as it explains the financial status of the institutions, and its economic activities, in order to benefit from it and other parties who use accounting information, and so that the accounting information is useful. It should have four main characteristics: comprehensiveness, relevance, reliability, and compatibility of the information.

3. Users of accounting information:

Accounting information is important to managers and owners, but it benefits others as well. We will refer to some other users:

1. Owners/shareholders: One of the main objectives is to provide accounting information to business owners.

2. Managers: In companies, managers must be provided with accurate accounting information, because they are responsible for the company’s business before the owners, shareholders, and investors.

3. Potential investors: Investors and owners want to know the commercial profits of their business and the possible risks, and they get this through the company’s financial reports.

4. Creditors and bankers: The creditor and the bank want to make sure that the institution or company can pay the required amount in a timely manner, so the financial reports help them to analyze this, so we see the banks requesting financial reports from the company before approving the loan.
5- Government: The government is interested in financial reports because it is the one who calculates taxes on the basis of business profits, as well as various government departments such as the department designated for registering companies and others.

6- Researchers: Researchers make use of accounting information in their accounting research.

4. The information circuit within financial-accounting system:

The accounting information path includes several steps: data collection, processing, communication, receiving, and then use. That is, we can say that all the tools used to perform these steps are included in the accounting information system.

This system is concerned with providing the necessary information to users in an understandable manner, but many users may lack knowledge of economic matters, but this is resolved through the use of specialized accountants [12]

Employees responsible for financial accounting departments must be able to provide the best possible work, because the information they analyze, and process must provide assistance and answer the economic decisions that users intend to make. [13]

5. Accounting information. a significant and essential part of the informatic system in the path of the economic unit

Within the global economic conditions, the economic units face severe pressure, and the most important of these pressures is competition, whether it is local or external competition.

To achieve economic development, accounting information must be analyzed and obtained accurately and reliably, because it helps its users to know the appropriate orientation of each company within the international and local markets. [14]

In general, accounting information has a major role in decision-making at all levels, but therefore increasing the quality of information leads to an increase in the quality of decisions taken, and the increase in the importance of accounting information and the role it affects depends directly on credibility and reliability. Reliable accounting information is important for the development of the labor market, because, for example, if the investor loses confidence in the reports and accounting information he owns, it will hinder economic development, because reliable accounting information gives reliable financial reports and reduces risks in the financial markets. The investment decision, for example, is based on integrated and reliable information on which to build the foundations of work to support economic integration.

6. Decision making:

Administrative innovation in companies is an important matter, in which the general form of the company, practices, and others may be changed, and the greater the ability of the institution or company to innovate, this means increasing its performance, the effectiveness of its performance
and creating value for it, as innovation is not an easy matter, but rather it comes as a result of a right decision-making. [15]

Making a decision means having several achievable options and choosing one of them. The decision-making process takes place constantly in our lives, starting from small daily decisions to big decisions, and also takes place in various fields from mathematics to statistics to economics and others. [16]

Attention should be paid to the difference between problem analysis and the decision-making process. The analysis of the problem generally precedes decision-making, as the analysis of the problem requires its study and analysis of its causes. As for decision-making, it assumes the existence of certain goals to achieve them, studying the available alternatives to choose between them, and knowing the most appropriate decision. [17]

In the end, the decision-making process can be interpreted as organizing the alternatives and choices that exist, and choosing the most appropriate among them and the most appropriate [18]

It is one of the most important and basic steps in achieving the effectiveness of organizational performance, and various factors can affect the decision-making process, so the accounting information in this case, when adhering to its characteristics, must help us study alternatives to reach the right decision [19]. It’s a process of selecting the alternatives we have, and then we start evaluating the alternatives that have been selected for implementation to reach the goals we are looking for in the company or organizations. [20]

7. The importance of Accounting Information in Decision Making.

Looking at the various opinions of researchers and writers, we see that everyone agreed with the idea of the impact of accounting information on the decisions taken, and that the greater the quality of this accounting information, the more positively it affects the quality of the decisions taken.

The Roman writer (Feleaga) [6] stressed the necessity of having special standards to evaluate the quality of accounting information that greatly benefit its users, and that the presence of these qualities is necessary in preparing accounting standards to be compatible with the required objectives. The quality of information related to accounting greatly affects economic and financial decisions to be effective, and this is what aims us to study accounting to obtain the necessary knowledge to enable participation in economic decision-making.

On the other hand, American scientists (Needles, Anderson and Coldwell) [21] believe that accounting information is the basis on which to rely in the internal and external decision-making process, and that the main objective of it is to provide data that users will make their decisions based on it.

American economists Hongren, Foster, & Datar [22] see that accounting systems depend on the economic processes that take place inside and outside the organization and process the data to translate it into useful information for users, as the processing of data and economic processes
requires data collection, classification, analysis, and summarization. The performance of any economic entity or company is evaluated on the type of taken decisions and their implementation. In order to reach high-quality decisions, we must rely on well-founded sources of information. Everyone makes daily decisions, but not all of them are simple and easy, but all of them fall within the scope of the “decision-making process”.

According to Hongren, Foster, & Datar, the decision-making process involves gathering data, considering future costs, benefits, and risks, selecting an appropriate course of action, and then evaluating the results.

Investors need to be informed of the financial situation and reports that show the company’s position, to know whether their investment is profitable or not, and through analyzing the information, it becomes clear to them their profitability from this investment and whether they should reduce it or increase it in the future according to the current studies available to them.

Suppliers and creditors also need this information to know that the supplies provided by them will be paid for in a timely manner.

The government also needs accounting information related to the performance of a company or an economic entity, as it determines the amount of taxes imposed on it according to the information in their possession.

Also, the employees of the economic entity, including managers and others, need this accounting information to know the company's current situation and to consider the possibility of increasing salaries, and improving working conditions.

Conclusion:

Obtaining information is a basic source for knowing how to develop successful businesses, and this appears in obtaining accounting information that benefits its users and affects their decision-making process, especially their economic and financial decisions. This information must be characterized by certain characteristics so that decision makers can benefit from it to the fullest, and most importantly, it must be accurate and reliable in order to obtain the confidence of users, which will lead to enhancing financial strength and discovering risks, managing them, and attracting investments. The field of accounting information is a wide field, we tried to cover the most common topics, where we talked about accounting information and its users and types, in addition to talking about the decision-making process, then we talked about the topic of our paper, which is the role of accounting information in making decisions.
References:


This paper presents the Work-In-Progress of a pilot research study on STEM learning and learning environments for cybersecurity. The project engaged 6-8 middle-school students with a focus on: (1) their understanding of key personal and school-related cybersecurity issues, and (2) how students monitor, think about and communicate to others about their own cybersecurity, both at home with family members and at school with peers.

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Introduction

Cybersecurity knowledge is fundamental to all global citizens. Given the sudden global transition to remote and online educational, professional, and personal activities due to the COVID19 pandemic, our global citizens are now exposed to even greater critical cybersecurity risks in many facets of their lives. This dire situation has created a need to fill research and literature gaps in student understandings of cybersecurity education. Filling the STEAM (science, technology, engineering, arts, and mathematics) pipeline in cybersecurity may result if cybersecurity interest is sparked at earlier ages---especially in scenarios where students apply to vocational high schools.

An overarching goal of this Work in Progress research study is to investigate how students learn about the risks associated with the naive use of devices (e.g., phones, tablets, computers) that enable access to the internet. Our investigation tracks student learning about cybersecurity issues and their communications about that learning with each other such as: data sensitivity, data sharing, privacy policies, scams, cyber risks, and securing personal assets.

Literature Review

There are multiple ways by which cybersecurity impacts education significantly. Cybersecurity education is offered in both conference and workshops that are dedicated to
expanding pedagogy and accreditation (Crick et al, 2019; Schneider, 2013). Cybersecurity can engage learners in Science, Technology, Engineering, and Mathematics (STEM), as it directly affects learners’ personal interests and values (Blikstein & Krannich, 2013; Hmelo-Silver, 2004). Cybersecurity education can assist students learn the importance and risks for security and privacy for their own personal technology and information in their own daily lives and the lives of their families by birth or choice. Each day, students learn about technology through information interactions that engage those who may not otherwise display interest in STEM (Rusk et al., 2008). The development of cybersecurity education pathways to attract and retain students from groups that are underrepresented in computing fields is essential for personal, local, national, and global security (Denner et al, 2020). According to the U.S. Department of Labor (2019), Cybersecurity jobs will increase by 28% from 2016 to 2026 with a median pay of $95,510/year reported in 2017. However, a skills gap exists, according to Weese (2019), so that filling cybersecurity positions remains difficult. O'Flaherty (2018) emphasizes the importance of creativity in considering different cyber-risk factors which may emerge from teams of individuals with diverse backgrounds and experiences. Morrow (2018) reports, however, that in many cases diversity remains unrealized.

Research Goals

Our primary goal for this research project is to address an apparent research gap on how students’ reason about heightened cyber dangers, obstacles in understanding, their cyber beliefs, and their communication their understandings about this area.

Although both national and international security rely on human understanding of cyber topics and research to design, develop, deploy, interact with, and decommission technology: We were unable to identify research in the learning and teaching of cybersecurity topics such as discovering how students build understandings and structures about cybersecurity concepts in their earlier K-12 years.

Design and Methodology

This Work-in-Progress research is designed around two concentrations comprised of three Modules. In cybersecurity education, both the National Institute of Standards (NIST)’s National Initiative for Cybersecurity Education (NICE) Cybersecurity Workforce Framework published in the NIST Special Publication (SP) 800-181 (2017) and the National Security Agency (NSA) (n.d.) refers to cybersecurity learning in the form of knowledge, skills, and abilities (KSAs). The cybersecurity learning goals for concentrations are based on these standards, and the interventions are designed to meet the requirements of knowledge and skill building. The concentrations are learning reference: Data Sensitivity and Risk, and Scams and Risks. The deals of each concentration are described in the following section.

The Modules were designed to be implemented in a cloud-sharing document with real-time virtual team collaboration using appropriate software. Both technologies support participant anonymization. This virtual research team structure enables students’ full participation remotely and enables removing travel obstacles for participating students. Video narratives detailing the process that the students follow will be produced for analysis. These
artifacts will also be useful for professional development activities for teachers---those not enrolled in this study.

**Target Population and Recruitment**

The target population for this research pilot study is middle-school students in the New York City Tri-State Region. A diverse group of middle-school students will be recruited to participate in the interventions. The school’s minority student enrollment is 48% and the student population is made up of 51% female students and 49% male students. The school enrolls 5% economically disadvantaged students. The students will be invited to participate through emails, announcements, and in-class calls for participation. Priority consideration was given to all minority students to participate who indicate they identify with characteristics for traditionally low cybersecurity graduation numbers.

**Logical Connections to an Established Research Base**

The intervention is grounded in a theoretical socio-constructivist and cognitive framework. Specifically, from a socio-constructivist perspective (Cobb, 2011; Davis, Maher, & Noddings (Eds), 1990), intervention design is guided by learning, which is a process of mental construction onto already constructed knowledge. In addition, learning occurs under conditions of sufficient time for exploration, discussion, reexamination of ideas that have been shared with others, who listen to, contribute to, and challenge ideas. As such, learning does not occur in isolation. From a cognitive perspective (Davis, 1984, 1992; Davis & Maher, 1990), knowledge is represented in spoken language, physical models, drawings, and writings. The strategies, heuristics, forms of reasoning, and representations used in support of the problem solving of each individual make visible the knowledge development. Building knowledge of core cybersecurity issues will enable participating students to share their knowledge with others and enable growth in understanding of critical cybersecurity issues. There remains a literature and research gap on studying how students build meaningful cybersecurity learning. Thus, the proposed conceptual framework is both adequate conceptually, and offers a firm basis from which implications for practice can be drawn. Drawing on studies on student learning from mathematics education research, according to Freudenthal (1983) and Davis (1984, 1992), it is important to build conceptual understanding. One way to build understanding is through problem-solving activities. Freudenthal (1991) emphasized that the material students are to build meaningful internal representations should be real for students, an approach called Realistic Mathematics Education (RME).

To build meaningful internal representations, Goldin (1998) describes a need to be able to use not just one representational system construct in isolation (e.g., “rule learning, algorithms, strategies, image schemata, visualization, heuristics, metacognition, metaphor, construction of meaning, affect, belief systems, or any other) (Goldin, 1998, p. 142).” Instead, he argues that there is a need to be able to use “constructs in combination with each other. (Goldin, 1998, p. 142)” The cognitive perspective accounts described by Goldin for learning through the observable features of the cognitive constructs include representations, strategies, and forms of reasoning employed during individual problem solving.
Davis (1984) and Davis & Maher (1990) proposed that learners cycle through steps when working on mathematical problem-solving activities. Their learning cycle hypothesis included problem-specific representation building, relevant knowledge constructing or recollection, constructing a mental map between the knowledge and data representations, internal validation of map adequacy, and applying, revisiting, and representation modifications as new situations are encountered. This internal mental mapping is aided in part, according to Davis and Maher (1993), by an “assimilation paradigm.” Using Piagetian language, an assimilation paradigm is “a set of information processing activities in which the learner sees a new experience as ‘just like’ or ‘similar to’ some recalled earlier experience.” As such, new experiences create opportunities for the learner to organize and work with their existing mental data representations. Data thus are internalized through a learner’s well-coordinated actions on objects that may occur in response to explorations of a problem-solving situation (Davis & Maher, 1990).

Davis (1984) describes properties that make activities an assimilation paradigm. Specifically, he describes four properties as follows: (1) “involves ideas for which virtually all students have powerful representations,” (2) “it is a reliably accurate isomorphic image for all [the applicable] operations,” (3) “it tells a student how to deal with [the applicable] problem; the story itself guides you to a solution,” and (4) it is “simple.” Thus, the conceptual framework guiding the interventions investigations draws on the work from (Freudenthal, 1983; Davis, 1984, 1992; Davis & Maher, 1990), and (Goldin, 1998).

One aspect of our research project focuses on students’ learning how to express their understandings of cyber security. These communications rely, by necessity, on a specialized language, and as such is referenced as “academic language” (Bailey & Wilkinson, 2022). Academic language is more precise than “everyday” language, and for each discipline, it is manifested by both oral and written forms, sharing lexical and syntactic features such as increased conciseness in word selection to avoid redundancy; a higher frequency of informational words as the means to achieve more concise expression; and grammatical processes such as embedding complex ideas into fewer words. Learning the academic language to communicate ideas is important in cybersecurity as it is in all disciplines. By academic language, we mean the “specialized language, both oral and written, of academic settings that facilitate communication and thinking about disciplinary content” (Nagy & Townsend, 2012, p. 92.) Language as it is used within the different academic disciplines takes on different characteristics. Formal features and functions as well as text types or genres comprise the ways language may differ depending on the communicative traditions and routines within a specific discipline.

Preliminary Report of Data Collected

Our Work-in-Progress research revealed both strengths and limitations.

Work in Progress Strengths

The Work-in-Progress research pilot revealed that students encountered need for security understandings. Each Module on which students worked, elicited novel cybersecurity understandings according to interviews and during module statements.
In all the Modules, students reported learning new security ideas such as language, risks, and legal requirements. When discussing in the Modules on scams, one student reported, “I got one of these before, someone called and said I am at the airport, come pick me up. I knew that it was a stranger and hung up but now I may have reported it.” Other ideas such as what information websites are collecting, perhaps under privacy policy requirements, was also reported as novel for students.

Student engagement was strong and showed strong student interest. Although the Modules were designed to be of approximately 45 minutes in duration, student engagement was such that during one session we had to stop the session after 1.5 hours.

Based on the post session interviews, students preferred online sessions due to schedule the flexibility. Overall, the students suggested continuing with the same style of Module design for future research.

**Work in Progress Limitations**

The online environment revealed some limitations. Overall, most of the limitations were based on limitations of technology and time.

During the Module meetings, we found we had to diversity the approaches to encouraging discussion and students’ familiarity. After several initial Modules, we incorporated some changes, and student interactions became more extensive. We also created some new methodologies for remote work to improve and encourage discussions among students.

Given the engagement of the students, there were some time constraints. As students met with us in their “free time,” they indicated a preference for shorter sessions, instead of finishing a complete Module in one session. They also expressed concerns regarding time conflicts with other extracurricular activities, such as clubs and sports. We realized the importance of designing the Modules so that they were in limited time (approximately 45 minutes). It became apparent that this design feature was essential for students to fit the modules within their lifestyles.

Additionally, we found that the online video conferencing software posed some limitations for our study. For example, recording limitations and video placement both impact the study. In such scenarios, breakout rooms have limited, if any, video recording features. In addition, there is limited user-driven screen layout changes to accommodate learning and interactions.

Learning these limitations early in the study helps future planning.

**Future Work**

Future work involves many facets of the research project. First, we anticipate building out more concentrations of cybersecurity studies relevant for middle school students’ current and future lifestyles. Second, we anticipate building out a methodology for a larger study. Third, we
are re-designing the Modules based on student participant feedback. Lastly, we are working on data coding and analysis to examine how students construct their understandings and communicate them with other students.

Conclusions

The field of cyber and information security have been established to help protect people, data, and information systems from malicious activities. Due to rapid transitions into online environments exacerbated by the COVID19 pandemic, technology usage far outpaces cybersecurity understandings. This research focuses on interdisciplinary understanding of student’s online cybersecurity risks to build foundational literature on discovering how students build and communicate conceptual understanding of cyber risks. Ultimately, our society is as safe as the infrastructure and supply chains on which it relies. Our research formalizes foundational security literature gaps ultimately to build an institute to guide the improvement of cybersecurity understanding across the United States and larger international community.

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Abstract
Since the 2000s, the world economy as a whole has been developing globally, but the Japanese economy has not been able to grow as much as before, and one of the reasons is that only a few Japanese people have been able to produce "Global Talent". The purpose of this study is to clarify the characteristics of employment attitudes and success factors of both Japanese employees hired locally overseas and their host companies. Thailand, which has developed mainly through manufacturing industries such as the Japanese automobile industry, and Singapore, which has developed mainly through the financial industry, have very different industrial structures and employment environments. Therefore, a comparative study of expatriates' job satisfaction and attitudes toward work and the personnel hiring strategies of host companies in Thailand and Singapore revealed that there are several attributes of people who are highly satisfied with their jobs. Three representative examples are "ELA=Enjoy Life Abroad," "MSS=MySelf Shine," and "UWS=Upward Success." ELA is a trend seen mainly in Bangkok, Thailand, where it can be said that they prefer to experience life abroad itself, regardless of the industry they work in or the nature of the work they do. MSS are those who are not satisfied in Japan, where membership-based employment is the norm, and who prefer gender equality, fair evaluation, and a multicultural environment, and who are willing to try and work abroad. Furthermore, UWS are more upwardly mobile than MSS and actively seek higher rewards, recognition, social significance, and prestige. We were able to derive a hypothetical model that the reason for the formation of these three different characteristics may be differences in the way they self-actualize.
Furthermore, regardless of the attribute group of it, we were also able to confirm the trend that pre-employment overseas experience, including in childhood, broadens the scope of one's subsequent career development. In recent years, "overseas internships" have gradually begun to be offered at Japanese universities, raising new possibilities for success. It is clear that actively providing opportunities to experience the possibility of working abroad through university education, including exchanges with overseas universities, various forms of study abroad, and active promotion of "overseas internships," is effective for career development that makes the most of individual characteristics. This clearly shows that university education is effective for career development that makes the most of individual characteristics.

**Keywords:** Global Talent, SIEs=Self-Initiated Expatriates, Boundary-spanners, Overseas Experience, Overseas Internship, Multicultural Symbiosis

**Introduction**

This presentation is a research report on the Grant-in-Aid for Scientific Research (KAKENHI) study "A Study on Career Paths of Locally Hired Japanese Employees in Asia and Recruitment Strategies of Japanese Overseas Subsidiaries". One of the various reasons for this is the lack of globally active human resources. There are two types of globally active human resources: those who are stationed overseas by Japanese companies and those who are hired locally overseas and work overseas at their own request. The purpose of this study is to clarify the characteristics of employment attitudes and success factors of both Japanese employees hired locally overseas and their host companies. Japan has a unique employment system customarily referred to as "membership employment. This system has supported Japan's rapid economic growth to date and has functioned effectively within Japan. Japanese society has been formed as a monolithic cultural sphere centering on the Japanese language, and members within the same organization are expected to be homogeneous, and human resource development has been conducted with the aim of contributing to maximizing organizational capacity on the premise of homogeneity.
In the 2000s, the world economy expanded globally, and the Japanese economy needed to develop global human resources to adapt to globalization, but it was extremely difficult to develop global human resources while maintaining the Japanese membership-based employment structure. In this environment, Japanese companies dispatched many Japanese expatriates to promote their business operations overseas. However, the result, with a few exceptions, was not a system to develop global human resources. The reasons for this are said to be that becoming a global human resource for employees dispatched overseas has not become their business objective, and various corporate restrictions and limitations. On the other hand, the study is very interesting from the viewpoint of global human resource development of Japanese people, and it is very meaningful in terms of its practical implications.

In the late 1990s, Japan had the highest GDP per capita in the world, but it now ranks lower among the G7 countries. Now, in GDP per capita comparisons, Japan tends to be overtaken by South Korea and Taiwan, also in Asia. Membership is important for Japanese companies. The required "homogeneity" is favorable for "endorsement" from the organization. On the other hand, another Asian country that emphasizes 'homogeneity' is South Korea, which also employs a lump-sum hiring system for new graduates and membership-based employment. However, it is necessary to take a serious look at the background that has created the situation where GDP per capita is inverted.

Figure 1. Comparison of employment practices between Japanese and Western firm
Research background, awareness, purpose.

The purpose of this study is to investigate the gap in employment attitudes of both Japanese workers employed locally overseas and host companies.

The two countries for the study are Singapore and Thailand. The reason for choosing these two countries is that Singapore has joined the ranks of developed countries through the development of its financial industry and is now the largest financial center in East Asia. Thailand, on the other hand, has achieved the most economic growth of any developing country in Asia through the development of its manufacturing industry, especially in the automobile industry. It is important to consider the characteristics, similarities, and differences between the two countries in this study.

Regarding the definition of global human resources, Japan defines "Global Talent" as people who have acquired rich language skills, communication skills, and cross-cultural experiences, and who can play an active role on an international level. However, it cannot be said that Japan as a whole has been sufficiently successful in developing such human resources. Japanese SIEs working in Singapore and Thailand are a valuable sample for research and study. The characteristics of locally hired Japanese SIEs who are already active overseas will provide perspectives for solutions.
Previous research

Regarding the positioning of Japanese local hires as SIEs, in the 1970s and 1980s, there were scattered cases where expatriates were hired in the role of Japanese language support (internal organization center, general affairs, interpreter, local affairs expert) to replace expatriates or for business expansion. Companies expect boundary spanner functions (even expatriates serve as a bridge to the head office/liaison) (Furusawa 2019).

After the Lehman Shock in 2008, partly due to the worsening employment situation, the number of locally hired employees (SIEs) who has opportunities for career advancement overseas and voluntarily travel for work purposes increased in the Asian region, where work permits are easier to obtain. (Furusawa 2017).

There was an immediate need for human resources with knowledge of the overseas field (e.g., a nodal role between expatriates and local staff) to respond to business expansion and other needs, and local companies expected them as middle management and executive candidates for further localization. The number of SIEs increased from a wide range of age groups, including not only young people but also mid-career professionals and retired but energetic seniors, providing SIEs with an opportunity to leave Japan and take on a new challenge. (Niwa, Nakagawa, and Timo THELEN 2016)

From these previous studies, we can get some overall picture of the operational differences between expatriates and Japanese SIEs. However, how are "Global Talent" formed? The question of how "Global Talent" are formed has not yet been sufficiently studied. Specifically, it is necessary to clarify the characteristics and expectations of companies that employ Japanese SIEs and the attributes of the SIEs themselves. The following questions need to be clarified.

Research questions

Human resources who voluntarily work overseas have a variety of motivations for wanting to work overseas. In order to investigate the gap between the employment attitudes of both locally hired Japanese workers and their host companies, and to clarify the relationship between the development of an environment in which "Japanese local hires" can continue to work and the work attitudes of overseas workers, the following research questions were set up for this study.

RQ1: Human resources who voluntarily work overseas can be divided into several attribute groups from the viewpoint of work motivation.

RQ2: There is an influence of overseas experience that creates a motivation or trigger to go abroad from Japan.
Overview of Field Survey
We planned to conduct field surveys in Thailand and Singapore to investigate the gap in employment awareness between Japanese workers hired locally overseas and their host companies, and to clarify the relationship between the development of an environment in which "Japanese local hires" can continue to work and the employment awareness of overseas workers. The reason for our selection was that Thailand, as a representative of a country where many Japanese are active, has developed mainly in the manufacturing industry, such as the Japanese automobile industry, and Singapore, which has developed mainly in the financial industry, have very different industrial structures and employment environments. In order to investigate expatriates' job satisfaction and awareness of work in Thailand and Singapore, and the personnel recruitment strategies of host companies, and to obtain suggestions on issues and solutions for labor-management relations between local (Japanese-affiliated) companies and Japanese local hires, we conducted a survey of Japanese local hires in Singapore and Thailand, including their work awareness and local (Japanese-affiliated) company local hiring policies. We conducted a questionnaire and interview survey on the actual conditions of work attitudes and policies of Japanese local hires in Singapore and Thailand.

【Summary of Field Research】
The original research plan called for activities from FY 2019 to FY 2021, but due to the Corona disaster, the research period was postponed by one year. Targets were selected from the list of Japanese companies in Thailand published by the Thai Chamber of Commerce and Industry. Target companies were sent the survey in advance, and interviews were conducted after they understood the purpose of the survey. The second field survey was designed independently and conducted online using Google Form.

First field survey: Interview survey
Schedule : February 18 (Tuesday) to February 22 (Saturday), 2020 (5 days)
Location : Bangkok, Thailand
Research team: Principal investigator and two sub-researchers
Survey targets: 18 Japanese corporations, JETRO Bangkok Office, Bangkok Chamber of Commerce and Industry (BCCI), and Bangkok Chamber of Commerce and Industry (BCCI).
Survey method: Semi-structured interviews based on a questionnaire sent in advance.

Second Field Survey: Interviews and Questionnaire Survey
Date : July 31 (Sun.) to August 8 (Mon.), 2022 (9 days)
Location : Singapore and Bangkok, Thailand
Research organization: Principal investigator and two sub-researchers
Survey targets: 10 Japanese-affiliated companies, Embassy of Japan in Singapore, Embassy of Japan in Thailand, JETRO Singapore, JETRO Bangkok, Singapore Chamber of Commerce and Industry, Singapore Embassy of Japan in Singapore, Embassy of Japan in Thailand, Bangkok JETRO, Singapore Chamber of Commerce and Industry, Panya Bangkok Chamber of Commerce and Industry, 16 companies in total
Japanese local employees, mainly locally hired, 34 in total
Survey method: Semi-structured interviews based on a questionnaire sent in advance.
Survey method: Semi-structured interview survey based on a questionnaire sent in advance and a web-based questionnaire survey using Google Form

**Interview items for each company**

1. Overview of each company's business (including employee composition, benefits, employment conditions, etc.)

2) Number of Japanese employees (locally hired and expatriate), hiring process, roles, evaluation, training, etc.

3. Challenges and prospects for Japanese companies in ASEAN

**Interview and Questionnaire Items for Overseas Workers**

1. History of overseas work (including location, number of years, process to employment, satisfaction with job content and compensation, etc.)

2. Skills required for overseas work, awareness of working overseas, etc.

3. Views on career design, future career prospects, etc.

**Survey Result**

Several attributes were identified for people with high levels of job satisfaction.

“ELA = Enjoy Life Abroad”

“MSS = MySelf Shine”

“UWS = UpWard Success”

ELA is a trend SIEs mainly in Bangkok, Thailand, and can be described as a preference for experiencing life abroad itself, regardless of the industry in which they work or the type of work they do.

MSS are those who are not satisfied in Japan, where membership-based employment is the norm, and who prefer gender equality, fair evaluation, and a multicultural environment, and who are
willing to try and work abroad. Furthermore, UWS are more upwardly mobile than MSS and actively SIEs higher rewards, recognition, social significance, and prestige. To derive a hypothetical model that the reason for the formation of these three different characteristics may be differences in the way of self-actualization.

The following characteristics are shown for each attribute. The table below summarizes them.

<table>
<thead>
<tr>
<th>Category/Life Values</th>
<th>Major features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELA</strong> = ‘Enjoy Life Abroad’ (Lifestyle oriented)</td>
<td>The <strong>top priority is to savor life abroad</strong> and not be concerned about the kind of job they work in. This group also includes those who are married to locals.</td>
</tr>
<tr>
<td><strong>MSS</strong> = ‘MySelf Shine’ (Self-fulfillment oriented)</td>
<td>MSS prefer gender equality, fair evaluation, and a <strong>multicultural environment, and are willing to take on the challenge of working abroad.</strong></td>
</tr>
<tr>
<td><strong>UWS</strong> = ‘Up Ward Success’ (Upward career success)</td>
<td><strong>More upwardly</strong> oriented than MSS, and actively seeks higher rewards, recognition, social significance, and prestige.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>Required job skills, expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELA</strong> = ‘Enjoy Life Abroad’</td>
<td>Ability to adapt to the local living environment, general job performance, and good communication skills with local people.</td>
</tr>
<tr>
<td><strong>MSS</strong> = ‘MySelf Shine’</td>
<td>Ability to adapt to local work environment, Excellent job performance, management and leadership.</td>
</tr>
<tr>
<td><strong>UWS</strong> = ‘Up Ward Success’</td>
<td>Hyper-professional, Highly multilingual, Highly professional expert, Highly competent, Professional business minded</td>
</tr>
</tbody>
</table>

Figure 3. SIEs 3 Categories summary of Major features, Required job skills, and expertise

To understand the overall picture, a graph was created using 'willingness to improve at work' on the vertical axis and 'job skills needed' on the horizontal axis. This shows that there are three attributes in Thailand, but no SIEs as ELAs were found in Singapore. It can be inferred that the reasons for this are that work permissions are difficult to obtain and require a high level of business expertise, and that the standard of living is high and low salaries are not enough to make a living.
Figure 4. SIEs 3 Categories summary in Thailand, Bangkok

Figure 5. SIEs 3 Categories summary in Singapore
Furthermore, based on these findings, the following hypotheses were derived that can be used for future research.

1. The reason for the formation of these characteristics is due to differences in methods and purposes of self-actualization.
2. Realization of "Global Talent" requires both "career design ability" and "ability to adapt to the environment".

Further empirical research on these two is needed based on the results of this survey.

Discussion and consideration
As a result of a comparative study of the job satisfaction and work attitudes of expatriates and the human resource employment strategies of their host companies in Thailand and Singapore, it became clear that there are several attributes of people who are highly satisfied with their jobs. Three representative examples are 'ELA=Enjoy Life Abroad', 'MSS=MySelf Shine', and 'UWS=Understandable Work Satisfaction'. ELA is a trend observed mainly in Bangkok, Thailand, and can be described as a preference to experience life abroad itself and not being concerned with the industry or job description in which one works. In many cases, it can be said that they are not concerned about the industry in which they work or the nature of the work they do. MSS are those who are not satisfied in Japan, where membership-based employment is common, and who prefer gender equality, fair evaluation, and a multicultural environment, and are willing to take on the challenge of working abroad and thrive. Furthermore, UWS are more upwardly oriented than MSS and actively seek higher rewards, recognition, social significance, and prestige. We were able to derive a hypothetical model that the reasons for the formation of these three different characteristics may be different ways of self-actualization.
Figure 6. Results of SIEs interviews with respondents with and without overseas experience and the timing of their overseas experience.

*Source Survey result summary*

Figure 7. Comparison of number of student study abroad (Japan vs Korea)

*Source Revised public information modified.*
Consideration of the interviews and questionnaires also confirms the trend that regardless of the type of experience, pre-employment overseas experience, including during childhood, broadens the scope of one's subsequent career development. In recent years, "overseas internships" have gradually begun to be offered at Japanese universities, raising new possibilities for success. It is clear that actively providing opportunities to experience the possibility of working abroad through university education, such as exchanges with overseas universities, various forms of study abroad, and active promotion of "overseas internships," is effective for career development that makes the most of individual characteristics. This clearly shows that university education is effective for career development that makes the most of individual characteristics.

The reality of Japanese students studying abroad

The total exceeded 100,000 for the first time in 2017.

Figure 8. Overall number of students studying abroad in Japan and by length of study

The problem is Japan's approach to its study abroad program. Long-term study abroad programs have hardly increased. Various institutional improvements are essential to this improvement.

【Study Abroad Programs in Japan】
1. Study Abroad: Specialty + language (credits are transferable)
2. Overseas language study: English only (credits transferred for English language classes only)
   1 year or 6 months
3. Overseas language study: English only 1 month, summer, winter (1 or 2 credits, depending on the university)
4. Overseas language experience: English only 1 to 2 weeks
【Study Abroad Programs of Japanese student】

Types of Overseas Internships
1. Long-term internship: several months, some universities offer credits
2. Short-term internship, 1 to 2 weeks, with credit depending on the university
3. Online Overseas Internship About 1 week Expanded by the Corona Disaster

The results of the interview survey for this study also confirmed the trend that pre-employment overseas experience, including during childhood, broadens the scope of one's subsequent career development. In recent years, "overseas internships" have gradually begun to be offered at Japanese universities, raising new possibilities for success. It is clear that actively providing opportunities to experience the possibility of working abroad through university education, including exchanges with overseas universities, various forms of study abroad, and the active promotion of "overseas internships," is effective for career development that makes the most of individual characteristics. This is a clear indication that university education is effective for career development that makes the most of individual characteristics. Japan is a mono-ethnic social environment, and there are few opportunities to be aware of national borders and other ethnic groups in daily life. In order to contribute to the world in the future, it is necessary to produce "Global Talent" that make the most of Japanese characteristics.

Future Research
Continue research on human resources working not only for Japanese companies, but also on Japanese working for multinational companies, including those outside of Asia.
1) In particular, the correlation between the motivation to work abroad and study or/and experience abroad.
2) The formation process of MSS "shining human resources" and UWS "glittering human resources" Statistical approach with a larger sample size and elucidation of the mechanism.
3) Cross-country comparison of women's activities in Asia from the perspective of the increasing trend of Japanese women's overseas employment.

Acknowledgments
Thank you to the many Japanese companies, Japanese embassies, overseas public institutions, and industry representatives in Singapore and Thailand who kindly cooperated with our questionnaire survey and interviews in writing this report.
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Socially Engaged Discourses through Visual Art

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By introducing practical examples, this paper explores how visual art can be utilized as an effective tool to bring social awareness in this difficult time with COVID-19 and ongoing racism. The included discussions highlight social roles of visual art in educational discourses (Koo, 2021 & 2022a) and values of utilizing artworks of contemporary artists who embody socially engaged art in their artmaking practices (Koo, 2022b & 2023). Based on those examples, I invite readers to reconsider their existing perspectives toward visual art and its potential as an agent of positive social change (Thompson, 2012; Quinn et al., 2012).

During the session on January 5, 2023, the attendees/participants and I examined the potential of visual art as an effective medium of promoting socially engaged discourses in this unprecedented time while allocating a space to share individuals’ thoughts. First, I introduced two female Asian American contemporary artists, Pao Hua Her and Amanda Phingbodhipakkiya, thought provoking artists, and their projects. Starting with reviewing Her’s Attention (2015) series¹, participants had an opportunity to look at Her’s photographs for a few minutes. While looking at the figures and settings of the photographs, the participants were asked to think about the following questions: What do you see? Who might the figure in the photographs be? What would their backgrounds be? Are there any interesting aspects regarding their outfits, facial

¹ This project exhibited in Minneapolis Institute of Art in 2015 focuses on Hmong American identity via presenting Hmong Army veterans.
expressions, and/or the setting of the photographs? What do you think about the figures and/or the artist wanted to present through those photographs?

Similarly, when the participants examined the second set of visual images created by Amanda Phingbodhipakkiya, they considered the following questions: What stands out to you in those visual images? Do you know where those artworks might have been displayed and why? How does the artist utilize visual aspects in social spaces? What kinds of messages do you read/find from the images? The viewers were intrigued by the vibrant colors, bold letters written on the artworks, and the main theme, *Human Rights*, expressed throughout the Phingbodhipakkiya’s multiple projects such as *I Still Believe* (2020-present), *We Are More* (2020-present), and *Stand With Us* (2021). Some of the attendees even recognized the images and/or the locations of the exhibited artwork.

During the two sets of initial reflection periods, attendees thoroughly reviewed and compared the photographs. After the initial step of analyzing the visual images, the participants shared what they found or how they interpreted the visual cues embedded in those visual images. Each individual presented various viewpoints and analyses, leading to critical conversations related to the visual aspects, social contexts, and power dynamics presented through the artworks. Through the framework of appreciating visual art as being engaged in social practice, the discussion expanded by introducing some key concepts that describe the theoretical and practical foundations of socially engaged art (Helguera, 2011). Then, the participants examined how contemporary artists explore those concepts in their artmaking practices.
Visual art has great potential to provoke people’s various ways of thinking related to our surrounding and social contexts (Koo, 2015, 2021, & 2022b). Analyzing visual images, individuals can share their diverse thoughts and interpretations without being judged by others (Koo, 2015). Different backgrounds and understandings from varied people can deepen the discourses while expanding the understanding of others and society.

References


Examining the intersectionality of Asian immigrants’ identities with race, ethnicity, language, nationality and legal status, this paper presents stories and experiences of six Asian immigrants living in the United States. Through a three year long participatory action research, this study highlights their cross-cultural negotiation as minorities who seek a sense of belonging (Koo, 2022). This paper also challenges existing racialized perspectives of Asian immigrants/Asian Americans in the United States while criticizing stereotypes and myth toward the underrepresented population.

This paper aims to shed light on underrepresented populations’ experiences through sharing voices of Asian/Asian American immigrants in a Midwestern urban city in the United States. This study explores collective voices and experiences of six recent Asian immigrants who migrated to the United States after 2000, but constantly struggles to search for identity in different contexts. In an attempt to address those struggles and concerns, the author presents Asian/Asian American immigrants’ experiences and views as a collective narrative. Furthermore, similar to other research projects highlighting various local contexts (Irizarry & Brown, 2014; Kemmis & McTaggart, 2000; Stringer, 2008 & 2014), community-based participatory action research has been utilized in this study to understand the specific experiences relevant to the local community setting.
Many Asians/Asian American immigrants in this community often feel a sense of difference due to many reasons such as physical appearances or language differences and further experience transnational cultural identities in their home, school, and in-between cultural settings (Chung, 1999; Kang, 2014). Through sharing narratives from the participants, the author highlights four main themes: Majority vs. minority; deficit perspectives; language barrier; sense of belonging. The study shows that cultural and societal transitions from Asian countries to the United States meant they became part of the minority group. The immigrants’ native customs do no longer coincide with the American values in the United States, resulting in their marginalization. Also, cultural differences are perceived as deficiencies in many circumstances (Ryu, 2014; Sleeter & Grant, 2007). As they follow their native customs, immigrant people living in the United States might behave differently from locals. Appreciated in their home countries, behaviors and abilities of immigrants are underestimated due to different standards in the United States (Hovey at el., 2006; Park, 2005). The result is they suffer from being undervalued and try to overcome the stigmatization (Min & Kim, 1999; Kibria, 2002).

Additionally, this study confirmed that language difference is a fundamental barrier among Asian immigrants and temporary residents living in the United States (Choi, 2015; Hovey at el., 2006; Kang, 2013). Although having sufficient knowledge in their field, the research participants could hardly get the opportunity to showcase their expertise. Indeed, when given the opportunity, many Asian immigrants struggle with delivering their knowledge and ideas as efficiently as native speakers, because English is their second or third language. Because of the language barrier and the sense of being different, Asian immigrants who migrated to the United States find support in American/Asian American communities (Jung, 2008; Jung & Lee, 2004).
They share similar values and struggles and support one another with a sense of belonging. They feel accepted by those communities where they can finally blend in.

May and Sleeter (2010) state that cultural identity is “multilayered, fluid, complex…, and at the same time as being continually reconstructed through participation in social situations” (p. 10). Understanding cultural identity is a complex process. Several aspects need to be investigated and understood such as cultural differences, stereotypes, identity conflict, social perceptions, and expectations. This research conveys the stories of minorities, Korean immigrants in this case, to diversify the stories of our society. This opportunity allows the minorities to express their ideas and issues, but also invites the majority to understand the minority and their culture. By building that bridge, we allow people to connect and contribute to diversity, to finally become an essential part of society.

References


Conference Proceeding Submission

History in Motion:
Applying the Archival Collections of Frank and Lillian Gilbreth’s Time and Motion Studies to Business Education

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Libraries are renowned for providing access to a rich array of resources. In the academic library setting, collaborating with different departments in a university or college not only promotes library and archival collections but also enhances student education and information literacy. While there are numerous methods for applying primary source research methods in the classroom, this paper discusses approaches for teaching undergraduates primary source research methods skills in the business education classroom in a way that increases information literacy, grounds students in the processes of Archival Intelligence Theory, and draws from the connection between affect and information-seeking behavior in research. Additionally, this approach allows the opportunity to showcase primary sources housed in archival collections as well as incorporate a broad range of relevant sources and studies that would interest a wide breadth of students. Purdue University’s archives offer many primary sources in connection to business and management, allowing students to examine firsthand different speeches, personal papers, ledgers, advertisements, and film footage pertaining to different businesses and scholars of management. In particular, the papers and films of Frank and Lillian Gilbreth offer an excellent breadth of materials for students to analyze.

Frank and Lillian Gilbreth were industrial engineers and efficiency experts who applied psychology to time-and-motion studies, excelling in studying and developing methods of efficiency in the industrial sector while balancing these approaches with human factors. Frank Gilbreth “turned film into an abstract learning model that provided for external stimuli needed for educational purposes,” seeing the potential in visual education as an entertaining and engaging way to train workers for efficiency (Hoof, 2018, p. 116). Lillian Gilbreth is considered the “First Lady of Engineering,” “Mother of Industrial Engineering,” and “Mother of Ergonomics” (Tietjen, 2020, p. 3). The Gilbreths “are considered two of the cornerstones of the field of industrial engineering—a branch of engineering that is concerned with optimizing complex systems, processes, and organizations” (Tietjen, 2020, p. 3). While Frank’s focus was the ‘One Best Way’ to do any task or series of tasks, Lillian succeeded in exploring social sciences in conjunction with mathematical and physical sciences (Tietjen, 2020). She used psychology to approach human beings in the industry, especially in the case of efficiency mechanisms “without consideration of cost to human beings” (Tietjen, 2020, p. 5).

Their breakthrough came with the use of the moving picture camera, which the Gilbreths used to record workers’ movements. Their footage of the workers included a clock in the frame, with the film being able to be played “over and over again, run in slow motion, stopped, backed up” (Tietjen, 2020, pp. 6-7). Ultimately, this led to Frank’s “One Best Way,” or “the least taxing method moving the fewest parts body in the least amount of space in the fastest time” (Tietjen, 2020, pp. 6-7).
Purdue University’s Archives and Special Collections contain the Frank and Lillian Gilbreth papers as well as their management research and professional papers, film, and film ephemera in physical form. Some of these pieces exist in surrogate form within the e-Archives digital collections. Among the digitized films are “The Quest for the One Best Way,” “Odds and Ends,” “Principles of Motion Economy in the Home,” as well as time-and-motion films capturing worker movements of women with boxes of materials, women packing cans, the Ball Brothers Mason Jar Study, and “Odds and Ends” (“Library and School”). Many of these film clips are silent films, focusing solely on chronicling worker movements. In other cases, there are sound components, as is true with “The Quest for the One Best Way,” in which Lillian narrates part of the film and carries on the time-and-motion studies seven years after Frank’s passing.

The Gilbreth collections are excellent examples of primary sources to showcase. In addition to promoting the primary source materials housed within Purdue University’s archive, they present a breadth of different source types but most prominently feature film as an influential educational tool. The work of Frank and Lillian Gilbreth was most meant to inform, educate, and—to an extent—entertain, and is still important in the fields of business and management and beyond. In the business classroom, students participate in an audio-visual resources activity, requiring the students to read and review portions of the Gilbreths’ work and papers, followed by viewing some of the films, including “The Quest for the One Best Way,” “Principles of Motion Economy in the Home,” and “The Ball Brothers Mason Jar Study” from Purdue University’s e-Archives. Upon viewing these materials and digitized films in the classroom, students will complete a source analysis assignment and connect their observations to modern-day scenarios and approaches to efficiency. In crafting assignments such as these, students are able to familiarize themselves with the processes of accessing primary sources and to think critically about the information housed in these sources.

References


Incorporating Diabetes Health Education During Shared Medical Appointments

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Proceedings Submission: Submitted January 17th, 2023

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Objectives: Roughly 37.3 million Americans, or 11.3% of the population are currently living with diabetes. Approximately 1.4 million Americans are diagnosed each year, and the disease prevalence is highest among racial and ethnic minorities. Shared Medical Appointments (SMAs), or group visits, offer a modern, interactive approach to healthcare and patient centered health education. This form of a medical visit brings patients with common needs together with one or more healthcare providers. SMAs are an efficient and effective treatment and educational tool. The SMA optimizes the provider’s time, the patient’s time, and patient travel costs while delivering extensive disease specific education with the medical visit. Prior studies have found that implementation of this nontraditional approach by both patients and clinicians can yield measurable improvements in patient trust, patient perception of quality of care and quality of life, and relevant clinical parameters. It is proposed that these visits help patients by combating isolation, offering inspiration from the experiences of others, allowing adequate time for patients to feel supported, increasing patient knowledge by combining professional expertise with first-hand information from peers and increasing rapport between patients, medical providers, and the other participating members of the healthcare team. The New Orleans East Hospital (NOEH), an affiliate of the National Diabetes and Obesity Research Institute (NDORI), is launching SMAs for their patient population with type 2 diabetes. The objectives of this study are to assess SMA patients’ diabetes knowledge, treatment satisfaction, medication adherence and clinical outcomes.

Methods: This study will recruit approximately 30 patients total. For this quality review project approximately 15 patients will be enrolled into the experimental treatment SMA group and approximately 15 patients will be enrolled into the Traditional Medical Appointments (TMAs) comparator group. During each of the 90 minute SMAs, a medical assistant or nurse will conduct a pre-assessment, after which the patient will join the visit. SMA visits will include the medical provider, certified diabetes educator nurse, registered dietician and/or clinical pharmacist. The educator in the study will be a Certified Diabetes Care and Education Specialist. The educational curriculum will be closely aligned with the American Diabetes Association’s (ADA) guidelines for diabetes self-management education. Utilizing these guidelines, patients will set goals and learn how to better manage diabetes.
Incorporating Diabetes Health Education During Shared Medical Appointments

with healthy eating, physical activity, medication management, glucose monitoring, risk reduction and mental coping strategies. Content will be adjusted according to patient educational needs. Topics will also be tailored for cultural appropriateness and relevance for the patient population. Participants will be surveyed regarding disease state knowledge, treatment satisfaction, and adherence. Clinical outcomes measured will include vital signs, BMI, blood glucose and A1c. Patients will also receive a glucose management system device which will interface with their smartphone. Patients will attend monthly SMAs followed by quarterly SMAs over one year.

**Potential Impact:**
We hypothesize that Shared Medical Appointments with education and remote glucose tracking will be associated with better clinical outcomes, improved therapy adherence, increased diabetes management knowledge, and enhanced patient satisfaction in the management of type 2 diabetes. This innovative and multidisciplinary approach to care stands to improve patients’ understanding of their disease state and ultimately lead to beneficial outcomes.

**References:**

Voices from the Pacific: Navigating STEM Education in Oceania

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Introduction

People Indigenous to Oceania descend from cultural heritages that are deeply rooted in the use of science and technology, yet despite this extensive history of scientific enterprise and achievement, today Pacific Islanders are drastically underrepresented in Science, Technology, Engineering, and Mathematics (STEM) fields (NSF, 2017). National STEM higher education data indicate that only 9.4% of STEM graduates are of Native Hawaiian and Pacific Islander (NHPI) descent, but this number is likely substantially lower since the data aggregate Asians and Pacific Islanders into a single group (NSF, 2017). Prior research indicates several key factors may contribute to this underrepresentation, including colonial legacies of mainstream STEM fields that provide unequal access to opportunities, a historical lack of inclusion of indigenous perspectives and input on research conducted in the Oceanic region, geographic isolation, challenging socio economic realities, and a complex set of cultural and familial conditions that can position STEM careers outside of or at odds with Pacific cultural norms (Kaomea, 2001). For reasons such as these, contemporary models of higher education, especially in STEM, can be a source of alienation from family, community, and culture, thus leading to disparities in engagement and participation (Puniwai-Ganoot et al., 2019).

The purpose of this study was to help address issues related to the underrepresentation of Native Hawaiians and Pacific Islanders (NHPI) in STEM fields through research designed to gain a better understanding of the issues faced by these populations as they work to pursue degrees in STEM fields. This includes working to understand their visions of success, what barriers they perceive on the journey to these visions of success, and what institutions of higher education might do to alleviate some of these barriers. The insights gained can be used to inform academic programs on how to best serve these populations, which in turn may lead to more individuals from this region choosing and persisting in STEM programs. The specific research questions addressed include:

1. What are the visions of success held by STEM students from Oceania?
2. What barriers exist in the pathways to these visions of success?
3. How can academic programs facilitate meaningful and supportive STEM education experiences for students from Oceania?

Methods

The research reported on in this paper was conducted as part of the NSF funded, Louis Stokes Alliances for Minority Participation (LSAMP) program which is designed to assist universities and colleges in diversifying the nation's STEM workforce by increasing the number
of STEM baccalaureate and graduate degrees awarded to populations historically underrepresented in these disciplines, including African Americans, Hispanic Americans, American Indians, Alaska Natives, Native Hawaiians, and Native Pacific Islanders. As a program funded by this historical grant, the Islands of Opportunity Alliance (IOA) works to serve 11 university and college campuses based across Oceania, including Hawai‘i. The financial support for these campuses is primarily provided through funding to support undergraduate student research experiences for URM students. A wide range of STEM majors are represented in the student population supported by IOA funding including a variety of natural sciences, computer science, information technology, engineering, and mathematics. The IOA also supports Indigenous perspectives with concentrations in the STEM fields such as Hawaiian studies students who focus on issues related to environmental stewardship and restoration. However, across each of the IOA institutions, the most common majors of students supported are those that focus on environmental conservation in the fields of biology, marine science, and environmental studies. The research aspect of the IOA project is designed to gain insight into the stories and lived experiences of IOA supported students as they work to pursue degrees in STEM fields. A better understanding of the reasons they pursue these degrees, what their goals are for the use of their degree, and the challenges and successes they encounter in their academic journey can help provide insight into how to best support them academically.

The data for this study include culturally responsive, ethnographic interviews conducted with 40 IOA supported students across the alliance. Each of the participants were interviewed one time for a period of 45 minutes to 1 hour. During these interviews, the participants were asked open-ended, conversational style questions about a variety of topics including, but not limited to, why they were pursuing their degree, what they hoped to do with it, what challenges they had encountered so far, how they overcame those challenges, what concerns or struggles they had in their program, what successes they had experienced, and what led to those successes. In keeping with the culturally responsive nature of the interviews, participants were also often asked to clarify terms and intended meanings and were given opportunities to review the interviewer's understanding of what they had said or meant.

These interviews were conducted by undergraduate apprentices who were Indigenous Pacific Islanders themselves and had completed extensive training on culturally responsive interview practices and techniques. Drawing from their own cultural backgrounds allowed for more culturally aware and responsive methods of information gathering as it applied to the interview contexts included in this study. Cross-cultural research of this nature promotes the use of qualitative data such as story, narrative, and conversation, which are compatible with Indigenous oral traditions privileging both individual and collective voices and providing rich data that can be used in meaningful ways (Sukop 2007). Drawing from Vaioleti’s (2006) Tongan research methodology of talanoa (“conversation, talk, exchange of ideas or thinking”) and being responsive to Pacific protocols of conducting interviews (Bennett et al. 2013), the ethnographic interviews were designed to reflect each culture’s effective means of communication.

This methodological approach was informed by the cultural protocols of the Pacific Island communities with which the research agenda is concerned. For many decades, indigenous peoples of the Pacific have suffered from the consequences of some of the most destructive aspects of colonization and modern development. They have had their ecosystems and ways of life infringed upon, been deprived of their means of livelihood, and forced to fit into societies that do not value their knowledge and culture. Because of these historical traumas, conducting research in Pacific Island communities requires a great deal of cultural sensitivity to a variety of
Island cultures, each of which has its own values and protocols. For example, the Australian Institute of Aboriginal and Torres Strait Islander Studies created the Guidelines for Ethical Research in Australian Indigenous Studies (2012), which stated that indigenous people have fundamental rights and that the protocols outlined need to be followed to ensure that the stories are not misrepresented by those who know less about the culture and community. Protocols such as these have been designed to aid in the decolonizing of research methods and for the betterment of the indigenous people being represented (Smith, 2013). The researchers involved in this project worked to adhere to these protocols at every stage of the study.

**Findings**

Analysis of the interview data revealed several clear themes that can inform our thinking about how academic programs might best serve students from Oceania pursuing degrees in STEM fields. To begin with, when students were asked about their motivations and goals for pursuing their degree and what they wanted to do with it, it became very clear the students interviewed in this study have career motivations inspired by their family upbringing and deeply rooted in a commitment to the natural environment and their local communities.

Analysis of the data revealed four distinct themes in participants’ responses to this line of questioning. These include being inspired to pursue a STEM degree based on their family upbringing and cultural roots (27% of responses), a desire to address issues they were witnessing in their local environment (33% of responses), a sense of commitment to give back to their local community (13% of responses), and positive pre-college academic experiences engaging in STEM activities (27% of responses).
When asked about their visions of a successful use of their degree in STEM, student responses included the desire to engage in conservation stewardship in their home island (17%), the desire to graduate with a degree and get a job (20%), be able to proliferate Indigenous STEM knowledge (21%), and contribute meaningfully to their home community (42%).

From these results, it is clear that many students interviewed, in some way or another, indicated that their personal inspiration for pursuing and persisting in their academic program was connected to the desire to return to their home community to work professionally to address issues that concern them. This sense of commitment may not be unique to this population, but it is certainly clear that for these students, returning home to work in their island community is the goal (see Table 1 for examples).

**Table 1.** Example statements of students speaking about their commitment to the natural environment and their home communities.

<table>
<thead>
<tr>
<th>Code Category</th>
<th>Example Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commitment to give back to the local community</td>
<td>“It is all about commitment and responsibility to the village. Before going out to school, any Yapese kid will be told &quot;Mu athamgil, ya fan ngodad&quot; by any elder they pass by. That saying literally means, &quot;persevere because it is for the benefit of all of us.&quot; Do I feel like I have a commitment? Yes, I do, and I intend on going back home after I am done obtaining my education here to help. It is part of who I am. Success for me is basically being able to give back to the community, whether it is doing a study or just by being there to attend the weekly village community work on weekends. I think being able to give back in a beneficial way is success.”</td>
</tr>
<tr>
<td>Commitment to give back to the local community &amp; Want to address issues in the</td>
<td>“As the eldest daughter of a small Palauan family, I have grown to love the environment as well as helping the community in every chance I get. I was inspired by my father who taught me that the only way to become a greater person was by protecting your marine environment. With that piece of wisdom, I became fonder of my island home as I promised to contribute in any way that I can. We still have canoe carvers, navigators, and strict cultural performances and ceremonies. It is this culture that brings about an environment of respect between each other, and communal living that sustains us. I want</td>
</tr>
<tr>
<td>Local Environment</td>
<td>“My children to have a strong pride of being a Palauan and a Pacific Islander as it is important for us to remember our roots. In addition, I want to create a new path for the younger generation to learn and follow my footsteps after succeeding in college.”</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Commitment to give back to the local community &amp; Want to address issues in the local environment</td>
<td>“Also, the coral reefs out here…. the reason why I want to work there is because the way I’m kind of giving back is preserving. That’s my only goal there. Just help preserve. That’s my way of giving back.”</td>
</tr>
<tr>
<td>Commitment to give back to the local community</td>
<td>“I want to have purpose in my community like values that I would be able to give back to my community and not just be some other student that wants to pursue this or that, and stuff like that.”</td>
</tr>
<tr>
<td>Want to address issues in the local environment</td>
<td>“The most thing that motivates me is my home... I see a lot of my resources about being depleted and my relatives and all Marshallese people here, they don’t know what to do with their resources, how to conserve and manage. That’s why I work on my Marine Science certificate because I want to understand and do my part, do what I can do for my country.”</td>
</tr>
<tr>
<td>Inspired by family upbringing and cultural roots &amp; Commitment to give back to the local community</td>
<td>“The Hawaiian core values that I grew up with and that I hold dear to me is respect, malama ‘aina (caring for the land), being honest to yourself, and giving back to the community. Those are my core values because growing up, we’re all taught to respect each other, especially our elders because they are the ones that had helped to bring us into this world, malama ‘aina because you want to take care of the land, especially people are only realizing this that you got to take care of the land because if you don’t then it’s not going to take care of you, it’s going to diminish in resources, which is what is happening in this world today, but in the Hawaiian community, we always realized that we always have to malama ‘aina and what we take from the land, we also have to give back and so that relates to giving back to the community because I’m taking all these resources that my community is helping me to give and I want to use that to get my education and go into a professional field and hopefully give back to my community.”</td>
</tr>
</tbody>
</table>

Student responses to questions related to barriers on their pathways to success and concerns or struggles they had in their program indicate that many do not feel as though their academic programs were preparing them for their desired outcome or were in some way misaligned with their goals and perspectives (see Table 2 for examples). Eight percent of responses to this line of questioning indicated that their family commitments and responsibilities were constraining, 9% indicated they had low efficacy in academics, 11% indicated a lack of a sense of belonging, 16% indicated they felt there is a lack of opportunity to engage in activities they value, 27% indicated poor mentorship experiences in their academic program, and 29% indicated the lack of cultural perspectives in their academic program were a constraint.
Table 2. Example statements about struggles or concerns or struggles they had in their program.

<table>
<thead>
<tr>
<th>Code Category</th>
<th>Example Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of cultural perspectives in academic programs</td>
<td>“When I first entered the marine science and kind of like I mentioned how discouraging it was because I’ve seen a lot of these people, mostly from the mainland that were coming here and they’re excelling in these types of classes and I just wasn’t understanding because some of them don’t even know how to swim and how are you going to be a marine scientist but you’ve never even seen the ocean before, but here you are excelling in these classes because you’re able to catch these concepts because this is a science that you know, but for us it’s so different and then I just remembered one of the teachers talking, teaching us about kelp, which is only like found in California, in those areas, the cold-water regions and here we are in the Pacific, we have such a diverse amount of seaweed that we could be learning about that have a similar structure as kelp but they’re teaching us about kelp, so it’s just like that disconnection of not applying place, space, knowledge to your work and how that affects the students from the Pacific or from that place, and then how it affects students from the mainland, like it really starts from the teacher and their curriculum, so.. hope that changes.”</td>
</tr>
<tr>
<td>Lack of a sense of belonging</td>
<td>“First time going into like my, I would say sophomore year, that’s when like most of the engineering classes take place, walked in class and not a lot of people looked like me, talk like me, and thought like me, you know the thinking process, so I kinda felt left out, it kinda felt like you know maybe I don’t belong”.</td>
</tr>
<tr>
<td>Lack of cultural perspectives in academic programs</td>
<td>“I guess other than taking extremely difficult classes...a lot of the times the classes and programs that I participate in...a lot of the times there is not a lot of representations from Hawai’i...there is not a lot of representations from other Pacific Islands as well...it’s a lot of people from the mainland, which isn't a bad thing but it’s just...it kind of makes me feel misplaced...misfit, I guess.”</td>
</tr>
</tbody>
</table>
When taken together, the first two themes articulate a very clear story. A majority of the NHPI students interviewed in this study want to work in their home communities to contribute positively and address issues that concern them, but they feel their academic programs are not necessarily designed for this outcome. However, we find some encouragement in the participants’ responses to questions about their academic successes and what supported those successes.

Fifteen percent of responses indicated that their personal commitment to their family and community supported them, 15% indicated that mentorship experiences that recognized their cultural values were highly supportive, 22% indicated their own personal and cultural identity supported them, and 48% of the comments coded were statements about how they have worked to overcome obstacles to academic success through strong connections to academic program experiences and supports that recognize and support their cultural values and career aspirations (see Table 3 for examples).

Table 3. Example statements about the positive impact of engaging in research projects that are meaningful to them.

<table>
<thead>
<tr>
<th>Code Category</th>
<th>Example Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentorship experiences that recognize cultural values</td>
<td>“We partnered up with the Department of Marine Wildlife to help them with their community outreach. We made videos for the public to see and better understand what our community is going through with the ocean, our environment, and our reefs. The reefs are a really important part to our Samoan culture and our island lifestyle. That’s a little overview of what we did with the Department, community outreach.”</td>
</tr>
</tbody>
</table>
| Academic supports that recognize and       | “We research issues that affect our local community and the culture here on Guam. We have to reorient the way we do research... to go out in the community and work with the people in that community to help them better understand the
support cultural values

work we are doing, our goals, and ask them for their input on what they think could be a solution to these problems. So, it’s not the ivory tower way of research where it’s just confined to yourself, but involving those around and their input. It is important for them to understand what is happening and give their “in-there, out-there” opinion as well.”

Personal and cultural identity & Mentorship experiences that recognize cultural values

“I have come to recognize that my culture is in fact more "scientifically" grounded than I had previously expected and I also have come to appreciate how much knowledge my culture has to offer the world. It has given me and my people a voice despite our size in this world. Papa Mau [Satawalese navigator] once quoted, "If you forget how the Islands move, then you are lost." In relation to our research, I think this quote holds true. If you do not possess a place in the heart to reference/distinguish north from south and east from west, then you are lost. This research experience has given me a deeper sense of appreciation for my people and my culture.”

Personal and cultural identity & Mentorship experiences that recognize cultural values

“It is also very refreshing to be a part of a research study where I don’t have to explain and validate my background as an Indigenous person. My kumu (teacher) are all familiar or identify as Pacific islander, and so they have previous knowledge of Pacific island culture, histories, and issues. Not only that, with how this project is led, our kumu always asks us what we think and makes sure that we are heard and represented properly. This makes me feel comfortable in the fact that I am a proud Hawaiian and can comfortably share my own ‘ike (experiences) and ‘ike ku’una (ancestral knowledge) with them to better support this project.”

Discussion

The findings from this study indicate that many NHPI students experience a strong connection to issues affecting their home communities but face significant barriers in their efforts to align education experiences in ways that will position them to engage in endeavors that benefit their island communities. However, some of these students have worked to overcome these obstacles through strong connections to program experiences and supports that recognize and support their cultural values and career aspirations. In particular, students from each of the 11 IOA-LSAMP campuses participate in their campus' STEM learning community in addition to regular coursework. They often name these IOA-LSAMP STEM learning communities as examples of supportive programming that provides culturally-grounded research experiences in complement to their academic courses. We hope that findings such as these can help inform other (non-LSAMP) academic programs of the importance of aligning program activities and research experiences with the outcomes most desired by their students, namely, giving back to their communities. We argue that one way of accomplishing this is to work to identify research experiences for undergraduate NHPI students that engage them in experiences that are personally meaningful and well aligned to their desired outcomes. We feel this is best accomplished by encouraging a more Equitable Exchange of research ideas. The construct of Equitable Exchange works to expand research spaces to be inclusive of a more diverse range of individuals and perspectives through the co-production of knowledge (Harris et al. 2021). Equitable Exchange through knowledge co-production offers a framework for shifting the production and dissemination of knowledge away from the current unidirectional transfer of information from credentialed experts to the societal users of this knowledge and toward a broader exchange of knowledge between research communities and societal users (Callahan et al. 2018; Harris et al. 2021).
2021). This shift is designed to address ethical considerations in research as well as increase the quality and usefulness of scientific endeavors through the inclusion of a broader range of knowledge and perspectives. Our data suggest that education models that embrace the Equitable Exchange of intellectual capital can facilitate more supportive experience for NHPI students because it provides opportunities for identifying issues and perspectives that are meaningful for them and thus engage in research experiences that are better aligned with their desired outcomes.

We believe experiences that embrace Equitable Exchange can also help position NHPI STEM graduates as valuable Boundary Spanners. The literature on Boundary Spanners emphasizes the important role of individuals who straddle the boundary between information producers and information users (Safford et al. 2017). Such individuals have credible knowledge in both realms and as a result, can facilitate communication, translation, and mediation between multiple stakeholders in ways others cannot (Cash et al. 2003). The NHPI students included in this study take on complex roles culturally, academically, and socially. The perspectives gained from navigating these roles simultaneously can be a valuable resource in communicating with a wide variety of stakeholders.

References

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Storytelling Approaches to Program Evaluation: An Introduction. Los Angeles, California,
United States of America: The California Endowment.
Abstract

Mathematical discourse, identified as an effective teaching practice by NCTM (2014), is an ongoing routine based on carefully selected tasks carried out in a supportive classroom community. Engaging young students in mathematical discourse builds a shared understanding of important mathematical ideas and provides them with opportunities to communicate and justify their thinking. Stein (2007) defines mathematical discourse as “the way students represent, think, talk, question, agree, and disagree in the classroom.” Hattie’s research (2017) determined that classroom discussion yielded an effect size that was more than double that of attending a typical year of school.

In order to facilitate meaningful mathematical discourse in early childhood classrooms, pre-service teachers (PSTs) must develop methods for leading discussions with young children. Not only must they establish developmentally appropriate routines, but these discussions must also be mathematically important for their students. This study examines the process by which we use Number Talks as a vehicle to help PSTs understand, employ, and refine the process of facilitating meaningful mathematical discourse.

Number Talks are short routines, based on carefully selected problems, used to engage students at all levels in understanding numbers and developing computational fluency (Humphreys & Parker, 2015; Richardson & Dolphin, 2020). During a Number Talk, children are asked to use strategies that make sense to them to reason about and solve problems. This, in turn, allows them to develop a deep understanding of number and number relationships. With regular use, students are able to work with greater accuracy, efficiency, and flexibility to solve problems and explain their thinking.

Design research methodology (Gravemeijer & van Eerde, 2009) was used to investigate elements that support PSTs as they learn to facilitate meaningful mathematical discussions. We used the three phases of planning, teaching, and retrospective analysis to guide each of three design experiments. The data analysis throughout this iterative process have identified seven steps which continue to guide our work in helping PSTs learn to facilitate meaningful mathematical discussions.

Findings indicate that PSTs wrestled with preconceptions of the teacher’s role in discussion. The introduction of important guiding principles such as questioning, listening, clarifying ideas, and approaching mistakes as learning opportunities supported by mathematical discourse (Humphreys & Parker, 2015) was beneficial to our students. Especially difficult for our PSTs, as students and as instructional practitioners, was viewing mistakes as critical components of the learning process.
By planning and implementing their own Number Talks in clinical placements, PSTs had the opportunity to consider the impact of their decisions regarding quantity, types, and sequence of representations, and facilitation techniques. PSTs were also provided an opportunity to document observations of student discussion and understandings or misunderstandings. The process also provided PSTs with feedback about their instructional decisions from their students and their cooperating teacher. The lessons learned through this experience provided a foundation that PSTs could apply to later planning and instruction, not only in mathematics but across content areas.

Engaging PSTs in Number Talks and exploring the versatility of using mathematical models to anchor discourse provided shared experiences to which PSTs could later refer. Using the seven steps to scaffold PSTs’ learning built their confidence as facilitators of mathematical discussions and created a culture of facilitating mathematics learning that PSTs have the ability to transfer to their own classrooms.

References


All across campus, Purdue University students create tangible, innovative works in the makerspace and beyond. The process of making always leaves entrepreneurs and makers of all kinds with an intriguing story to tell. Individuals can share stories about the genesis of their creativity as well as any pitfalls, successes, and lessons learned. In doing so, both the maker and their audience are given a sense of context and connection to what one has made. Moreover, crafting and sharing a story through the podcast medium, otherwise known as a narrative podcast, allows one’s story to be disseminated across a wide range of audiences.

Beginning in 2021, the Purdue University Libraries and School of Information Studies partnered with the Brian Lamb School of Communication to host the podcast series, MakeYourStory. All episodes, podcast resources, and host information are housed on the MakeYourStory website.

In its first season, MakeYourStory laid the groundwork for developing a narrative podcast, with episodes on the elements that go into creating engaging stories of making, including interview skills, the use of sound, narrative construction, and tools for marketing. In addition, the podcast hosts crafted a competition for student submissions once per semester, with students applying narrative podcasting skills discussed in previous episodes. The podcast followed a release schedule of two episodes and one student competition per semester.

The second and most current season of the podcast showcases stories of making that originate from Purdue’s campus, with stories about 3D-printing processes, the Student Soybean Innovation Competition, cooking, TikTok content creation, and more. This season follows a release schedule of two episodes and one student workshop per semester. The first workshop for this season offered students the opportunity to engage in Foley art to effectively use sound as a storytelling tool in the narrative podcast.

Podcasting can be an effective way for students and entrepreneurs to tell their stories of making. In order to develop a podcast, individuals must research their idea and examine how their broad topic idea may be narrowed and explore any gaps in information that exists on the subject. They should consider what their podcast may contribute to a certain area of interest and explore how their approach may be novel, note key players and content creators in this arena, and strive for longevity. There are ample business databases pertaining to market research and industry research which may further bolster research and discussion on a given podcast subject. Moreover, opportunities for collaboration are encouraged, such as pursuing internal and external guest speakers (relevant speakers, fellow podcaster, etc.) as well as involvement from internal and external organizations (campus organizations, cultural institutions, etc). Connection with
relevant trade associations can also help build relationships and gain content for podcast episodes.

In terms of development and marketing, recording equipment includes but is not limited to stationary and travel microphones as well as headsets. Hosting, editing, and transcription (self-transcribed or outsourced) tools must also be considered, with some requiring paid subscriptions. Marketing schedules must also be developed for the sake of consistency, either by self-promotion or using a team.

In creating a consistent marketing and release routine, podcast creators can focus on building a presence and an audience of listeners. Podcast hosts should offer multiple lines of communication for their audience by maintaining a presence on various platforms and consider setting up a link tree or website to centralize information pertaining to the podcast.

This session is inspired by an episode of MakeYourStory that focuses upon podcast resources for entrepreneurs. This session will highlight podcast hosting services and editing tools in addition to resources dedicated to marketing one’s podcast. Moreover, attendees will learn about how to create effective partnerships to create a podcast; explore podcast recording and editing tools; and review marketing strategies to bolster engagement and participation.
Supporting High Quality Adjunct Faculty in Graduate Education Programs

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Supporting High Quality Adjunct Faculty in Graduate Education Programs

Abstract

The trend of hiring adjuncts appears to be here to stay (Douglas-Gabriel, 2019; Elfman, 2021; Jaschik, 2017). A review of the literature regarding adjunct development reveals several common themes: institutional support, orientation, professional development (Eddy, et al, 2021; Layou, et al, 2022). To successfully onboard and support adjunct faculty, the work of Fischer, Kellogg, and Erickson (2020) suggests that the organization needs to create buy-in for adjuncts through communication and feedback; also, collaboration is critical in university-wide programs, particularly with deans, program directors, and the Human Resources department. A successful onboarding experience helps adjuncts feel connected to the institution and more prepared to teach.

This paper discusses the ways in which the School of Education at a small, faith-based institution ensured the success of its part time faculty through avenues of communication, professional development, use of technology, and course coordination. Full-time and adjunct faculty participated in the activities and collaborated on course development and revision. Adjunct faculty survey results indicated a high level of satisfaction with the bi-monthly unit and departmental meetings, clear and consistent communication to instructional personnel, and ability to collaborate with colleagues and participate in course coordination.
Introduction

Although a 2022 report from the National Center for Education Statistics (NCES) indicated the number of part-time faculty decreased by 14% from 2009 over the period of a decade at US institutions of higher education, this part-time pool of instructors still makes up 44% of the teaching force in higher education. The American Association of University Professors (AAUP) addressed the decrease in full-time, tenured faculty in higher education across the United States, sharing data from the Integrated Postsecondary Education Data System (IPEDS). According to the 2016 report, non-tenured track instructional positions made up 73% of all US institutions. In two-year institutions, the percentage is even higher, with only 20% of the faculty positions being those on a tenure track (AAUP, 2018).

Non-tenure track instructors, or adjuncts, are more cost-effective for institutions, most often receiving lower compensation and smaller benefits packages, if any at all. While the purpose for hiring adjuncts is largely financial, there are many other advantages for building a strong adjunct pool. Adjuncts supplement the expertise of full-time faculty. They are also able to provide current expertise from the field (Guthrie, et al, 2019; Smith, 2019).

The trend of hiring adjuncts as a cost-saving measure for universities appears to be here to stay (Douglas-Gabriel, 2019; Guthrie, et al, 2019 Jaschik, 2017). While it is difficult to track the work of adjuncts, their plight is better documented. Low pay, little opportunity for advancement or career growth, and not belonging to an academic community was found to be the case for many (Elfman, 2021; Flaherty, 2022). Identifying and implementing the supports top adjuncts need to persist seems a worthy endeavor.
Literature Review

A review of the literature regarding adjunct development finds several common themes: institutional support, orientation, professional development, and understanding the needs of adjunct faculty (Bickerstaff & Ran, 2020; Center for Community College Student Engagement, 2014; Culver et al., 2021; Eddy, et al, 2021; Parker, et al., 2017). The recent pandemic tested our ability to be flexible and nimble in our teaching practices (Quezada, 2020) and galvanized the need to provide more support to instructional personnel. As educator preparation programs traditionally employ large numbers of adjunct faculty, the need for organized and systematic programs as well as ongoing communication is apparent. Organizations can create buy-in or support adjuncts through communication and feedback; as well, collaboration between university staff such as deans, program directors, and the HR department is key in the development and implementation of university-wide programs (Fischer et al, 2020). Additional factors that may influence adjunct instructor effectiveness include scheduling, course design, curriculum, faculty development, and faculty support (Hammond, et al, 2018). These factors will be discussed further in the following sections.

Faculty who feel a sense of commitment to the institution are more effective in teaching and more productive in regards to research and “organizational citizenship” (Culver et al., 2020). Smith’s 2019 study indicated that adjuncts feel called to teach because of the significance teaching plays in their calling, the connection to students and subject, and the commitment to student learning and success in their field. Regardless of the status, studies of both full-time and part-time faculty found that those with higher levels of commitment to their institution demonstrated increased engagement in the institution (Culver et al., 2020). Positive influencers
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to organizational commitment are equity, healthy communication and feedback, and support from colleagues and administrators (Culver et al., 2020).

Institutional Support

It is well documented in the literature that adjuncts are not usually invited to participate in university activities such as curriculum development, faculty governance, and community events (Kezar, et al, 2013). Often, adjunct faculty feel isolated from the university community; feelings of disconnect and concerns of inclusion abound (Bickerstaff & Chavarin, 2018; Kimmel et al, 2017). Allowing for opportunities for adjunct faculty to participate in governance and decision making not only increases morale, but the level of institutional engagement and commitment as well (Culver et al., 2020). This institution attempts to mitigate feelings of isolation by employing a technique called course coordination, which will be discussed later in the paper.

Universities would like a higher level of engagement and commitment from their adjunct faculty; the activities which support full-time faculty teaching effectiveness should be the same for their adjunct faculty. Many adjunct faculty are hesitant to ask questions, so as not to appear incompetent, risking future teaching opportunities. Creating a welcoming and supportive environment alleviates that risk, resulting in more confident and competent faculty (Fuller et al., 2017). Open communication from institutional leadership increases the perceived level of support for faculty. In addition, it was found that providing stability and security were particularly important ways to support non tenured faculty. All faculty, full-time or part-time, feel supported when they feel heard, included, and respected (Culver et al., 2020).

All faculty desire healthy communication. Since part-time faculty are not present on a day-to-day basis, they greatly benefit from key information and resources such as how to order
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textbooks, how to locate campus resources, and how to use the learning management system, how course preparation and course access are fulfilled and what online resources are available. Adjuncts also benefit from improved communication, interaction and engagement (Butters & Gann, 2022). Many adjuncts feel inundated with email from the institution, so pertinent communication is essential (Bickerstaff & Chavarin, 2018). Many colleges and universities have found it helpful to store helpful resources in a digital format, to include videos, links, and information housed in the course shell or learning management system. This allows all faculty, full-time and part-time, to access the information when they need it (Bickerstaff & Chavarin, 2018).

For many contingent or adjunct faculty, autonomy is an aspect of their role they value. In their research, Bickerstaff & Chavarin (2018) found that while some adjunct faculty desired community, some found limited engagement to be an advantage to their part-time status. However, faculty generally appreciated the ability to collaborate with other professors teaching the same course. This allowed them to share resources, pedagogy, and troubleshoot challenges, increasing their effectiveness and efficiency (Bickerstaff & Chavarin, 2018).

Orientation

Onboarding or adjunct orientation programs are important ways to welcome adjunct faculty to the institution. The orientation process also plays a key role in providing adjuncts a clear understanding of their roles and program expectations (McPherson, et al, 2019; Parker et al., 2018). Orientation should introduce adjuncts to departmental policy and procedures as well as logistics such as unlocking the classroom, creating the syllabus, etc. It should also include information from Human Resources at the university (Fuller et al., 2017). Butters and Gann (2022)
also found that the topics covered during the orientation were best remembered if they were continued throughout the school year. Many institutions have found that providing orientations that are specifically designed for non-tenured track faculty was more effective, as it allowed the institution to tailor the information to the needs of the adjuncts. Important information to cover in these orientations are introductions to the university, the learning management system, online procedures, resources, and a point person to contact for help. Asynchronous orientations can be effective in orienting new faculty. Many institutions require new adjuncts to complete an asynchronous onboarding prior to teaching classes (Culver & Kezar, 2021). Website content, including orientation and webpages specifically geared support for adjunct faculty assists in connecting adjuncts to the greater institutional mission as well as providing a clearer understanding of their role in instruction of students (Chun et al, 2019).

**Professional Development**

In addition, Anthony et al., (2020) corroborated the aforementioned research and outlined the need for “specific and specialized professional development programs” (p. 8). Adjunct faculty want to know how university systems work and what will be expected of them (Butters & Gann, 2022, Lockhart-Keen & Potvin, 2018; Parker et al., 2018). Many part-time faculty feel they do not receive the training and development that full-time faculty do. Thus, intentional professional development for adjunct faculty helps to equip and engage these professors in the work of the university.

Often, adjunct faculty feel isolated from the university community. Many adjunct professors desire to engage in the life of the university, especially in teaching and professional opportunities. Allowing faculty to engage with other faculty helps alleviate the “siloing” or
isolation many adjunct faculty feel. Professional development provides encouragement and guidance for faculty. The most meaningful professional development allows for community building and sharing, helping to alleviate the feeling of isolation (Fuller et al., 2017; Layou et al, 2022) and draws full and part-time faculty together as teachers and learners and draws full and part-time faculty together as teachers and learners.

Many institutions have found Faculty Learning Communities (FLCs) to be a successful strategy for professional development. These FLCs are groups of faculty who meet to discuss professional practices such as curriculum, instructional techniques, and ways to increase student engagement and success. The collaborative nature of these learning communities makes it more effective than one-time workshops or training (Culver & Kezar, 2021). Most often, FLCs are designated for full-time faculty, but some institutions have been more inclusive, inviting their non-tenured track faculty to participate. Overall, participation in these FLCs fostered a sense of belonging in faculty (Culver & Kezar, 2021).

Universities should be mindful of the unique training needs for online faculty. This work should align to training offered during orientation and consider synchronous and asynchronous instruction. There should be training for the Learning Management System used by the institution (Butters & Gann, 2022). There should also be training on best practices for online instruction (Fuller et al., 2017).

Professional development regarding course coordination and updates on course materials/content was seen as important to clinical adjunct faculty (McPherson, et al., 2019). Course coordination at this institution is defined as the triangulation of the course material and
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course data that takes place between Assessment Coordinator, Lead-Full Faculty and Adjunct Faculty. In other words, directed mentoring. Lockhart-Keen and Potvin (2018), found that mentoring was a needed support for adjunct faculty.

Methodology

This survey-driven, qualitative study drew upon phenomenological methods to describe the experiences of adjunct faculty during a time of great change. The goals of the research were to learn the degree to which our adjuncts’ experience aligned with the academic literature on the adjunct faculty experience and whether newly implemented institutional supports were meeting their needs. Existent and emergent themes were identified by three coders who undertook four separate coding passes through the data as they worked toward consensus. Themes of connection, barriers, professional development and orientation were confirmed while others emerged from the dataset.

Participants

The School of Education employs 13 full-time faculty and more than 60 adjuncts in addition to university supervisors who monitor candidates in their fieldwork and clinical practice settings. The adjunct faculty includes current and former public school, district and county employees representing an array of specializations and teaching expertise across Kern and San Diego Counties.

Participants were invited to complete the survey through announcements at supervisor and adjunct meetings held on April 28 and 30, 2022, respectively. A follow up reminder to participate was sent in early May. Twenty-six participants drawn from the two meetings responded to the survey. The response rate of 43% (26/60) was lower than initially sought but
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exceeds rates common among survey/questionnaire-based data collection (Ary, et al., 2018). Overall, the sample group was judged to represent the adjunct pool.

Instrument and Data Collection

School of Education leadership, driven by external accreditation, anticipation of a push toward online instruction, and the Covid-19 pandemic sought to collect data to inform new ways to support the instructional team. A review of the literature identified key areas of inquiry to include in the survey. The survey was designed to gather instructional community sentiment, needs and responses to institutional support efforts implemented during the 2021/22 academic year.

The data collection instrument consisted of a six-question survey. All questions were open ended in format to allow participants to respond in their own words to the questions. Table 1 displays the six questions on the survey.

**Table 1: SOE Instructional Team Feedback 2021/22 Survey Questions**

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
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<tbody>
<tr>
<td>1</td>
<td>What was most helpful to you in teaching this year?</td>
</tr>
<tr>
<td>2</td>
<td>What support could we provide to help you do your job better?</td>
</tr>
<tr>
<td>3</td>
<td>What barriers impeded your work this year?</td>
</tr>
<tr>
<td>4</td>
<td>What professional development would you like to receive next year?</td>
</tr>
<tr>
<td>5</td>
<td>What is your feedback regarding the format of the monthly meetings?</td>
</tr>
<tr>
<td>6</td>
<td>What additional comments or feedback would you like us to review?</td>
</tr>
</tbody>
</table>

The survey was distributed via institutional email accounts which are issued to all faculty, staff and adjuncts as they enter the university. The survey remained open to participant edits post-submission and participants were able to submit multiple responses.
The survey was open to collect responses when it was initially distributed on April 28th, 2022. The data collection occurred for 30 days.

**Data Analysis**

Data collected via the survey was analyzed by three different coders and subjected to four different coding passes. Qualitative content analysis (Bengtsson, 2016) was used by all coders on all four passes. Each coding pass included all six questions with questions coded separately for each question. Questions might share the same code but were not pooled for analysis.

The first coding pass, conducted by coder 1, focused on applying an a priori set of codes drawn from the literature review and previously detailed in this paper. The second and third coding passes, conducted by coder 2 and coder 3 respectively, applied an emergent design (Ary et al., 2018) to draw recurrent themes in the data to the surface.

Table 2 (below) details the emergent coding process conducted by coders 2 and 3. Percent agreement was calculated between coder 2 and 3 (Table 2, Column C). Coder agreement ranged from 69 to 81% across questions one through five. Item six was not included in the calculations because it was optional for participants. The high level of coder agreement prompted coders 2 and 3 to conduct a fourth pass through the data to build consensus codes, which were used for data analysis and reporting.
Table 2: Emergent Code Summary by Question

<table>
<thead>
<tr>
<th>Question</th>
<th>(A) Participant Response Count</th>
<th>(B) Initial Codes</th>
<th>(C) Percent Coder Agreement</th>
<th>(D) Final Code Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helpful</td>
<td>26</td>
<td>8</td>
<td>73</td>
<td>7</td>
</tr>
<tr>
<td>Support</td>
<td>26</td>
<td>11</td>
<td>73</td>
<td>5</td>
</tr>
<tr>
<td>Barriers</td>
<td>26</td>
<td>7</td>
<td>77</td>
<td>7</td>
</tr>
<tr>
<td>Professional Development</td>
<td>26</td>
<td>8</td>
<td>69</td>
<td>5</td>
</tr>
<tr>
<td>Feedback</td>
<td>26</td>
<td>8</td>
<td>81</td>
<td>6</td>
</tr>
<tr>
<td>Additional Comment</td>
<td>19</td>
<td>5</td>
<td>–</td>
<td>5</td>
</tr>
</tbody>
</table>

In response to “what was most helpful to you in teaching this year” (Table 3), participants’ most common response was support. Thirty-eight percent of the responses aligned to this theme which primarily included mentions of specific people or staff roles who provided support for our adjuncts. The second most prominent theme was communication & information. Nineteen percent of the responses aligned to this theme which centered around information shared from the Dean’s office and during meetings. The third theme to emerge was course coordination and collaboration. Fifteen percent of the responses aligned to this theme which centered around spending time thinking about instruction with others who taught the same or similar courses.
Table 3: Question 1 Code Summary

<table>
<thead>
<tr>
<th>1) What was most helpful to you in teaching this year?</th>
<th>Code Count</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>support</td>
<td>10</td>
<td>38.46%</td>
</tr>
<tr>
<td>communication &amp; Information</td>
<td>5</td>
<td>19.23%</td>
</tr>
<tr>
<td>course coordination &amp; collaboration</td>
<td>4</td>
<td>15.38%</td>
</tr>
<tr>
<td>All other codes combined</td>
<td>7</td>
<td>26.92%</td>
</tr>
<tr>
<td>Grand Total</td>
<td>26</td>
<td>100%</td>
</tr>
</tbody>
</table>

In response to “what support could we provide to help you do your job better”, participants’ most common response was *all good*. Forty-six percent of the responses aligned to this theme which mentioned satisfaction with the support given thus far. The second most prominent theme was *info/organized*. Thirty percent of the responses aligned to this theme surrounding the need for more organization in the available resources at PLNU. The third theme to transpire was *need help*. Eleven percent aligned to this theme which encompassed the availability needed when complications arise.

Table 4: Question 2 Code Summary

<table>
<thead>
<tr>
<th>2) What support could we provide to help you do your job better?</th>
<th>Code Count</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Good</td>
<td>12</td>
<td>46.15%</td>
</tr>
<tr>
<td>Info/Organized</td>
<td>8</td>
<td>30.77%</td>
</tr>
<tr>
<td>Need Help</td>
<td>3</td>
<td>11.54%</td>
</tr>
<tr>
<td>All other codes combined</td>
<td>3</td>
<td>11.54%</td>
</tr>
<tr>
<td>Grand Total</td>
<td>26</td>
<td>100%</td>
</tr>
</tbody>
</table>

In response to “what barriers impeded your work this year”, participants’ most common response was *none*. Forty-six percent of the responses aligned with the theme suggesting there were no barriers that hindered their work this year. The second most prominent theme was *constraints*. Nineteen percent of the responses aligned to this theme, indicating their challenges with the course modality. The third theme to appear was *candidate care*. Eleven
percent of responses aligned to this theme, expressing their concern for student engagement and/or stamina in an online modality.

### Table 5: Question 3 Code Summary

<table>
<thead>
<tr>
<th>3) What barriers impeded your work this year?</th>
<th>Code Count</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>12</td>
<td>46.15%</td>
</tr>
<tr>
<td>Constraints</td>
<td>5</td>
<td>19.23%</td>
</tr>
<tr>
<td>Candidate Care</td>
<td>3</td>
<td>11.54%</td>
</tr>
<tr>
<td>All other codes combined</td>
<td>6</td>
<td>23.08%</td>
</tr>
<tr>
<td>Grand Total</td>
<td>26</td>
<td>100%</td>
</tr>
</tbody>
</table>

In response to “what professional development would you like to receive next year”, participants’ most common response was *instructional methods*. Thirty-eight percent of responses aligned to this theme, showing the desire to learn new practices surrounding student support and content expertise. The second most prominent theme to emerge was *none*. Thirty percent of responses aligned to this theme, confirming the already existing professional development opportunities meet their satisfaction. The third theme to be addressed was *content expertise*. Fifteen percent of the responses aligned to this theme which is centered around diving deeper into their respective content areas.

### Table 6: Question 4 Code Summary

<table>
<thead>
<tr>
<th>4) What professional development would you like to receive next year?</th>
<th>Code Count</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional Methods</td>
<td>10</td>
<td>38.46%</td>
</tr>
<tr>
<td>None</td>
<td>8</td>
<td>30.77%</td>
</tr>
<tr>
<td>Content Expertise</td>
<td>4</td>
<td>15.38%</td>
</tr>
<tr>
<td>All other codes combined</td>
<td>4</td>
<td>12.38%</td>
</tr>
<tr>
<td>Grand Total</td>
<td>26</td>
<td>100%</td>
</tr>
</tbody>
</table>
Supporting High Quality Adjunct Faculty in Graduate Education Programs

Question 5 required two sequences of coding. Many participants included multiple distinct themes in their response so the coding team created a second code block to represent the depth of participant feedback. In response to “what is your feedback regarding the format of the monthly adjunct meetings”, participants’ most common response of the two codings was *works well/likes*. Twenty-seven percent of responses aligned to this theme which displayed satisfaction in the meeting format. The second outstanding theme was *format time*. Twenty-five percent of responses aligned to this theme expressing that the time frame of the meetings, the multiple days the meetings are offered, and the availability of recordings post-meeting helped the meeting fit into their schedule. The third theme to emerge was *format Zoom*. Twelve percent of the responses aligned to this theme, indicating the Zoom format is more convenient than in-person meetings.

**Table 7: Question 5 Code Summary**

<table>
<thead>
<tr>
<th>5) What is your feedback regarding the format of the monthly adjunct meetings?</th>
<th>Code Count</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Works Well/Likes</td>
<td>13</td>
<td>27.08%</td>
</tr>
<tr>
<td>Format Time</td>
<td>12</td>
<td>25%</td>
</tr>
<tr>
<td>Format Zoom</td>
<td>6</td>
<td>12.50%</td>
</tr>
<tr>
<td>All other codes combined</td>
<td>17</td>
<td>35.42%</td>
</tr>
<tr>
<td>Grand Total</td>
<td>48</td>
<td>100%</td>
</tr>
</tbody>
</table>
In response to “any additional comments”, participants’ most common response was thanks. Fifty-three percent of the responses aligned to this theme being thankful for the support they have received thus far. The second most prominent theme was none. Thirty-four percent of the participants offered no additional feedback.

Table 8: Question 6 Code Summary

<table>
<thead>
<tr>
<th>Code</th>
<th>Count</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thanks</td>
<td>14</td>
<td>53.85%</td>
</tr>
<tr>
<td>None</td>
<td>9</td>
<td>34.62%</td>
</tr>
<tr>
<td>All other codes combined</td>
<td>3</td>
<td>11.55%</td>
</tr>
<tr>
<td>Grand Total</td>
<td>26</td>
<td>100%</td>
</tr>
</tbody>
</table>

Discussion

Findings

The survey results supported the literature that suggests adjunct faculty need to be equipped with information and resources. The adjunct faculty surveyed appreciated regular communication as provided in the regular adjunct meetings and correspondence from department leadership. The faculty also mentioned the support of several leaders and staff, providing them with necessary information and assistance when needed. Another theme that emerged from the surveys was the value of course coordination and collaboration. The adjunct faculty appreciated the opportunity to discuss their courses with other faculty. This supports literature about the need for collaboration with colleagues (Bickerstaff & Chavarin, 2018; McPherson et al., 2019) and aligns with our experience.

We also found that successful adjunct faculty professional development needs to include space for collaboration where trial and error are celebrated. In the world of academics, where it is hard to sustain the generation and execution of ideas it is imperative that adjunct faculty are
included and that their opinions are validated. As O’Grady (2021) aptly insisted, “all ideas need the unconditional support of Dean’s cabinet members. Leadership needs to buy into ideas early and often, facilitate resource allocation, and provide the autonomy to try, fail, and optimize accordingly” (p.91).

The literature also suggests in order to support high quality adjunct faculty a transparent system must be in place and available to all. The way that we operationalized this idea was through succinct orientation, institutional support and ongoing professional development. The coded data tells us that the full-time staff and faculty have been connecting and engaging in “just-in-time” support for adjuncts. This was in the form of emails, professional development, regularly scheduled meetings, and course coordination. In addition, adjuncts reported that this support was helpful to them both in their teaching of coursework, as well as promoting a sense of belonging within the system. Data from the survey suggests that our adjunct faculty feedback and beliefs align with the recommendations from the literature.

Limitations

Participation in the study and the feedback provided through participation was completely voluntary, so not all adjuncts responded. The number of participants (26 out of 60) does not represent the entirety of the adjunct faculty, but, despite this low number, the patterns that emerged seem to be a representative sample.

Recommendations

As universities continue to employ large numbers of part-time faculty, attention should be given to the support and development of this important teaching force. Communication should be intentional and pertinent for adjuncts. The data suggests that providing
opportunities for collaboration in coursework, instructional practices and troubleshooting concerns helps equip and engage part-time faculty who would otherwise feel disconnected from the institution.

In addition, due to the increased level of needs of students and the complexities of supporting them, adjuncts need, now more than ever, the support of staff and leadership. Institutions can support their adjuncts by providing key points of contact and communicating supports available for students in need. Adjuncts also benefit from just in time support with technology and logistical concerns. Providing opportunities for faculty to collaborate and troubleshoot can help to equip faculty as they support their students.

The results of this study suggest that course coordination should be further strengthened. Given the limitations of this study, the researchers suggest future surveys to evaluate the effectiveness of course coordination over time. Multiple attempts to elicit participation in the survey would help increase the sample size, thus adding to the body of literature.
Supporting High Quality Adjunct Faculty in Graduate Education Programs

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Supporting High Quality Adjunct Faculty in Graduate Education Programs

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Sense and Sensibility:
The Value of Women’s Leadership Work

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Abstract

“The world needs what women bring” (Longman, 2019). Research has focused on the topic of women as leaders in higher education, noting gender inequities in representation in leadership positions as well as barriers preventing women from either making the career transition to leadership or advancing to more senior leadership positions. This paper explores the role of sense and sensibility (e.g., head and heart) for women leaders. The autobiographical phenomenological study examines in-depth the experiences of four women leaders at faith-based institutions. The women reflect on their strengths and the way their roles invoke the need for sense (rationality/logic) and sensibility (sensitivity) in their daily leadership tasks.
Sense and Sensibility: The Value of Women’s Leadership Work

Jane Austen’s novel, “Sense and Sensibility,” was set in the late 1700s when roles and opportunities for women were very limited. While the plot of “Sense and Sensibility” revolves around marriage, one discovers subtle themes such as character and personal integrity, women in society, and the role of strategy to maintain one’s place in society.

Austen’s use of the term sensibility refers to sensitivity, or an emotional perspective, while sense refers to practicality and logicality. Elinor and Marianne, the two principal characters of the book, each portray one of these virtues, and the sisters are challenged to find an interrelatedness of the two or what one might describe as the meeting place between emotion and rationality. The concept of “sense,” or a practical view of the world, along with proper regulation of one’s “sensibility,” or an emotional display of passion, is also a theme of women’s leadership. Today, we might describe sensibility as the emotional intelligence leaders need to navigate human emotions, both one’s own and those in the organizational hierarchy above and below (Goleman, 2004).

Previous research has documented the double bind women leaders face: the balance between sense and sensibility and perceived gender stereotypes (Zheng, Kark, & Meister, 2018). This paper focuses on the need for leaders to utilize sensibility, or those skills often associated with emotions, that women leaders can and typically are expected to bring to the workplace. It is a phenomenological study that is introspective and autobiographical, exploring the experiences of the phenomena of emotional labor and the invisible work of university leaders.
The subjects include a dean, an associate provost, an associate vice president, and a vice president, each serving at different faith-based institutions across the country. All subjects were graduates of the 2017 Thrivent Fellows Leadership Program. Each of the women leaders was given a set of questions, and the responses were coded for themes and then compared. In addition, the women met weekly for a semester to discuss their lived experiences, determine definitions, and code text from written interviews. The fact remains that higher education benefits from female leader perspectives, and, as Longman (2019) stated, “The world needs what women bring.”

**Literature Review**

Research confirms that women are significantly underrepresented in higher education presidencies, including those at faith-based institutions. As of 2016, only 30 percent of higher education institutions had a woman president (American Council on Education, 2017). The highest percentage of institutions with a woman president were two-year colleges, and the lowest percentage of institutions with a woman president were nonprofit private and doctoral-granting institutions (American Council on Education, 2017; Gardner, 2019). Specific to the nonprofit private classification, additional data demonstrates faith-based institutions employ a lower percentage of women presidents. The Council for Christian Colleges and Universities (CCCU) is an association of more than 185 Christian institutions worldwide; as of spring 2021, only 18 institutions (9.7%) were led by women presidents, despite enrollment at these institutions being comprised of more than 60 percent of female students (Council for Christian Colleges and Universities, 2022).
The pathway to leadership for women in higher education has been difficult. While previously described as a glass ceiling preventing entry, Eagly and Carli (2007) describe the pathway as a labyrinth due to the many challenges encountered throughout a woman’s leadership journey. Gallagher and Morison (2019) pointed out that universities were developed by and for men; women were only allowed access in the 20th century due to societal changes in norm expectations. They also noted that women’s pathways to leadership positions are very different from that of their male counterparts. Moodly (2021) found that when males in university leadership positions discussed women’s career trajectories, there was not a consciousness of agency, nor was there any urgency in addressing the barriers to equal access of women to positions of power. Rather, institutional cultures continue to inhibit the advancement of women toward leadership positions. In yet another example, Gedro et al. (2020) participants provided commentary as to their leadership learnings during the Covid-19 pandemic, and a key conclusion was the recognition that gender bias continues to impact leadership in higher education. In addition to gender bias, the topics of emotional labor, invisible work, and the double bind impact women’s progression into higher education leadership roles. Additional commentary regarding these phenomena can be found in the sections below.

**Emotional Labor**

Emotional labor was a term first defined by Hochschild (1983) in her seminal work, *The Managed Heart: Commercialization of Human Feeling*. Hochschild described emotion as a social norm and coined the term emotional labor as referring to managing feelings and expressions based on the expectations of the work at hand. As Denham Smith and Grandey (2022) observe,
emotional labor relates to a leader’s attention to employee mental and physical health and
burnout while also demonstrating sensitivity and compassion. And while emotional labor is not
limited to one gender, research has documented impacts on females within and outside of
higher education. In their work on emotional labor from the perspective of women leaders,
Aveling and Brygt (2019) found that emotional labor is the “unpaid and unnoticed work that
foremost women carry out...highly associated with femininity according to previous research
and often involves being attentive to others, creating a good ambiance, and to be warm and
caring” (p. ii). Their findings indicate that women leaders feel obligated, and both their
superiors and those they supervise expected them to perform in a manner that exudes
sensibility or caring. Additional resources, such as Wilding (2018), document the ongoing
impacts of emotional labor on women in their careers, including the time spent in rephrasing
communication or figuring out how to not sound harsh or offensive; including the unpaid and
unnoticed work that women do “to keep everyone around them happy and comfortable.”

Invisible Work

Connected to the concept of emotional labor is the notion of invisible work. Hartley
(2018) expands the definition of emotional labor to also include the concept of invisible work,
defining emotional labor as the unpaid, invisible work women do to keep those around them
comfortable and happy. Embedded within this definition is the unpaid and often overlooked
work that women perform at home and at work. Previous research has separated the concepts
of emotional labor and invisible work. In the 1987 article entitled Invisible Work, Daniels
described work activities that are essential to an institution or community’s success, such as
interpersonal skills, organization, and teamwork as being seen as more of a women’s role (i.e.,
nurturing) and do not necessarily come with financial compensation. This work is readily
devalued as less important, unpaid, and uncounted towards promotion or, if in a university
setting, tenure. Additional research reports that females typically complete higher levels of
service and advising work, both of which impact their opportunity for promotion and even
career advancement (Reid, 2021; Social Sciences Feminist Network Research Interest Group,
2017). In yet another example of the impact of invisible work, McKinsey & Company (2022)
stated, “Compared to men at their level, women leaders do more to support employee well-
being and foster diversity, equity, and inclusion—work that dramatically improves retention and
employee satisfaction, but is not formally rewarded in most companies” (p. 14). Invisible work
helps universities but continues to negatively impact female leaders.

**Gender Bias and the Double Bind**

In their 2018 study of a large nonprofit organization, Ballakrishnen et al., found that
women professionals continue to “face biased expectations at work and at home” (p. 23).
Women are expected to conform to organizational expectations, processes, and beliefs that
were structured by men (Acker, 1990), but when women do behave in a masculine fashion, it is
not accepted, and the women face a backlash (Eagly & Carli, 2007). This double bind impacts
women leaders: They must balance sense and sensibility to demonstrate assertiveness and
decisiveness, but not too much, and show emotion and care, but not too much. Tradition and
culture influence gender bias within higher education: Leadership traits of decisiveness and
assertiveness are valued and rewarded for men but if women demonstrate these same traits,
they have to be careful to balance them with more traditionally expected female behaviors
such as kindness, understanding, and compassion. Female leaders within higher education
clearly experience issues associated with double bind and gender bias, which impact their ability to lead and to be seen as a leader as well as their promotability.

**Methodology**

Moran (2002) described phenomenology as a way of perceiving: “The unprejudiced, descriptive study of whatever appears to consciousness, precisely in the manner in which it so appears” (p. 1). In phenomenological approaches, the researcher examines phenomena uncontaminated by a priory common sense or scientific impositions; the goal is to capture the richness of a phenomenon as it manifests in the individual who experiences it (Moran, 2002). The methodological use of phenomenology is relatively recent and can be traced to the philosophy of phenomenology.

Phenomenology first began in the 1800s in Germany and spread to the United States in the 1920s. Georg Wilhelm Friedrich Hegel, one of the first phenomenological theorists, admired the work of Immanuel Kant but believed that just as social and political institutions change, so too do the categories we use to understand the world. Hegel thought that the most reasonable and just social institutions do not divide and fragment subjects because that would cause the subjects to experience themselves as incomplete (Ashley & Ornstein, 2004). Hegel’s belief that human beings understand themselves through the categories available in society helps one understand how a woman living in the 1900s might understand herself differently than a woman living in the 21st century. Hegel noted that the categories of mediation (class identification, educational qualifications, occupational classifications, ethnic identity, etc.) available to anyone are constructed by society collectively through communicative
interaction. Thus, the ability of any person to begin to view themselves differently depends on societal discussion and the modification of categories of mediation. In part, this paper explores the categories of mediation available to women leaders and the importance of including them in societal dialogue.

In phenomenological research, individuals attempt to describe and thus understand the essence of a phenomenon. Many different types of data gathering are used in phenomenological research. Some of the most common include interviews, focus meetings, and the analysis of personal texts. Many researchers (Gorden, 1969; Measor, 1985; Oakley, 1981) discuss how to conduct phenomenological research and suggest that the thread that connects each data-gathering method is one of minimum structure and maximum depth of personal experience/reflection.

For this study, data collection included analysis of personal responses, participant discussion, and interviews of the four women administrators. Regularly scheduled discussions of the lived experiences over the course of six months became “field notes,” offering a glimpse into experiences of gender-biased expectations, the identification of categories of mediation, and the sensibility of women’s leadership work.

Written interviews were used to tease out the experiences of the participants, focusing on behaviors that were placed in either the “sense” category (business, rational, non-emotional) or the “sensitivity” category (relational, collaborative, emotional). The written interview protocol may be found in Appendix A.

Findings
The primary sense and sensibility content was found within responses to questions 1 and 2, and thus form the foundation for the findings section. These questions include: (1) In thinking about sense and sensibility, (a) what work are you expected to take on as a leader? and (b) What work may be invisible to others but work you feel is essential to your organization? The second (2) question asked: What types of emotional labor is expected of you as a woman leader? Participant responses were found to align with previous research regarding invisible work and emotional labor. In addition, participant responses centered around aspects of their position description: Work explicitly required, other duties as assigned, and additional expectations for their positions.

**Finding #1: Participant Responses Aligned with Research on Invisible Work, Emotional Labor**

In responding to work that was expected to be taken on as a female leader, responses aligned to the invisible work of Daniels’ (1987) research:

I also see it as essential to notice little things that often fall to administrative assistants and help where I can. For example, it often falls to them to refill the water in the coffee maker or make sure we have plates and utensils available. I try to buy birthday cards and keep them handy. I make time to ask about their families and lives and be sure we are considering their perspective when big decisions surrounding our organization are made.

As a woman, I always bring food treats to meetings. Men rarely bring breakfast muffins, lunch cookies or cheese and crackers at the end of the day. I just do it because I think it will contribute to the overall experience of the group. No one asks me to do this. They always thank me but rarely am I compensated. I continue to bring the food treats because I think it helps our progress.

In my first academic departmental meeting, 12 men and I met to discuss the fall semester’s plans. The Chair of the department looked at me and said, “Will you be the secretary and take notes?” Inside I was boiling mad as I assumed he had asked me as the only woman present. Even though it was the very first day on the job, I looked at him and said, “I would be happy to do it today. And then for every month after, let’s rotate.”
I’ve sometimes been expected to take notes and arrange meetings, although I’ve made it clear that males are as capable of doing this as I am and that it is not a gender specific skill. When I stopped arranging the meetings for my colleagues (who were male) and asked someone else to take over that role, no one stepped up so there were no more monthly meetings, even though it was considered valuable time for all of us.

The work that is invisible to others but work I feel is essential to our organization is continuously improving practices and procedures. I have found not everyone ascribes to the mentality of continuous improvement, and there is a “good enough” mentality at times. The desire to continuously improve the student experience, ensure policies and procedures are student-centered and legally compliant, and enhance the efficiency of university personnel and resources drive this invisible work. It is not requested of me, but it is part of what I feel needs to be done on behalf of our learners.

The idea of invisible work is VERY REAL and should be talked about more. It is important that organizations begin to identify the work that is done and never acknowledged (like filling the coffee pot, buying a birthday card, making sure a new person has been given information about the community and shown around campus, etc.).

When asked about emotional labor, responses from participants indicated that as women, they were expected to take on leadership work that would be considered nurturing:

In addition to the task type of work anyone in this position would have, I believe I’m expected to also engage in work that uplifts people emotionally. My position relates to faculty affairs so it is quite possible that anyone in this position would be asked to pay attention to faculty morale etc. However, I am at times asked to go meet with faculty to ‘hear them out’ to ‘better understand’ the situation. Within the office, I feel some pressure to uplift people and help create an atmosphere of joy.

Expression of sensitivity or emotionality occurs primarily through one-on-one conversations. I have found that many male colleagues are very uncomfortable with any displays of emotion and want to problem solve rather than understand the variables driving the sentiment (for example, significant frustration over several weeks of the same issue leading to anger or other emotions). The one-on-one conversations with peers and direct reports have led to positive, supportive relationships: They know I care about them as people, not employees, and our faith and family are our priorities.

I think it is my job to “make sure everyone’s feeling ok” with the decisions we have had to make. I presume, because no one has told me to do this in between our
meetings, that if it’s “meant to be, it’s up to me.” I am not sure where these expectations come from, but I do this all the time as a leader.

I’m expected to provide a sense of community and support even though it is not in my job description, and in my mind is a collective responsibility of all. I’m expected to send flowers, call, and ensure that those I supervise who are in a difficult time emotionally or health-wise are doing all right.

**Finding #2: Positions Included Explicit and Implicit Expectations**

The concepts of sense and sensibility were used by all the subjects to describe their leadership experiences and job duties. When describing work they were expected to take on as a leader, the women referenced the work they knew they would do since it was clearly outlined in their position descriptions (explicit expectations), the work that fell into the “other duties as assigned” category (implicit expectations), and the work that others seemed to expect them to do (implicit expectations). This section will describe these different categories of work duties, how sense and sensibility are embedded in each category as well as the mediated category of gender to each category.

*Explicit Expectations: Responsibilities Outlined in Job Descriptions*

Most of the subjects reported that leading change, working as a middle manager and establishing and maintaining communication with others were significant parts of their jobs and were listed in their job descriptions. None of the women were surprised by these tasks; all saw them as important and believe that they are required of any person in their role regardless of gender. However, they did acknowledge that sense and sensibility are needed to perform these three main tasks well.

One subject described leading change as the most difficult aspect of her job. She went on to note that it is particularly hard because no one seems to want change in her organization.
She noted that the sense aspects of this task (the planning, organization of moves, reading, and applying theory of change management) are the relatively easy parts. It is the sensibility tasks associated with change (spending a great deal of time with people and understanding their emotional reactions and fears related to change) that are difficult to accomplish.

“I have taught many seminars on change management. I know all the theories and best practices. It is still difficult when you have so many different personalities involved. You cannot force people to change. It is a process that takes time and lots of work.”

For another participant, the need to implement change was directly related to creating improved programs and processes for students. Yet the same themes of designing the change (sense) and helping people feel comfortable (sensibility) were present: “There are numerous challenging aspects of my position. One is developing and implementing change in the form of continuous improvement for our students. There is a general resistance to change, and newer programs require a different approach than has been used in the past, which is not always supported. None of the women said that managing change felt particularly gendered. They all agreed that it was a key responsibility listed in the positions they held just as managing from the middle and establishing communication channels were non-gendered position duties.

And as they did with managing change, the women talked about the ways in which sense and sensibility were significant factors in middle management and communication networking. For any initiative to work well, it is important that strategy formation and implementation are coordinated (Mair, 2005). Typically, top administrative positions (upper-level management) are responsible for strategy implementation, and middle managers (deans, assistant provosts, vice-presidents) are responsible for the strategy implementation (Floyd & Wooldridge, 1992; Guth & MacMillan, 1986). But at times, middle managers also provide
information and ideas in the strategy formation process (Burgelman, 1983). As such, the interaction between top managers and middle managers is crucial in effective strategy formation and implementation (Raes, Heijltjes, Glunk, & Roe, 2011). Equally crucial is one’s ability to integrate the implementation tasks associated with middle management roles and the need to establish clear and effective communication networks.

In this study, the women noted the difficulty inherently involved in a middle management role. “I do not have the power to make institutional decisions. My ability to influence lies in my ability to persuade others.” This quote likely represents the experience of most middle managers regardless of gender. The quote highlights the need to use persuasion which is a tactic and skill that relates to both sense and sensibility. As a tactic, persuasion is carefully and strategically planned. As a skill, persuasion involves knowing and understanding the feelings and emotions of others. One respondent spoke about the sense and sensibility she uses in her middle management role: “I find that men tend to respect other men’s opinions more than women’s (at times). Thus, if I want to influence, I may need to not only provide evidence but engage other men in the process and hope they will support the position I am advocating for.”

Because communication is a central piece of any implementation process, it is not surprising the women noted this as a key position duty. They identified the need for “clear, strategic, and intentional communication between faculty and administration” and noted that “navigating the necessary communications between senior leadership and faculty and working to have everyone on the same page with a shared vision and the necessary tactics to achieve the vision is time-consuming and has challenges such as working in a male-dominated culture to
have female voices represented and seen as competent and qualified.” While middle management tasks and communication networking require sense and sensibility and are not inherently gendered, the women often raised the issue of gender as they discussed these duties. They found that they needed to use special strategies to gain the respect and following of men.

Implicit Expectations: Other Duties as Assigned

One woman who was interviewed stated that the bulk of her work seemed to fall into the ‘other duties as assigned’ category. She noted that no one was explicitly responsible for developing the standard operating procedures her organization would need as collaborations between academic units and other offices (admissions, advising, registrar) occurred. Because she noticed the disconnect between academics and operations, she found herself leading conversations designed to enhance communication and ultimately the student experience. Her experience suggests that her strong process orientation (sense) helped her spot an area that needed improving and her sensibility (understanding others’ emotions) helped her design and facilitate needed conversations. She stated: “This has been a time-consuming and messy process, but one that is needed.”

For another respondent, the ‘other duties as assigned’ was the creation of community. She wrote: I’m expected to provide a sense of community and support even though in my mind it is a collective responsibility of all. I’m expected to send flowers, call and ensure that the people in my division who are in a difficult time emotionally or health-wise are doing all right.” While creating community may be an implicit part of many middle-manager roles, in this case
the tasks were far more related to sensibility and being female (gender) than the tasks outlined in the other respondent’s answer.

Finally, a third respondent painted a broader picture of the ‘other duties as assigned’ category. She suggests that the category is full of invisible work and said: *It is important that organizations begin to identify the work that is done and never acknowledged (like filling the coffee pot, buying a birthday card, making sure a new department/unit member is given information about the community and shown around town and campus, etc.”*

Thus, unlike the first category of job duties (those explicitly stated in the position description), the duties that are found in the all-other category are not explicit and are seemingly more likely to be sensibility-related and gendered (seen as more typically female tasks).

*Implicit Expectations: Work that Others Expect One to Do*

In all positions, there is work that others expect someone in the position to do even though it is not written down. One example would be having the University chaplain say grace at almost any meal he or she is at. Most of the time, people just assume that a religious leader will say any prayer that needs to be said. This expectation is not gendered. For other university leaders, the work that others expect them to do may be less clearly identified and is frequently gendered.

Noticing the ‘little things’ that administrative assistants do is one gendered task that is often expected of female leaders. Other workers do not often expect that a male leader will take note of the table cloths that an administrative assistant or coordinator chose nor do they expect him to notice when that assistant or coordinator makes sure there are “happy birthday”
decorations. Yet the women in this study noted that “I also see it as essential to notice little things that often fall to administrative assistants and help where I can. For example, it often falls to them to refill the water in the coffee maker or make sure we have plates and utensils available. I try to buy birthday cards and keep them handy so I can contribute.”

Another respondent stated that she was expected to take on all leadership work that her male colleagues are asked to do but believes there are additional expectations or tasks she is expected to take on because she is female. One example she gave relates to meeting tasks: I am also sometimes expected to take notes and arrange meetings, although I’ve made it clear that males are as capable of doing this as I am and that it is not a gender specific skill. Even though she suggested that this was not a female task she found that no men stepped up when asked: “When I stopped arranging the breakfast meetings for the graduate deans and asked someone else to take over that role, no one stepped up so we quit meeting monthly, even though it was considered valuable time for all of us.”

Emotional labor is another area the women identified as something that is expected of them by others. Emotional labor and emotion management occur in at least three different ways: surface acting, by pretending or regulating one's emotional expressions; deep acting, by consciously modifying one's emotions to express a desired emotion, and genuine experience of emotions (displaying naturally felt emotions) (Grandey, 2000; Hochschild, 1983; Glomb & Tews, 2004).

A study participant noted that compared to the men on the leadership team, she was expected to conduct more pre- and post-meetings with everyone to make sure things run smoothly. She wrote: I think it is my job to “make sure everyone’s feeling ok” with the decisions
we have to make. I am not sure where these expectations come from. But I do this all the time as a leader.”

A different respondent described the way she consciously modified her emotions and wrote: *In almost all cases, I am aware that if I express strong negative emotions, I will likely be penalized. The penalty will not be open nor voiced but it is likely I will be judged as either too strident or as not able to handle difficult issues/decisions etc. Thus, I find that my male colleagues can voice strong objections and even say that an idea or project is stupid but I will need to tamp down my emotions and find a nicer way of saying something that doesn't make sense (is stupid).*

A third participant described the work she did of regulating her own emotions so she could listen to others and provide them a place to express their feelings. “*I have colleagues who share frustration with me regarding university policies, procedures and the institutional culture. They are not venting in a negative manner; instead they are trying to find solutions and expressing the frustration which led to their emotions…. There is emotional labor of working to support colleagues and students navigating their journey and deciphering the impact at the university level.*” This respondent believed that others expected her to be the ‘listener’ and then decipher and translate the emotions into content for her peers to work with.

In summary, all of the women identified three categories of job or position duties: those that were explicitly stated, those that fell into the explicitly stated category of other duties as assigned (or needed), and those that others just expected them to do either because of their position or their gender. Our finding is that making things explicit seems to lessen the likelihood that the task will be gendered. Tasks in the first category required both sense and sensibility
and were not seen as gendered. Tasks in the second category also required both sense and sensibility and were sometimes seen as gendered, while tasks in the last category almost always involved sensibility but did not always involve sense and were mostly gendered.

**Conclusion**

It was agreed among participants that Daniels’ definition (1987) of invisible work and Hochschild’s (1983) theory of emotional labor was assumed in the work of the women leaders studied. The weekly data-gathering sessions were supportive; participants were able to discuss the varied contextual nature of their institutions yet find commonality in assumptions and expectations that were, for the most part, not those required of male counterparts. An interesting side note is that the sessions did not turn into complaint sessions; rather, the women worked to support one another in finding ways to move forward in a positive fashion of continuous improvement and solution orientation, which aligns with Dweck’s (2006) work on growth mindset. While the participants recognized that not all the expectations cited were gender-related, they noted that the tasks related to invisible work and emotional management of the workplace were more often taken for granted as “women’s work.”

Jane Austen’s novel, “Sense and Sensibility,” explored the comparison of emotions and rationality, which could be perceived as an either/or approach: Either emotions or rationality are superior, rather than combining the concepts. For the purposes of this study, the title of sense *and* sensibility is a fitting concept: Both sense and sensibility are needed within higher education leadership today. Women provide significant value to higher education institutions through their ability to fulfill the responsibilities of their position to meet the business needs of the organization, and through the manner in which they build relationships and support the
communities they serve. This concept of leading with the head and the heart is well articulated by Vigoda-Gadot and Mesler (2010):

Current writings place a great deal of value on the wisdom of the mind as representative of rational thinking and systematic order...It is the mind that seems to be the ultimate ruler...almost no attention is devoted to the role of the heart. It is the heart that goes beyond rationality, representing the feelings and emotions that play an essential part in administrative reality (p. 81).

This study demonstrates that while there are barriers to women’s leadership in higher education, there are women who are meeting and exceeding expectations in their positions due to the strengths they bring to the roles.

**Study Limitations**

While helping to gain an understanding of the lived experience, phenomenological research is subjective in nature, and it is often difficult to establish the validity of the information. In this study, the only voices represented were those of white women with a Christian religious background. There were no perspectives from women of color or those with a different religious worldview.

**Recommendations for Further Research**

In phenomenological research, the author seeks to understand and describe the essence of a phenomena. A way in which the personal leadership experiences of the authors continued to develop and be understood was the use of weekly communication in which terms and understandings were defined and refined. Over the course of a semester, the authors recognized that perhaps sensibility, at least in this century, would better be defined as the collaborative act of building community. Much of women’s leadership work revolves around the activities, both physical and emotional, that support the building of a culture of
inclusion. Further study is needed to determine the implicit or hidden expectations organizations have around the work of women (and men) leaders.

Additional research can include greater representation of race and ethnicity as well as religion. There were no authors of color or religion other than Christian. Including women whose lived leadership experiences may have been further exacerbated by ethnicity or religious beliefs would be beneficial as white, Christian women likely experience employment and leadership in higher education differently than women of color and those with differing religious backgrounds. Including more diversity of women leader participants, particularly those of color, would be a valuable addition to this research.
References


Appendix A
Protocol/Reflective Questions

1. In thinking about sense and sensitivity:
   - What work are you expected to take on as a leader?
   - What work may be invisible to others but work you feel is essential to your organization?
   - How do you know that work may be valued by others?
   - How are you able to express sensitivity or emotionality?

2. What types of emotional labor is expected of you as a woman leader?

3. What are the most difficult aspects of your job?

4. Have you mentored other women into or in a leadership position? What were some of the most important information you imparted to your mentees?

5. What have you learned in your tenure as a leader that you would share with women coming into leadership positions behind you?

6. What intersectionality do you see as a woman and a leader?
   - Second shift
   - Double bind

7. Diversity, equity, and inclusion: have there been experience(s) that impacted your ability to lead?

8. How is your leadership style different in today’s society than when you started your first leadership position?

9. Is there anything else you would like to share about your experiences with invisible work or emotional labor that we have not asked you to reflect upon?
Structural Impediments Impacting Early-career Women of Color STEM Faculty Careers

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Abstract

Women of Color faculty continue to experience many challenges in their careers in the professoriate, especially in the science, technology, engineering, and mathematics (STEM) fields. As such, more research is needed that considers structural issues inhibiting their success. Using critical race feminism, we conducted semi-structured interviews with faculty and administrators in STEM departments at higher education institutions to gauge their perceptions of structural impediments impacting early-career Women of Color STEM faculty careers. We present our findings with practical implications.
Introduction

Underrepresented faculty of color—identified as Alaskan Natives, Asian Pacific Islanders, Black/African Americans, Latinx/Hispanic Americans, Native Americans, and Native Hawaiians—comprise only 9% of STEM faculty (National Center for Science and Engineering Statistics [NCSES], 2021). However, they comprise 32% of the United States (U.S.) population (NCSES, 2021). Faculty of Color encounter many challenges in the science, technology, engineering, and mathematics (STEM) fields, such as inequities in service expectations, racial and gender bias, difficulty building networks and collaborations, lack of quality mentoring, and hostile departmental climates (Corneille et al., 2019; Miriti, 2020; Sgoutas-Emch et al., 2016). When disaggregated, Women of Color faculty are particularly grossly underrepresented, disadvantaged, and underserved in the professoriate. In 2019, Women of Color represented only 2.94% of the tenured faculty and 5.54% of the tenure track faculty in sciences and engineering (NCSES, 2021). Additionally, interventions designed to support underrepresented groups in the STEM professoriate often lack an intersectional lens (Armstrong & Jovanovic, 2015).

Because of their dearth of representation and systemic biases, Women of Color faculty report encountering racism, sexism, and the compounded nature of both (Collins, 2020; McGee et al., 2021; Malcom et al., 1976); resulting in academic bullying, marginalization, imposter syndrome, tokenism, isolation, lack of sense of belonging, inequities in service expectations (Grant, 2021; Hurtado & Figueroa, 2013; Ramos & Yi, 2020; Patterson et al., 2017; Wilkins-Yel et al., 2019, 2021). Women of Color STEM faculty also report concerns with ambiguous promotion guidelines (Roth & Sonnert, 2011) as well as chilly climates and uncivil cultures (Miner et al., 2018). These concerns are especially prevalent for Women of Color STEM faculty in white male normative spaces that are usually non-supportive and uncomfortable in allowing
them to share their experiences and struggles with others, including their advisors/mentors (Wilkins-Yel et al., 2021). Consequently, more research is needed that considers structural issues inhibiting efforts in diversifying the STEM professoriate with an intentional attention to Women of Color STEM faculty. Thus, the purpose of this study is to describe how faculty and administrators describe structural impediments (institutional and departmental) impacting the careers of early-career Women of Color STEM faculty. Specifically, we sought to answer the research question: How do institutional structures inhibit the career progression of Women of Color STEM faculty in research universities?

**Literature Review**

This literature review is informed by current scholarship that centers on the challenges imposed by systems in academia and how these systems disenfranchise people of color. However, we focused on faculty careers and narrowed our scope to Women of Color when possible due to their compounding marginalized identities. In looking at challenges and barriers, we also considered the operational practices and processes in STEM departments and their impact on faculty careers, broadly. As such, our literature review is organized in three sections: (1) discretion in policy enactment, (2) tenure and promotion evaluative practices, and (3) raced-gendered disparities in faculty workload.

**Discretion in Policy Enactment**

In her presidential address, O’Meara (2021) discusses the intersection of discretion and policy enactment. Using Ball’s (2018) concept of “discretionary spaces” defined as “places where faculty and academic leaders hold the power and authority to make decisions and take action” (O’Meara, 2021, p.559), O’Meara shows how racial inequities can be reinforced when discretion is left unchecked. She goes on to argue that “because discretion is enacted in ways that
reproduce racialized organizations, and amplify privilege, we need checks and balances” (p. 575). Ray (2019) questions whether these checks and balances are possible when racial structures continue to be an insidious aspect of organizational life. He advances that organizations as racial structures entails four tenets including the ways organizations minimize the agency of racial groups and separation of policy from practice denotes a racial undertone. Consequently, seemingly objective policies and “practices may be enforced in ways that disadvantage” communities of color (Ray, 2019, p. 42). Nine years prior, Lipsky (2010) noted that discretion in policy enactment is often perceived to be neutral and possibly harmless. While O’Meara (2021) agreed that discretion can be used to advance or limit “faculty to act as agents to advance full participation” (p. 559), Martin et al. (2012) illuminated that faculty of color may be constrained in their attempts to disavow policy and may be subject to serious consequences.

**Tenure and Promotion Evaluative Practices**

Faculty are expected to perform in ways that address tenets of the tripartite of faculty life: teaching, research, and service (Griffin, 2019). Within the research domain, faculty are evaluated on their quality of their work and outlets (e.g., journals, books) where their research exists (Griffin, 2019). Legitimacy is often determined by levels of productivity and type of research engagement (e.g., traditional vs. newer forms of scholarship) (Gonzales & Terosky, 2016). In order to achieve legitimacy, Griffin et al. (2013) note faculty of color being intentional about solely publishing in top-tiered, peer reviewed journals. Much of the extant literature discusses how women and faculty of color are disproportionately engaged in service and teaching than research which impacts their productivity in this area (Griffin, 2019). Conversely, in a recent study, Nyunt et al. (2022) showed that even when minoritized faculty may be meeting or exceeding standards set in tenure and promotion guidelines, tenure and promotion may not be
within their reach. Nyunt et al. (2022) qualitative study using interviews from 22 participants who were denied tenure, withdrew from the process, or left the institution because of perceived unlikelihood of earning tenure elucidated inequities in the tenure and promotion process. Participants reported that it was commonplace for tenure criteria to be “unclear, continuously changing, and/or unevenly applied” (p. 9). There were also instances where senior faculty shared erroneous information resulting in at least one participant not receiving tenure and promotion. Another issue that arose in this study was research and scholarship not being recognized as valid and legitimate causing confusion as to why these participants were hired when their research agendas were known (Nyunt et al., 2022). To counteract such perceptions, the University of Michigan STRIDE program (University of Michigan, 2023) provides training for tenure and promotion committees to minimize bias against candidates who engage in topics, methods, and epistemologies that may not be central to some disciplines. O’Meara (2021) purported “such efforts to leverage faculty judgment are critical to improving the integrity and legitimacy of faculty evaluation” (p. 573).

**Raced-Gendered Disparities in Workload**

Women of Color in academia usually step beyond their teaching and research duties and commit to disproportionate services activities that require being personally invested, these services activities are usually not reciprocally beneficial to salary or career advancement (Alter et al., 2020). Women of Color usually commit to these requests as agents of change and to respond to constant requests from their institution under the premises that Women of Color must be representatives for minoritized groups and responsible parties to address and educate the campus community on diversity issues (Carson et al., 2019; Liu et al. 2019). Moreover, a qualitative meta-analysis conducted by Corneille et al. (2019) revealed critical challenges faced
by Women of Color in faculty positions. The study revealed various literature pointed out Women of Color dealing with excessive teaching loads and not adequate support. This demand impacts Women of Color research productivity, an aspect vastly expected in the STEM field for tenure and promotion (Corneille et al., 2019). Additionally, high teach and service loads for Women of Color are not accompanied with institutional support mechanisms to make their contributions visible, rewarding, and conducive to personal, professional, tenure and promotion goals (Carson et al., 2019; Garret et al., 2022; Griffin & Newsome, 2021). In fact, Women of Color navigate unseen workloads with an expected obligation to agree to other demands to evade criticism and stereotyping (Liu et al., 2019). These substantial workloads and demands are not only detrimental to Women of Color career advancement but also their work life balance promoting their burnout and increasing the chances of leaving academia (Hess et al., 2013).

**Conceptual Framework**

We used Critical race feminism (CRF) as the framework for the interpretation of our research findings. This framework asserts that Women of Color face a multitude of racial and gender discrimination, and can be understood through adding both the race and gender additive dimensions to the study through multiple techniques to present Women of Color’s intertwined gender and racial experiences (Berry, 2009; Berry, 2010; Ladson-Billings, 1998, 2009; Wing, 1997, 2000; Yosso, 2005). Critical race feminism focuses on deconstructing the dominant narrative of the system of power by foregrounding the multidimensional experiences of Women of Color as “an outsider within,” navigating the historically biased system that discriminates against gender, race, and other marginalized identities (Collins, 1986; Wynn et al., 2021). Kimberley Crenshaw proposed the theory of intersectionality, which focus on how Women of Color experiences are not fully acknowledged in legal system, it either sees her as a women or as
Black, and fails to acknowledge the multiplicative identities and how power has clustered around specific categories fostering social hierarchies, positioning Women of Color within at least two subordinated groups exposed to racism and sexism (Crenshaw, 1991, 2019).

Several studies have applied the CRF framework to explore Women of Color faculty experiences. Roby and Cook (2019) used the framework to understand Black women sharing in resistance within academia. They find that Black women in graduate school are silencing themselves to remain in the academy and Black women experiencing pressure to conform to a whitened success model to achieve academic goals (Roby & Cook, 2019). Turner et al. (2011) utilize Critical race theory and CRF to foreground the experiences of 51 Women of Color tenured faculty from various academic disciplines from all regions of the United States, facing racial and gender dynamics of institutional tokenism, significantly inconsistent and arbitrary communication regarding diversity programs and services on their campuses. Venice Thandi Sulé (2014) used the CRF lens with the agency frame examining the intersection of professional socialization and agency among 14 tenured Black female faculty at four Predominantly White Institutions and found that Black women faculty employed different navigational strategies including using their agency to engage, modify, enact or discard different institutional norms to succeed in academia. Sulé argues that this is an important framework to decenter the dominant narrative and put forward the voices of marginalized women in academia.

Previous studies researching Women of Color faculty rejected traditional research frameworks focusing only on race or gender; hence, failing to account for the complexities that come with the social identity of being a Woman of Color faculty navigating institutional norms through the structurally reproductive and structurally transformational agency and the history of institutional exclusion. CRF allows researchers to destabilize the discourse that justifies power
hierarchies by interrogating the additive dimensions of identities and the resulting inequalities in power relationships. To this end, we used CRF in the current study as a vital lens to understand the exclusionary structural standards in academia impeding the progress of early-career Women of Color STEM. Furthermore, CRF provides a basis for examining how institutional norms influence historically disadvantaged groups and how those groups negotiate unwelcoming environments.

**Methods**

We conducted basic qualitative research as an interpretive study (Merriam & Tisdell, 2016). Merriam and Tisdell (2016) argued that “qualitative researchers conducting a basic qualitative study [are] interested in (1) how people interpret their experiences, (2) how they construct their worlds, and (3) what meaning they attribute to their experiences” (p. 24). Drawing on the focus of “understanding the meaning a phenomenon has for those involved” (Merriam & Tisdell, 2016, p. 24), we employed basic qualitative research to explore how practices and procedures in STEM departments at six major research universities in the United States serve as structural impediment and systems of oppression in the careers of early-career Women of Color STEM faculty.

In this study, we draw upon the perspectives of 19 participants; administrators and faculty members, including five pre-tenure Women of Color faculty, five department chairs, three tenured faculty, four diversity administrators (i.e., chief diversity officers, ADVANCE grant administrator), and two deans. Participants’ racial composition include five Black/African Americans, five Whites, four Latinx, two Asians, two mixed-race, and one Alaskan Native. In terms of gender, 13 participants identified as women and six as men.
Data Collection

Using different interview protocols for the different participant groups, we conducted virtual semi-structured interviews with each participant during the 2021-2022 academic year via the Zoom web conferencing technology. Interviews generally focused on participant’s background, lived experience, perceptions of departmental and institutional policies, practices, and procedures and how they contributed to forces of impediments in the careers of early-career Women of Color STEM faculty. Interviews were conducted by multiple researchers. Each interview was 50-60 minutes long, recorded, and transcribed verbatim.

Data Analysis

Interview data were transcribed using a professional transcription service (TranscribeMe), and imported into the Dedoose data analysis software for analysis. Two members of the research team conducted independent open coding to establish related patterns of codes in the data (Saldaña, 2016). Following this phase, we met to discuss the codes and emerging patterns across the data, especially to identify the similar and varied ways participants discussed how they perceived and attributed meaning to our phenomenon of interest (Merriam & Tisdell, 2016). During this phase of our analysis, we also considered how the data aligned with the CRF conceptual lens (Wing, 1997; Wynn et al., 2021) in unveiling participants’ perceptions of how racial and gendered discrimination function as a system of oppression in hindering the progression of early-career Women of Color faculty in STEM departments at research universities. After several rounds of deliberation about the codes and emergent patterns, we applied thematic analysis by sorting codes of related meaning according to the corresponding category of themes (Robson & McCartan, 2016). Themes emerged from engaging
in a constant comparative method of all data across the various participant groups (Charmaz, 2006). We present these emergent themes in the findings of this paper.

**Findings and Discussion**

Three themes emerged from our data analysis: (1) nebulous policies, (2) unclear performance expectations, and (3) inequitable workloads.

**Nebulous Policies**

Participants discussed how policies that were applied in their institutional contexts tended to be vague and unclear. In some cases, policies that were being enacted were not written and seemed to be employed haphazardly. For example, some participants indicated that they were being held accountable for tenure and promotion policies that were not equally applied throughout the department. Other issues arose with course assignments and concerns that decisions were being made without consideration of the needs of early-career faculty. One participant shared,

[Methods] would be my go-to graduate course…I continue to teach it," which is actually incredibly beneficial for a new assistant professor to teach the same course and not having to do multiple course preps. And I even spoke to the colleague who was actually the one to be teaching that class…and she was hands down okay with me taking over the class for the next four years. But what broke down was the graduate chair decided that he was going to remove me from the class the following year. He vaguely said, "I have a plan for everyone teaching everything." And not everyone is qualified to teach that class. I think it has to do with his students complaining about me because they just didn't like my literal tone of voice. They thought that I was an angry person when I was answering questions. I just have a teaching tone that is more assertive. And I guess
his students just complained to him about me.

In the previous quote the participant identified several structural issues that were consistent with other participants’ experiences in the study. Oftentimes policies were changed without notice, or the policy never existed but institutional actors made decisions as if they were. This speaks to the discretion academic leaders may apply to fit their arguments (O’Meara, 2021; White-Lewis, 2020). Though the participant was trying to teach the same course for several semesters to establish a manageable workload and improve her teaching practice, the graduate chair had other “plans.” The graduate chair’s discretion created a barrier for the participant to enact plans of her own for strengthening a course that she had unique expertise to teach. While we do not know for sure because the graduate chair was a participant in our study, this decision may have been racialized. Plaut (2014) pointed out that though organizational leaders are encouraged to be color evasive in an effort to promote equality, such approaches can exacerbate forms of oppression and inequity. In fact, Plaut et al. (2011) uncovered that departments where faculty were encouraged to be color evasive, stereotype threat, bias, and a poor climate were more likely to be reported.

Student perceptions may have also played a role in why the participant was being removed as an instructor of the course. Countless studies illuminate that teaching evaluations are biased especially toward Women of Color faculty (Basow & Martin, 2012; Bavishi et al., 2010; Chávez & Mitchell, 2020; Eaton et al., 2019). Liu et al. (2019) also point out that Latina women, as in the case of our participant, may be stigmatized as a “fiery Latina” if they act in a manner that is perceived as hostile. Concerning our participant, because of her age and gender, she was purposefully presenting herself in a way that students would respect her positionality as the instructor of the course. Unfortunately, this created some tension between her and the students
that the participant was still trying to make sense of at the time of the interview. In a supportive academic environment, the graduate chair would have considered the participant’s identities, how the students perceived her given these identities, and what support mechanisms could have been put in place to improve her teaching (as necessary) or work to improve the climate in the department to buttress Women of Color faculty (Griffin & Newsome, 2021). The participant continued with explaining additional failures in the system to invest in her as a faculty member and facilitate what she needed to be successful,

I'm removed from the class that I had been teaching for a semester. And I did a significant amount of restructuring and course prep for it. So, I emailed him [graduate chair] about that issue of, "Why are you removing me from my class? If your students didn't like me, that's okay. I can learn. I can grow. There should be an opportunity for me to grow in my teaching." But he wouldn't budge. I looped in the director, and I told her, "Removing me from this class and trying to give me another course to prep is not a supportive environment and it's not a way to support new assistant professors." Those were the words that I was using while looping in the director and nothing was done still.
(Pre-tenure Faculty)

According to Griffin et al. (2020), institutions can retain diverse faculty if they address factors that inhibit these individuals from traversing the academic environment. They also underscore that individual factors alone cannot explain why faculty of color continue to depart higher education institutions necessitating the importance of exploring institutional elements that complicate the experiences of marginalized faculty. As such, this participant’s scenario reflects a critical example of minute but problematic events that occur in the academy. While the participant was looking to improve her teaching, establish anchor courses that would not require
her to prepare new courses each semester, and follow the “chain of command” by informing her
director of the situation, nothing was done to remedy the situation.

**Unclear Performance Expectations**

Early-career faculty participants exposed inconsistencies in how individual performance was evaluated in relation to expressed tenure and promotion guidelines. For some participants, this caused a great deal of psychological stress because they found themselves having to advocate for higher ratings on evaluation rubrics, even though it was warranted based on their achievements in a given year. While all of the early-career faculty participants, in the study, were exceeding tenure and promotion expectations, some were met with average or satisfactory ratings when being evaluated. Interviews with several department chairs revealed that these behaviors were related to a tendency to demonstrate a “trajectory towards excellence” in order to support the narrative of an upward trend and potential for a successful long-term career. One department chair explained,

> When I had that first conversation with them about promotion and tenure after the hire, I have a conversation that the chair had with me when I came. And that is we want to show a trajectory towards excellence. And the way our evaluations go each year for untenured faculty is you can get an excellent, a commendable, a satisfactory, or an unsatisfactory [in teaching, research, and service]. And so, I really talk about ways to strategize moving towards excellence in all those categories, and it doesn't have to be next year or the year before or the year after in all the categories, because once you get to excellent, there's nowhere to go but down, if something happened, right. (Department Chair)

While this mindset may seem helpful to the career of an early-career faculty member, this approach may have unforeseen consequences. Specific to early-career Women of Color faculty,
it could create a false narrative that they are performing at or below the level of their
departmental counterparts. In turn this may suggest they are not adequately trending toward
tenure and promotion or longevity in an academic career (Griffin, 2019). Evaluative practices
that focus on trajectories and upward trends without rating performance as excellent when
warranted also undermines the feedback mechanism that is embedded within the tenure and
promotion evaluation process, if people are being evaluated below what they have achieved. For
example, one participant reported the following,

Because I'm telling you, that first year I pulled two grants, and he gave me "good". And
I'm like, "Bro, what would be exemplary? We're supposed to get two for tenure, and I did
it in my first year." And he's like, "Well, I just never feel comfortable giving anybody
exemplary, because if I called that great, what if something even better happens? So, I
just always hold exemplary in my back pocket." And I'm just like-- so this May-- last
month I got my first exemplary, and every year I have exceeded the expectation. And it's
like, "Really?" But he just really was adamant about it. And even my white colleagues--
we brought in big-- during 2020 we got a NSF Rapid grant-- 200,000. Good. Like,

"How's this good?" (Pre-tenure faculty)

This example not only points to the unfair expectations about what an evaluator, in this
case the department chair, may hold for early career faculty who appear to be surpassing tenure
and promotion policy guidelines, but it demonstrates that an unwillingness to evaluate Women of
Color appropriately may be a form of resistance to invest in faculty of color (Griffin &
Newsome, 2021). Griffin and Newsome (2021) highlight that Black faculty are often
overwhelmed with the demands of the academy and not appropriately compensated for their
labor. While this is consistent with the extant literature (Domingo et al., 2022; Liu et al., 2019),
most examples focus on teaching; diversity, equity, and inclusion (DEI) work; mentoring and advising; and other forms of service. However, no known studies have illuminated the labor associated with grant activity that may go unrewarded internally. As the early-career faculty member pointed out at the end of the quote, the department chair seemed to be “adamant” about rating the faculty member as “good” though she was demonstrating exemplary performance, specifically in the form of grant activity. Because the participant was told she only needed to receive two grants, and by the time of this interview, she had received three, the participant was perplexed about what constituted exemplary performance. Further, these structural issues also point to a need to create agreed upon rubrics and well-defined measures of performance that set clear expectations and parameters for success (Laursen & Austin, 2014). Fortunately, at the time of the study, many of the institutions were working on such efforts.

Inequitable Workloads

Participants discussed inequitable workloads as unequal labor distribution driven by systemic inequities that early-career Women of Color faculty have to undertake to exemplify their productivity for tenure. Early-career Women of Color faculty explained how inequities in their departmental structures and operations facilitated extra workloads for them as compared to their counterparts. They demonstrated that they had to proactively involve themselves in extra responsibilities that were essential to improve the conditions in their departments to enable them to succeed in their careers. One participant explained,

Our growth capability has been slow. And I think it has a lot to do with the structure of the program. Everything is on the shoulders of the faculty… And so, that's when new people like me and [Colleague], we had to take up the charge of creating this open house to try to attract more students because it was our asses on the line. We are the ones that
need to graduate a student. Whereas, my [senior] colleagues - and when I say older, I mean associate professors - they didn't have to graduate a student for tenure. That expectation did not exist for them. So, maybe they don't see the need to be so aggressive. I don't know. Or it doesn't matter to them because it doesn't affect them. That's probably the better way of putting it. But yeah. So, this whole recruitment was on our shoulders, and we had to try to attract students because we needed the students for our tenure and promotion cases. And for research as well. It's difficult to do research without support from students. So, I would say the structure here is just sad, completely sad given the amount of years we've been in existence, so. And it's just disappointing. (Pre-tenure Faculty)

Although early-career Women of Color faculty felt it was important to take on extra workloads to address the impediment of inadequate students which was necessary to assist them meet tenure requirements, it is incumbent upon all stakeholders, especially departmental and institutional leadership to promote a climate that does not only attract students but a climate that deconstructs dominant narratives and resist patriarchal and racist oppressions (Wing, 1997) in offering Women of Color faculty the appropriate tools and support that they need to progress in their work. As the participant disclosed, early-career Women of Color faculty taking on extra responsibilities such as planning open houses without the involvement of senior scholars and adequate program support is inequitable, “sad…and it’s just disappointing” because inequitable and high workloads impact faculty morale, retention, and well-being (Hess et al., 2013).

Our findings are also consistent with the fact that Women of Color step beyond their core teaching and research functions to undertake an inordinate amount of service loads that can be counterproductive to their careers (Alter et al., 2020). As evident in our data, participants also
expressed concerns with early-career Women of Color being requested to perform disproportionate service as compared to their counterparts. For example, one participant explained,

What I think is somewhat inequitable, not equitable, is the types of workload and microaggressions, and inequities that impact faculty of color before they get to [tenure]. So, they may or may not be successful when they go up for promotion, [though] they follow that process. For example, maybe being asked to teach a higher teaching load…

Maybe being asked to sit on a zillion different committees because you're the only woman of color in the school. So, you're spending 10 hours a week doing your duty on the Diversity, Equity, and Inclusion Committee, or going to talk to other incoming faculty of color about the process or about the school. You're being constantly asked to do extra stuff, for better or for worse. That time away from, maybe, what you could be doing to improve your chances of getting tenure. Of actually doing your research, publishing those papers, writing those grants. I think the workload can be inequitable. And so, therefore, you have trouble showing as much productivity because you're being pulled in so many different directions. (Tenured Faculty)

The aforementioned quote corresponds with recent findings from a study conducted at a minority-serving institution (MSI). Researchers found that service was inequitably distributed without reward for said service (Domingo et al., 2022). They also found that there was a “lack of clarity and consistency about the role of service in the retention, tenure, and promotion (RTP) process” (Domingo et al., 2022, p. 365). Similar to the current study, race and gender-related biases influenced these actions. If higher education institutions desire to retain and advance Women of Color, faculty inequities in labor distribution need to be made transparent, so that they
can be addressed. Additionally, if there is an expectation for women and Women of Color to disproportionately engage in certain types of service (e.g., committee work, advising and mentoring students of color), such services should be recognized in tenure and promotion processes (Domingo et al., 2022; Griffin et al., 2020).

**Implications**

As higher education institutions endeavor to diversify the professoriate, this study is significant in enabling institutions and STEM departments to be aware of systemic issues confronting them from making significant inroads in broadening the participation of Women of Color faculty. Institutions and STEM departments may take a deeper look at their policies, practices, and structure and reorganize their modus operandi to alleviate systemic barriers that make it challenging for Women of Color to access and thrive in the STEM professoriate. Institutions can improve their climates and create an affirming environment that better supports the recruitment, retention, and advancement of Women of Color faculty, thus, increasing the representation of Women of Color faculty in the professoriate. Additionally, this study is essential to expanding the national diversity of faculty at higher education institutions and in STEM departments, if they address a number of issues especially the following which were illuminated from this study:

- Policies about course assignments should be clear, documented, and transparent.

Department leaders and faculty should also work with early-career Women of Color to contextualize teaching evaluations and make decisions about course assignments that will contribute to the growth and development.
● While showing incremental progression in faculty evaluations may perceivably demonstrate equity, department chairs should consider the implications for Women of Color who have historically been perceived as incompetent.

● Inequitable workloads prevent Women of Color from excelling in their careers at the same rate as their counterparts. They also illuminate power differentials that help some to advance their careers while others are exploited for their labor.

**Conclusion**

The current study sought to understand the institutional structures that inhibit career progression. Using critical race feminism as a theoretical lens, we unearthed how nebulous policies, unclear performance expectations, and inequitable workloads threatened the career progression of early career Women of Color faculty. Consequently, the study’s findings revealed the need to establish policies that are clear, documented, and transparent. Additionally, incremental approaches to tenure and promotion evaluation should be reconsidered, especially when this approach may position Women of Color faculty to appear as if they are underperforming when the opposite may be true. Lastly, inequitable workloads are not a new phenomenon. However, the pervasiveness of such practices is contributing to Women of Color faculty being overburdened and possibly departing the academy. If this issue is not addressed soon, we may lose the diverse professoriate we espouse to value.
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Title Page

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Applying Self-Peer Assessment Model in STEM Higher Education

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Applying Self-Peer Assessment Model in STEM Higher Education
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Abstract: In this work, we propose a comprehensive self-peer assessment model applied in teaching and learning activities within STEM (Science, technology, engineering, and mathematics) fields. This model incorporates both self- and peer assessments in group-based and instructor-guided settings. Using statistical analysis on the students’ performance and case studies, we observe both positive and negative results in applying the model in STEM education. Incorporating both theoretical and practical perspectives, we explore various teaching and learning effectiveness of the self-peer assessment model in STEM higher education. Experimental results show that the self-peer assessment model helps to improve students’ learning outcomes, especially for the upper division courses. Studies also show that the self-peer assessment model has statistically significant impact on reducing various types of errors, such as algebraic errors, notation errors, communication errors, and possibly calculus errors.

Keywords: STEM, peer assessment, collaborative learning

1. Introduction

The acronym STEM is a term used to group the academic disciplines of science, technology, engineering, and mathematics. Improving STEM education has been recognized as pivotal to the U.S.’s long-term economic growth and security [1]. It has been reported that federal agencies in the U.S. have established between 105 and 252 STEM education programs or activities [2]. Annual federal appropriations for STEM education are typically in the range of $2.8 billion to $3.4 billion [2]. Recently, efforts in the STEM higher education have been focusing on increasing the number, diversity, and quality of STEM graduates [3]. Such efforts include various improvements to instructional practices. Singer et al [4] report best practices in discipline-based teaching and learning and how they affect higher education in science and engineering. In [5], inductive teaching and learning methods are introduced for engineering instruction. Borrego et al [6] describe the goals, assumptions, and underlying logic of selected change strategies to promote the use of evidence-based teaching in STEM higher education. Kennedy et al [7] introduce a number of model programs focused on student engagement, and discuss assessments in progress. Kim et al [8] investigate the effectiveness of computer-based scaffolding in the context of problem-based learning for STEM education.

As discussed in [9], reforming STEM higher education involves many aspects: increasing public awareness about STEM, increasing the STEM pipeline, and enhancing the preparation of STEM college students for their professions. Among these, improving STEM teaching and learning in college classrooms still remains the focus of such efforts. To achieve that goal, there are typically
two objectives: improving instructors’ teaching practices [10] and improving students’ learning outcomes [11]. In this work, we study how to apply a teaching-learning model to address both objectives. In addition, work has been done in evaluating a certain teaching and learning model in multiple STEM disciplines and discussing how such instructional change is related to each other. In this work, we evaluate our proposed model in both science and engineering disciplines. We hope to show how instructional changes in one STEM discipline may be connected to or affect other STEM disciplines.

2. Methods

Peer assessment has been widely used in higher education for quality assurance [12]. It usually involves the collaborative and intentional process of observation to improve teaching practices [13]. There exists many different peer review and observation models in higher education. As an example, Gosling et al [14] propose models of peer observation of teaching based on their participants, purpose, outcome, status of evidence, confidentiality, inclusion, judgment, and more. Their models include an evaluation model, a development model, and a peer review model. Kollar et al [15] discuss several peer assessment research models from a cognitive perspective. They point out that researchers should seek a commonly-agreed upon, cognitively-toned model of peer assessment. In addition, collaborative learning and how to implement and promote interactivity should be incorporated into peer assessment studies. Reinholz et al [16] propose the assessment cycle model to establish the connection between peer assessment and self-assessment in a domain-general way. Their model involves all or a subset of six activities: task engagement, peer analysis, feedback provision, feedback reception, peer conferencing, and revision. Based on their discussions of several popular peer observation models and their drawbacks, Jill Cosh et al [17] propose that peer review/observation can, and should focus on the active self-development of the observers rather than the observed.

![Figure 1. The proposed comprehensive self-peer assessment model applied in STEP fields](image)

In this work, we propose a comprehensive self-peer assessment model, as shown in Figure 1, and study how this model may affect STEM education in college classrooms. Our proposed model is based on peer- and self-assessment in group-based and instructor-guided settings. This is based on
our observation that the effectiveness of STEM education significantly depends on how instructors and students are involved and how they interact when handling errors made by the students during the teaching-learning activities.

In college classrooms, making academic errors is inevitable to all students no matter how well an instructor teaches. Such errors can be roughly categorized into two groups based on their durations: short-term errors and long-term errors. Short-term errors are those that usually can be fixed and prevented with less effort in a short period of time. Most common short-term errors include careless errors in reading, writing, and calculations, fresh or recent conceptual misunderstanding; and one-time misdealing previous knowledge. Long-term errors are those same types of errors appearing in different circumstances and occurring consistently during the learning process for a long period of time. Most common long-term errors include errors in notations and communication, logic errors, and unwarranted generalizations. Compared with short-term errors, long-term errors are much harder to prevent and fix, and are more harmful to students’ academic performance and interests. Identifying, fixing, and preventing long-term errors are critical to having an engaged-learning process. There are three obvious advantages of such process: first, it may invoke students’ motivation to review the previously learnt knowledge and techniques; second, it may promote their practice with strategies and skills that improve their learning; third, it may help students develop positive attitudes towards errors, by focusing less on blaming but more on understanding and improving.

In addition to targeting long-term errors, our proposed self-peer assessment model is designed such that students play the essential role as active observers. They observe and assess their own and others’ work, aiming at active self-improvement rather than making judgements on themselves or others. The model can be formalized in the following steps during the classroom instructions:

**Step 1: Student Engage in Classroom Activities**

The first step of the model is to let students participate in regular classroom activities, including formal lecturing and question-answering. Students then work individually on homework assignments and/or exams. The problems in the homework or exams should reflect what has been covered in the lectures and should be designed in a way to assess how well students understand the concepts and are able to apply the learnt skills to solving similar problems.

**Step 2: Peer Review and Assess Others’ Work**

During this step, students are required to grade others’ homework assignments based on the guidance of the instructor. The objectives include recognizing academic errors and identifying why the errors are produced. Students need to acknowledge errors made by others, but should avoid covering up or blaming others for what goes wrong. Clearly defined rubric is provided by the instructor for the grading. Such rubric indicates partial credits given to the students in the homework problems to encourage students to pay attention to the details in others’ work. Self-reflection is involved during the process of students comparing their work with others’ such that their learning can be improved especially from their failing work.

We realize that students’ grading may be limited by their level of knowledge and involvement. Thus, it could potentially lead to high marginal grading errors. To resolve this drawback, the
instructor may optionally assign two students to grade homework assignments as a group. The grade is determined by the average grades from both graders. Working in a group setting also improves students’ involvement in their assigned peer review and assessment tasks.

*Step 3: Self Review One’s Own Work*

During this step, students are required to review their own work based on the peer review assessment results. This step should also be conducted under the guidance of the instructor. During this step, the instructor may require the students to grade their own work, and compare the results with those from peer review assessment. The objectives include understanding, accepting, and fixing the reported errors, focusing on getting better rather than being good. Students can learn from their own errors by correcting them. This process deliberately engages students and requires their focused attention especially as it is conducted with the specific goal of improving performance.

*Step 4: Move Beyond Errors*

During this step, students are required to summarize and understand the reasons behind their academic errors and choose similar questions to practice. Those similar questions could be personalized for students to focus on their weaknesses. This will help students develop critical thinking abilities. It will also build up their confidence by understanding and preventing some of the mistakes, if not all. Furthermore, it will help them obtain the skills and habits of validating their work before making a final conclusion or submission.

Very importantly, error analysis is a type of diagnostic assessment that can also help instructors determine what types of errors students make, and why. This will inevitably help improve instructional activities in college classrooms.

3. **Experimental Results**

In this work, we apply our proposed comprehensive self-peer assessment model to courses in mathematics, electrical engineering (EE), computer engineering (CE), and computer science (CS) disciplines. These courses include Ordinary Differential Equations (math), Trigonometry (math), Digital Circuits (EE), Signal Processing (EE), Object Oriented Programming using C++ (CE), and Advanced Algorithms (CS). During the evaluation, for each course, all students are divided into two groups. We apply the self-peer assessment model to one group and use the other group as the control. We then evaluate the teaching-learning performance based on students’ learning outcomes, i.e., students’ scores in homework assignments and exams. For one math course, we also apply a variation of the model to different groups to see if such variation has significant impact. In addition, we collect extra data in one course to study what types of errors students are likely to make and how the proposed model may reduce the occurrence of those errors.
3.1 Evaluations on how the model may impact STEM courses

A two-sample t-test [18] is performed for each assignment or exam during the evaluation without the assumption that they have equal variances. Table 1 shows our evaluation and comparison results. In the first row of the table, H# represents a homework assignment; E# represents an exam. Each evaluated course has up to 10 homework assignments and up to 3 exams. Also, in the table, N1 and N2 represent the sample sizes for the two groups in the evaluated course with N1 for the control group and N2 for the self-peer assessment group. Mean1 and Stdev1 represent the mean and standard deviation calculations for the control group; Mean2 and Stdev2 are for the self-peer assessment group. P-values smaller than 0.05, which are highlighted in the table, suggest that the self-peer assessment group performs better on that assignment or exam than the other group.

Table 1 Comparisons of students’ learning outcomes between the peer-self review group and the control group using four STEM courses (Note: gray cells mean certain assessments are not available in a class)

<table>
<thead>
<tr>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
<th>H8</th>
<th>H9</th>
<th>H10</th>
<th>E1</th>
<th>E2</th>
<th>E3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1410: Object Oriented Computer Programming using C++ (N1=20, N2=15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean1</td>
<td>27.70</td>
<td>27.00</td>
<td>22.90</td>
<td>23.35</td>
<td>24.75</td>
<td>19.50</td>
<td>23.80</td>
<td>20.90</td>
<td>24.60</td>
<td>22.70</td>
<td>90.70</td>
<td>81</td>
</tr>
<tr>
<td>Sidev1</td>
<td>6.77</td>
<td>8.01</td>
<td>9.93</td>
<td>8.90</td>
<td>9.66</td>
<td>8.09</td>
<td>10.83</td>
<td>10.70</td>
<td>10.83</td>
<td>5.28</td>
<td>9.42</td>
<td>7.74</td>
</tr>
<tr>
<td>Mean2</td>
<td>30.00</td>
<td>28.33</td>
<td>26.53</td>
<td>27.40</td>
<td>27.67</td>
<td>25.00</td>
<td>19.13</td>
<td>26.69</td>
<td>24.80</td>
<td>25.00</td>
<td>80.54</td>
<td>81.47</td>
</tr>
<tr>
<td>Sidev2</td>
<td>-</td>
<td>4.72</td>
<td>5.33</td>
<td>5.08</td>
<td>7.76</td>
<td>6.81</td>
<td>13.73</td>
<td>8.50</td>
<td>4.92</td>
<td>7.83</td>
<td>7.99</td>
<td>9.73</td>
</tr>
<tr>
<td>T</td>
<td>1.52</td>
<td>0.62</td>
<td>1.39</td>
<td>1.70</td>
<td>0.99</td>
<td>1.83</td>
<td>0.07</td>
<td>0.73</td>
<td>-2.19</td>
<td>-1.86</td>
<td>0.37</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>0.069</td>
<td>0.271</td>
<td>0.087</td>
<td>0.049</td>
<td>0.165</td>
<td>0.038</td>
<td>0.858</td>
<td>0.038</td>
<td>0.471</td>
<td>0.236</td>
<td>0.954</td>
<td>0.957</td>
</tr>
</tbody>
</table>

Math 1030: Trigonometry (N1=17, N2=20)

| Mean1 | 78.03 | 74.47 | 64.47 |
| Sidev1 | 12.45 | 13.90 | 14.07 |
| Mean2 | 69.85 | 85.35 | 76.05 |
| Sidev2 | 13.50 | 10.31 | 11.07 |
| T | 1.92 | 2.66 | 2.75 |
| P | 0.968 | 0.006 | 0.005 |

Math 2280: Ordinary Differential Equations (N1=17, N2=26)

| Mean1 | 19.29 | 20.00 | 21.78 | 84.41 | 64.64 |
| Sidev1 | 5.89 | 4.31 | 3.29 | 11.44 | 19.33 |
| Mean2 | 19.42 | 22.84 | 21.84 | 76.71 | 68.96 |
| Sidev2 | 5.87 | 2.93 | 2.41 | 15.02 | 20.31 |
| T | 0.07 | 2.56 | 0.07 | -2.01 | 0.75 |
| P | 0.472 | 0.007 | 0.471 | 0.975 | 0.227 |

CS 6420: Advanced Algorithms (N1=7, N2=10)

| Mean1 | 25.57 | 24.43 | 26.00 | 26.57 | 24.17 | 25.00 | 24.71 | 23.71 | 25.71 | 27.14 | 87.86 | 87.86 | 81.43 |
| Sidev1 | 5.71 | 6.00 | 6.00 | 4.72 | 6.65 | 4.08 | 6.24 | 7.52 | 5.35 | 4.88 | 11.50 | 9.51 | 15.74 |
| Mean2 | 30.00 | 28.89 | 28.50 | 30.00 | 29.90 | 29.50 | 30.00 | 25.80 | 26.50 | 78.00 | 83.00 | 98.00 |
| Sidev2 | - | 1.05 | 4.74 | - | 0.32 | 1.58 | - | 9.26 | 6.69 | 7.53 | 4.22 | 15.49 |
| T | 2.05 | 1.95 | 0.92 | 1.92 | 2.32 | 3.17 | 1.99 | 2.21 | 0.02 | -0.23 | -1.99 | -1.27 | 2.15 |
| P | 0.029 | 0.035 | 0.186 | 0.037 | 0.017 | 0.003 | 0.033 | 0.021 | 0.491 | 0.589 | 0.967 | 0.888 | 0.024 |

Since so many t-tests are performed, we would expect to find a few assignments showing significant differences just by chance. We suspect this is the case for CS 1410, as shown in the table. From this course we do not see significant benefits of applying the self-peer assessment model. However, for Math 1030, and CS 6420, the self-peer assessment group is performing much
better than the control group. On the other hand, it could be possible that a self-peer assessment process works better in an upper division course with more mature students than in a lower division course.

3.2 Evaluations on how a variation of the model may affect a math course

For Math 2280 course (Ordinary Differential Equations), the data is collected over two different semesters. We apply the self-peer assessment in both semesters, with a slight modification to the model for one semester. We observe the fact that students from one semester (in the table, represented by N2, Mean2, and Stdev2) have relatively weaker background compared with those from the other semester (in the table, represented by N1, Mean1, and Stdev1), we decide to apply the group peer assessment instead of individual peer assessment, in addition to the self-assessment in that semester, hoping the additional group assessment may provide further help to improve students’ learning experience. Experimental results show no significant difference between the two groups, but we do observe the improved student performance in the exams (see Table 1).

3.3 Evaluations on what types of errors the model may help to reduce

To further study the effectiveness of the self-peer assessment model, we collect additional data from Math 2280 course in a third semester with the model implemented, and analyze the data on the error rates using T-test. We categorize the students’ errors into six different types, as shown in Table 2. We only look at errors made on exams. This is due to our observation that students may be more or less likely to make particular errors on different homework assignments due to the expectations of a particular assignment.

<table>
<thead>
<tr>
<th>Error Codes</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Algebraic errors. Mostly errors of signs or of small algebraic or arithmetic errors.</td>
</tr>
<tr>
<td>C</td>
<td>Calculus errors. Set apart as errors that are specifically errors of derivatives and anti-derivatives. Also, occasionally, errors in setting up infinite sums as that is usually covered in Calculus II curriculum.</td>
</tr>
<tr>
<td>L</td>
<td>Logic errors. Errors where the student misunderstands the point of the question, or gives an answer that doesn't make sense in context of the question.</td>
</tr>
<tr>
<td>M</td>
<td>Material errors. Errors of the main course material. A student misuses an equation or idea from the course, or just does understand the question at all.</td>
</tr>
<tr>
<td>N</td>
<td>Notation errors. The student cannot express their work in a way that makes sense or does not know how to notate an idea so instead tries a different way or writes it out in English.</td>
</tr>
<tr>
<td>O</td>
<td>Communication errors. The student misread the question and therefore does not answer part of the question. Or, they skip the question in its entirety.</td>
</tr>
</tbody>
</table>

Table 3 shows two sets of comparisons. In this table, the percentage values represent the percentage of students who make a particular type of errors at least once in an exam. In the first comparison, of the 39 students who complete exam 1, we compare the errors of the 31 students (“completers”) who complete exam 2 with the 8 students (“droppers”) who do not take exam 2 since they have dropped the class. The experimental results show evidence that the "droppers" are statistically more likely to make errors types C, L and O, and suggestive evidence that completers are less likely to make error types A and M compared with droppers. This type of information has the potential to be useful to study students making what particular types of errors are more likely to drop the class. In the second comparison, of the 31 students who complete both exams, we
compare exam 1 error rates with exam 2 error rates. In exam 2, we find statistically significant reductions in the occurrence of error types A, N, and O, with possible reductions in error type C.

| Table 3 Error rate analysis and comparisons for Math 2280 |
|---------------------------------|---|---|---|---|---|---|---|
| Students | N | A | C | L | M | N | O |
| Exam 1 | all | 39 | 94.9% | 79.5% | 64.1% | 69.2% | 92.3% | 79.5% |
| completers | 31 | 93.5% | 74.2% | 54.8% | 64.5% | 93.5% | 74.2% |
| droppers | 8 | 100.0% | 100.0% | 100.0% | 87.5% | 87.5% | 100.0% |
| Exam 2 completers | 31 | 64.5% | 58.1% | 61.3% | 74.2% | 74.2% | 51.6% |

Comparison 1: completers’ exam 1 vs droppers’ exam 1

| Z | 1.46 | 3.28 | 5.05 | 1.58 | -0.48 | 3.28 |
| P | 0.072 | 0.001 | 0.000 | 0.057 | 0.686 | 0.001 |

Comparison 2: completers’ exam 1 vs completers’ exam 2

| Z | 3.01 | 1.36 | -0.52 | -0.83 | 2.15 | 1.89 |
| P | 0.001 | 0.087 | 0.697 | 0.797 | 0.016 | 0.029 |

4. Conclusions

In this work, we propose a comprehensive self-peer assessment teaching and learning model applied within STEM fields. This model enables students to actively play an essential role in peer and self-assessment to improve their learning experience. We evaluate the effectiveness of this model applied in teaching mathematics, science, and engineering courses in a public four-year higher education environment. Experimental results show that the self-peer assessment model helps to improve students’ learning outcomes, especially for the upper division courses. Studies also show that the self-peer assessment model has statistically significant impact on reducing various types of errors, such as algebraic errors, notation errors, communication errors, and possibly calculus errors.

References:


Creciendo Juntos: Participant Perspectives of a Garden-Based Science Pilot Program for Latina Girls and their Parents

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Abstract
Presents participant perspectives for three implementations of a seven-week, garden-based program for 5th/6th grade Latina students and their parents. While valuing the antecedent Community Cultural Wealth, science capital, and family habitus of participants, the program promoted growth in these areas with Family Problem-Based Learning science activities and separate parent and daughter Conversation Groups. The data suggest parents and daughters felt supported, enjoyed working on the activities together, and would recommend the program to friends.

Introduction
It is well documented that women and Latinx students are underrepresented in STEM majors and occupations (NSF, National Center for Science and Engineering Statistics, 2015; Habig et al, 2020; Landivar, 2013). There is a need to investigate the science interests of pre-adolescents in various science learning contexts, including out of school. The focus of our work is on 5th and 6th grade Latinas and their parents in an informal science education context. As part of a larger NSF-funded research study, we have developed and implemented seven-week, Saturday morning science enrichment programs for families. This paper reports on the parents’ and daughters’ perspectives on three pilot implementations of a garden-based science program.

Community of Cultural Wealth
Yosso’s (2005) concept of Community Cultural Wealth (CCW) provides a framework and shift from deficit orientations to asset perspectives. CCW identifies six types of capital that students possess: aspirational, linguistic, social, navigational, familial, and resistant (Yosso, 2005). Aspirational capital includes the “ability to maintain hopes and dreams for the future, even in the face of real and perceived barriers” (p.77). Linguistic capital includes language and communication skills. Navigational capital refers to “skills of maneuvering through social institutions” (p. 80) and social capital recognizes the networks of community and people resources, including the emotional and instrumental support for maneuvering. Familial capital refers to cultural knowledge nurtured by immediate and extended families and interactions with other families. Resistance culture refers to the skills and knowledge that are developed through oppositional behavior that addresses issues inequality. Whether it is exposure to science careers that impact aspirational cultural capital or developing the linguistic capital to speak like a scientist, CCW is a useful framework for understanding how culturally and linguistically diverse students can benefit from science education programs.

In the last decade, science capital has emerged not as a separate capital but a conceptual framework for uniting other capitals “which have the potential to generate use or exchange value for individuals or groups to support and enhance their attainment, engagement and/or participation in science” (Archer, DeWitt, & Willis, 2014, p. 5). Habig, Gupta, and Adams
Creciendo Juntos

(2021) provide a case study of a Latina youth who leverages CCW and science capital to overcome obstacles to a STEM career. Evidence suggests that science capital is influenced by education, science experiences and family habitus (Archer et al., 2012; DeWitt et al., 2016).

Garden-Based Learning

Garden-Based Learning (GBL) is both an instructional strategy and a teaching tool that uses gardens to promote educational outcomes (Williams & Dixon, 2013). In their synthesis of garden-based learning research published between 1990 and 2010, Williams and Dixon found 48 research studies meeting their criteria. While lamenting an overall lack of focus, clarity, and research vigor, they conclude: “This synthesis found a preponderance of positive academic outcomes especially in science, math, and language arts, giving credence to gardens serving as instructional and curricular means for covering academic content” (Williams & Dixon, 2013, p.226). The preponderance of studies were conducted with students in third to sixth grades. For example, Klemmer et al. (2005) found that students in grades 3 to 5 who participated in a hands-on science program had higher science achievement than those who did not.

Limiting our understanding, Lohr et al. (2022) report that most studies have been done with predominately White participants. While the number of gardens in US schools rose from 2006 to 2014, unfortunately, gardens are significantly less common in schools with higher percentages of students eligible for free and reduced lunches (a measure of SES) (Turner et al., 2016). Greater opportunities for and more research on garden-based learning with diverse children could have promising results. For example, in an analysis of their data for gardening projects at 22 schools, Lohr et al. (2022), conclude:

Regardless of past school garden exposure, however, fifth-grade students, females, and those who identify as Latino/a (Hispanic) reported that school garden programming improves their learning. Latino/a (Hispanic) students who participate in school garden programming also indicated feeling a greater sense of connection to their teachers and peers at school.

With the perspective of the importance of familial capital, our project seeks to add to the understandings of Latino/a/x parents and their support for the daughters’ work and aspirations in science through the creation, implementation, and study of a seven-week program with gardening combined into an approach we call Family Problem-Based Learning. This emerged from our previous work with English Learners and our method called Problem-Based Enhanced Language Learning (PBELL) (Rillero et al., 2018; Rillero et al., 2017; Rillero, & Hernandez, 2016). This report analyzes three pilot implementations of the garden-based science enrichment program.

Methods

The Enrichment Program

Parents can influence their children’s interests and confidence by creating positive learning environments (Lee, 2012). Our work is with parents and their fifth and sixth grade Latina daughters. One of the goals was to create a Community of Learners with the Saturday gardening program, which was conducted in both English and Spanish. The 90-minute Family-Problem-Based Learning (FPBL) part of the project involves parent and daughter learning together about science through a garden project and activities. The project’s challenge was to design, plant from seeds, care for, and harvest in seven-weeks foods for a tostada party. Lettuce and radishes were
common selections because of their rapid growth. Within this overall framework, other hands-on activities were conducted to promote interaction, language use, and science learning.

Separate parent groups and daughter groups met for the 30-minute Conversation Group session, which are direct conduits for enhancing Community Cultural Wealth. We have piloted the program three times in two different Western cities in the US. The original goal of recruiting ten participant families in each pilot was pared back due to the coronavirus pandemic. There were 18 families that completed one of the three pilot programs. Participants were recruited from Title 1 schools.

Data Sources and Analysis
A variety of data sources are informing the project including pre, mid, post, and delayed post-surveys; a demographic survey; videotaping and analysis of parent-daughter interactions; researcher observations; and focus groups. This paper is reporting on demographic data and participant perspectives of the enrichment programs from the mid and post-surveys. These instruments use a five-point Likert scale (5=strongly agree and 1=strongly disagree) and open-ended items. The mid-surveys were administered at the four-week point of the program and the post-survey at end of the program (week seven). Parents and daughters completed the surveys in separate rooms. The open-ended responses were coded and analyzed using Miles et al. (2014) guidelines.

Retrospective items were also used to reduce response-shift bias—where participants overestimate knowledge, abilities, or behavior prior to an intervention (Klatt & Taylor-Powell, 2005). These paired items start with, “Before the program…” and “After or program…” Statistical significance of the pairs was determined with a paired t-test.

Results
Demographics
Parents completed the demographic survey, with the following results. All parents considered their daughters as Latina and themselves as Latino/a/x. Of the girls, 61.1% had Spanish and 38.9% had English as a first language. About 33.3% of participants reported speaking Spanish at home, 38.9% English, with the remainder (27.8%) speaking both English and Spanish at home. The average age of the participating parent was 39.8 years old, and 83.3% were female. For parents’ first language, 76.5% indicated it was Spanish and 23.5% English. About 22.2% of the parents had not finished high school and 33.3% reported high school as their highest degree. About 92.8% said their daughter was receiving free or reduced lunches. About 27.7% reported family income of less than $15,000, 5.5% up to $29,999, 38.9% up to $44,999, 11.1% up to $59,999, 0% up to $74,999, 0% up to $89,999, 5.6% up to 104,999, and 11.1% above $105,000.

Parent and Daughter Views
Table 1 displays the items that were used on the daughter mid-survey and daughter post-survey and Table 2 displays parent mid-survey and parent post-survey items. The results suggest overall positive perspectives with the lowest mean for girls at 3.65 and the lowest parent mean at 4.41. For parents, the item with the highest mean was about recommending the program to a friend, while for daughters it was the use of both Spanish and English in the program. Most of the means on the daughters’ mid-survey means were higher than the post-survey means; these differences, however, were not statistically significant. Parallel items between the parent and daughter post-survey are numbered from one to eleven in the table. On the post-survey, parent means were always higher, and these were statistically significant for all items except for 2, 5, and 11.
Table 1. Daughter Mid and Post-Survey Perspectives

<table>
<thead>
<tr>
<th>Item</th>
<th>Daughter Mid Mean</th>
<th>SD</th>
<th>Daughter Post Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I benefited from participating in this program.</td>
<td>4.06</td>
<td>1.30</td>
<td>3.76</td>
<td>1.31</td>
</tr>
<tr>
<td>2. Participating with my parent/s in this program strengthened our</td>
<td>4.13</td>
<td>0.99</td>
<td>4.06</td>
<td>1.06</td>
</tr>
<tr>
<td>family.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. It was a good experience to be able to observe other families</td>
<td>4.25</td>
<td>0.75</td>
<td>4.06</td>
<td>0.80</td>
</tr>
<tr>
<td>doing the same science activities as us.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I would recommend this program to a friend.</td>
<td>4.19</td>
<td>1.07</td>
<td>4.12</td>
<td>0.96</td>
</tr>
<tr>
<td>5. The use of both Spanish and English in the program was a good</td>
<td>4.44</td>
<td>0.93</td>
<td>4.44</td>
<td>0.77</td>
</tr>
<tr>
<td>thing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The program created a supportive environment where I felt</td>
<td>4.06</td>
<td>0.90</td>
<td>4.00</td>
<td>1.03</td>
</tr>
<tr>
<td>comfortable participating.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I enjoyed the program’s science activities.</td>
<td>4.38</td>
<td>0.99</td>
<td>4.18</td>
<td>1.0</td>
</tr>
<tr>
<td>8. I learned a lot from the program’s science activities.</td>
<td>4.38</td>
<td>0.74</td>
<td>4.12</td>
<td>0.83</td>
</tr>
<tr>
<td>9. I like the topic for our 7-week program.</td>
<td>4.31</td>
<td>0.92</td>
<td>4.16</td>
<td>1.00</td>
</tr>
<tr>
<td>10. The science activities promoted interaction between me and</td>
<td>4.25</td>
<td>1.03</td>
<td>3.94</td>
<td>0.83</td>
</tr>
<tr>
<td>my parent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. I learned a lot during the Girl Conversation Groups.</td>
<td>3.94</td>
<td>1.09</td>
<td>4.19</td>
<td>0.88</td>
</tr>
<tr>
<td>Because of the program, I feel greater support from my parents for</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>my science learning.</td>
<td>3.88</td>
<td>0.93</td>
<td>3.65</td>
<td>0.97</td>
</tr>
<tr>
<td>The program helped me develop a greater interest in science.</td>
<td>3.88</td>
<td>0.78</td>
<td>4.18</td>
<td>0.94</td>
</tr>
</tbody>
</table>

Table 2. Parent Mid and Post-Survey Perspectives

<table>
<thead>
<tr>
<th>Item</th>
<th>Parent Mid Mean</th>
<th>SD</th>
<th>Parent Post Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I benefited from participating in this program.</td>
<td>4.69</td>
<td>0.58</td>
<td>4.63</td>
<td>0.79</td>
</tr>
<tr>
<td>2. Participating with my daughter in this program strengthened our</td>
<td>4.44</td>
<td>1.00</td>
<td>4.50</td>
<td>0.71</td>
</tr>
<tr>
<td>family.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. It was a good experience to be able to observe other families</td>
<td>4.38</td>
<td>1.05</td>
<td>4.69</td>
<td>0.68</td>
</tr>
<tr>
<td>doing the same science activities as us.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I would recommend this program to a friend.</td>
<td>4.88</td>
<td>0.33</td>
<td>4.94</td>
<td>0.24</td>
</tr>
<tr>
<td>5. The use of both Spanish and English in the program was a good</td>
<td>4.75</td>
<td>0.66</td>
<td>4.63</td>
<td>0.79</td>
</tr>
<tr>
<td>thing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The program created a supportive environment where I felt</td>
<td>4.63</td>
<td>0.78</td>
<td>4.63</td>
<td>0.79</td>
</tr>
<tr>
<td>comfortable participating.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I enjoyed the project’s science activities with my daughter.</td>
<td>4.63</td>
<td>0.60</td>
<td>4.81</td>
<td>0.53</td>
</tr>
<tr>
<td>8. I learned a lot from the project’s science activities.</td>
<td>4.63</td>
<td>0.60</td>
<td>4.69</td>
<td>0.38</td>
</tr>
<tr>
<td>9. I like the topic for our 7-week project.</td>
<td>4.75</td>
<td>0.43</td>
<td>4.88</td>
<td>0.33</td>
</tr>
<tr>
<td>10. The science activities promoted interaction between me and</td>
<td>4.63</td>
<td>0.70</td>
<td>4.69</td>
<td>0.58</td>
</tr>
<tr>
<td>my daughter.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. I learned a lot during the Parent Conversation Groups.</td>
<td>4.31</td>
<td>0.98</td>
<td>4.50</td>
<td>0.71</td>
</tr>
<tr>
<td>I enjoyed the discussion with other parents.</td>
<td>4.25</td>
<td>1.03</td>
<td>4.38</td>
<td>0.93</td>
</tr>
<tr>
<td>I think my daughter benefited from participating in this program.</td>
<td>4.69</td>
<td>0.58</td>
<td>4.69</td>
<td>0.68</td>
</tr>
<tr>
<td>My participation in the program gives me ideas about how to work</td>
<td>4.63</td>
<td>0.78</td>
<td>4.56</td>
<td>0.86</td>
</tr>
<tr>
<td>on science with my daughter.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The program helps me develop knowledge of resources that support</td>
<td>4.56</td>
<td>0.70</td>
<td>4.50</td>
<td>0.87</td>
</tr>
<tr>
<td>my daughter’s interest in science.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The program helps me learn about my daughter’s abilities in science.</td>
<td>4.50</td>
<td>0.71</td>
<td>4.56</td>
<td>0.79</td>
</tr>
<tr>
<td>The program helps me learn about my daughter’s interests in science.</td>
<td>4.44</td>
<td>0.70</td>
<td>4.63</td>
<td>0.79</td>
</tr>
<tr>
<td>The program increases my ability to support my daughter’s interest</td>
<td>4.44</td>
<td>0.86</td>
<td>4.38</td>
<td>0.99</td>
</tr>
<tr>
<td>in science.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Retrospective Views

The results of the retrospective daughter items are shown in Table 3. All the differences in pairs are statistically significant (at a \( p < 0.05 \) threshold). The biggest mean difference (MD) between the pairs was for (a) liking the idea of doing science activities with their parents and (b) liking science.

The results of the retrospective parent items are shown in Table 4. All the differences in pairs are statistically significant. The biggest mean difference (MD) between the pairs was for (a) knowing science opportunities in the community and (b) having a connection with other parents interested in promoting science with their children.

Table 3. Two-tailed, Paired T-Test for Daughter Retrospective Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
<th>Mean Diff</th>
<th>t-test, ( p = )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a. Before the program, I liked the idea of doing science activities with my parents.</td>
<td>3.20</td>
<td>0.83</td>
<td>MD=0.60</td>
<td></td>
</tr>
<tr>
<td>1b. After the program, I like the idea of doing science activities with my parent.</td>
<td>3.80</td>
<td>1.05</td>
<td></td>
<td>( p=0.0449 )</td>
</tr>
<tr>
<td>2a. Before the program, I knew many girls like me with an interest in science</td>
<td>2.88</td>
<td>0.93</td>
<td></td>
<td>MD=0.84</td>
</tr>
<tr>
<td>2b. After the program, I know many girls like me with an interest in science</td>
<td>3.72</td>
<td>0.87</td>
<td></td>
<td>( p=0.0119 )</td>
</tr>
<tr>
<td>3a. Before the program, I was strongly considering a future job in science.</td>
<td>2.69</td>
<td>1.21</td>
<td>MD=0.63</td>
<td></td>
</tr>
<tr>
<td>3b. After the program, I am strongly considering a future job in science.</td>
<td>3.31</td>
<td>1.21</td>
<td></td>
<td>( p=0.0034 )</td>
</tr>
<tr>
<td>4a. Before the program, I knew my parent’s abilities in science.</td>
<td>2.93</td>
<td>1.12</td>
<td>MD=0.50</td>
<td></td>
</tr>
<tr>
<td>4b. After the program, I know my parent’s abilities in science.</td>
<td>3.44</td>
<td>1.06</td>
<td></td>
<td>( p=0.0406 )</td>
</tr>
<tr>
<td>5a. Before the program, I really liked science.</td>
<td>3.00</td>
<td>1.37</td>
<td>MD=0.75</td>
<td></td>
</tr>
<tr>
<td>5b. After the program, I really like science.</td>
<td>3.75</td>
<td>1.48</td>
<td></td>
<td>( p=0.0176 )</td>
</tr>
<tr>
<td>6a. Before the program, I really liked gardening.</td>
<td>2.83</td>
<td>0.99</td>
<td>MD=0.70</td>
<td></td>
</tr>
<tr>
<td>6b. After the program, I really liked gardening.</td>
<td>3.53</td>
<td>1.36</td>
<td></td>
<td>( p=0.0107 )</td>
</tr>
</tbody>
</table>

(N=18, degrees of freedom= 17)

Open-Ended Responses

Several categories of responses emerged from the open-ended posttest responses. Participants reported enjoying the enrichment program, learning from the program, and they described developing positive science attitudes because of the program. Numerous daughters commented on enjoying spending time with their moms. Participant P3BAG10 wrote that one of the benefits of the program was that “I get to spend more time with my mom.” Parents similarly reported enjoying spending time with their daughters through the program. Participant P3BAG2 stated that a benefit of the program was “bonding with my daughter.” In addition, frequent comments were made regarding the various project leaders and facilitators of the program. One young Latina participant wrote, “there are people like [Project Leader] that are really, really nice and girls that are just like me” (P3BAG4). Parents’ comments centered more on appreciation for
the team’s efforts, “I really want to thank everyone for their time” (P1BAG1). In addition to the program personnel, young Latinas also enjoyed spending time with each other. For example, one participant stated that a strength of the program was “Getting to know different girls from the program” (P6BCG1). The parents also indicated that a benefit of the program was spending time with other parents, as one parent reported, she enjoyed “meeting new people and interacting with others in a group setting to learn something new” (P3BAG10).

Table 4. Two-tailed, Paired T-Test for Parents’ Retrospective Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>SD</th>
<th>Mean Diff t-test, p=</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a. Before the program, I had a good idea of science opportunities in my community.</td>
<td>2.56</td>
<td>2.22</td>
<td>MD=1.75</td>
</tr>
<tr>
<td>1b. After the program, I have a good idea of science opportunities in my community</td>
<td>4.31</td>
<td>0.85</td>
<td>P=0.000016</td>
</tr>
<tr>
<td>2a. Before the program, I knew how to engage my daughter in science activities.</td>
<td>3.00</td>
<td>1.12</td>
<td>MD=1.50</td>
</tr>
<tr>
<td>2b. After the program, I know how to engage my daughter in science activities.</td>
<td>4.50</td>
<td>0.79</td>
<td>P=0.000007</td>
</tr>
<tr>
<td>3a. Before the program, I had good connections with other parents interested in promoting science for their children.</td>
<td>2.31</td>
<td>1.31</td>
<td>MD=1.35</td>
</tr>
<tr>
<td>3b. After the program, I have good connections with other parents interested in promoting science for their children.</td>
<td>3.67</td>
<td>0.94</td>
<td>P=0.000328</td>
</tr>
<tr>
<td>4a. Before the program, I knew my daughter’s abilities in science.</td>
<td>2.81</td>
<td>1.29</td>
<td>MD=1.50</td>
</tr>
<tr>
<td>4b. After the program, I know my daughter’s abilities in science.</td>
<td>4.31</td>
<td>0.68</td>
<td>P=0.000064</td>
</tr>
<tr>
<td>5a. Before the program, I knew my daughter’s interests in science.</td>
<td>3.13</td>
<td>1.17</td>
<td>MD=1.19</td>
</tr>
<tr>
<td>5b. After the program, I know my daughter’s interests in science</td>
<td>4.31</td>
<td>0.77</td>
<td>P=0.000216</td>
</tr>
</tbody>
</table>

(N=18, degrees of freedom= 17)

As far as learning from the program, both parents and daughters referred to both specific knowledge learned related to the gardening topics as well as general science knowledge. For example, one parent reported that one of the highlights of the program for her was learning “how to take accurate data on the growth of plants” (P3BAG4) while another reported learning “more about science and how interesting it is” (P1BAG1). One young participant described learning about using compost in the garden (P3BAG2) while another wrote that the program “helps me better understand science” (P3BAG7).

Related to developing positive science attitudes due to the program, parents commented on their own attitudes about science as well as developing and supporting positive attitudes about science in their daughters. One parent stated that because of the program, she was “finding out that I actually love the idea of science…which I didn’t when I was in school myself” (P6BCG10) while another described seeing her role in science through having learned “as a community how to live with and help the environment” (P3BAG9). There were also comments regarding attitudes
about the role of learning for the parent with one mother stating that the program helped her “support her daughter...by learning alongside her” (P1BAG2). Numerous girls wrote that one of the benefits of the program was that they now knew that they liked science and engaging in science activities and that the program had also helped them develop confidence in their communication skills. Young participant P3BAG4 expressed that the program had made her more able to “communicate with others” while another stated that the program helped her understand how to better help each other and “Guide them to the answer” (P3BAG9). In summary, the qualitative data supports the findings indicated by the quantitative analysis.

**Discussion and Implications**

The data suggest that parents and daughters had positive views of the three pilot implementations. They felt comfortable and supported, they enjoyed working on the activities together, and they would suggest the program to friends. Participants expressed that the activities did promote interaction between parent and daughter. They also valued being able to observe other families do the activities. These data are supported by open-ended statements by the participants.

The program valued the antecedent CCW, science capital, and family habitus of the participants and recognized these as potential reasons for enrolling in a seven-week program. The program provided opportunities for growth in these areas. The retrospective items suggest this may have occurred. Girls indicated gains in their liking of science, science interest, and considering science careers, which are important dimensions of science capital. They also had a greater appreciation for doing science with their parents and for their parents’ abilities in science, which are important dimensions of familial capital. Parents also expressed growth in this area reporting enhanced ability to engage their daughters in science activities and greater knowledge of their daughters’ science abilities and interests. Indicators of enhanced social and navigational wealth are suggested by growth in the items about connecting with other parents and knowing science opportunities in the community.

For all items in Table 1, except three, the daughters’ pretest means were higher than the daughters’ posttest means—all these differences were not statistically significant. One of the three items with continued positive growth was “The program helped me develop a greater interest in science,” which was a key objective of the program and is consistent with Bell’s (2009) finding that participation in informal science experiences is associated with increased interest in science. This is important as “research in various settings has shown that interest is in fact a gateway to deeper and sustained forms of learning” (Bell, 2009, p. 134). Parents had mostly higher means on the post-survey than on the mid-survey but again these differences were not significant. These data, therefore, raise the question but do not answer questions about optimal program lengths. A seven-week program is long and fatigue can set in. Is the program length justified based upon changes in attitudes and continued learning after week four? And if so, what can be done in weeks five, six, and seven to help the girls perceive the value?

For common items in Table 1 and 2, the parents’ means were higher than the daughters’ means and on the retrospective mean differences, parents had much greater growth suggesting that parents may have had perceived more benefits than their daughters. Their very positive attitudes might be because of their perceptions for the potential for long-term impacts on their daughters. The retrospective item with the highest perceived growth was related to knowing about science opportunities in their communities. These understandings can enhance their CCW. The second and third items for mean growth were for parents knowing to engage their daughters
in science activities and knowing their daughters’ science abilities. These understandings could promote science capital and changes in family habitus.

The item that daughters had a highest mean was for the use of Spanish and English. This was a powerful outcome, as many of the girls were not bilingual. In schools, English is the language of instruction, and the girls may have appreciated the opportunity to hear and/or speak in Spanish. There were instances in the program where knowing Spanish was promoted as helpful to learn science, such as with Latin scientific names and terminology. It is also possible, that the use of Spanish and English was perceived as a way of respecting the backgrounds of the participants. The positive regard for the use of Spanish in the program suggests opportunities investigating the interplay between linguistic capital, science capital, and family habitus.

References


Latina Girls and Parents in a Gardening Project Depicted through Narrative Photography

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Abstract

In an alternative presentation format, narrative photography of poignant and salient moments is used to depict a seven-week gardening project for Latina 5th/6th grade girls and their parents, sponsored by the National Science Foundation. Without spoken or written words, the images of the participants and their seed-to-harvest project and parallel garden-based-learning activities have potential to evoke aesthetic, emotional, value, and intellectual connections. Themes of culture, language, growth, parenting, renewal, childhood, nurture, life cycles, the environment and science may emerge in thoughts and discussions.

Scroll down at your own pace to begin the sample narrative experience:
Linguistic Features of Research Article Abstracts: Tense Usage in Relation to Rhetorical Moves

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Abstract

The abstract of research articles (RAs) is an essential component of the RA since it is the first document that many people briefly look at through online search. Novice writers need to know how the abstracts are organized and realized linguistically. This study aims at examining how different tenses and modal verbs are used and distributed in abstracts in the fields of applied linguistics and engineering. A corpus of 30 RA abstracts from three journals in applied linguistics and another corpus of 20 RA abstracts from two engineering disciplines (robotics and applied physics) were constructed. First, move analysis was carried out based on the content of the text using a five-move model proposed by Pho (2008). Then, finite verbs were classified according to tense, voice, and modality, and the frequency of occurrence was recorded for each rhetorical move. The results show 1) the present tense was dominantly used in every move in the engineering RA abstracts and 2) the present and the past tense were more or less equally used in the applied linguistics RA abstracts, with the past tense dominantly used in three rhetorical moves and with the present tense mainly used in the other two moves. The study has revealed that cross-disciplinary differences in conventional practices do exist in tense usage in RA abstracts, which points to the need to raise awareness in ESL/EFL instructors of academic writing towards such cross-disciplinary differences in RA abstracts.

Key words: research article abstracts, tense usage, rhetorical moves

Introduction
The abstract of research articles (RAs) is an essential component of the RA as it is the first document that many people briefly look at through online search and it promotes the paper. To lead the reader to the whole paper, the abstract must be written clearly, concisely, and coherently within word limits. It is, therefore, necessary that novice writers know how the text is organized and how the rhetorical structure is realized linguistically.

Recognizing the important role of RA abstracts, researchers in the fields of English for Specific Purposes (ESP) and English for Academic Purposes (EAP) have studied RA abstracts from several different disciplines to characterize their rhetorical organization or move structure and linguistic features to assist novice writers. “A “move” in a genre analysis is a discoursal or rhetorical unit that performs a coherent communicative function in a written or spoken discourse (Swales, 2004, p.228).” Many studies have focused on the rhetorical organization and identified rhetorical moves of abstracts in different fields of study. For instance, Salager-Meyer (1992) focused on Medicine; Samraj (2002, 2005) on Environmental Science; Santos (1996) and Tseng (2011) on Applied Linguistics; Pho (2008) on Applied Linguistics and Educational Technology; Stotesbury (2003) on Humanities and Social and Natural Sciences; Tankó (2017) on Literature; Lorés (2004) on Linguistics; Ishikawa (2021) on Engineering. In parallel, some of the studies have investigated linguistic realizations of abstracts such as tense, authorial stance, modality, evaluation, and self-reference.

This study focuses on tense usage and modality in RA abstracts in relation to the rhetorical moves of the abstract. Tense usage in research writing is one of the problematic areas for novice writers, especially those with non-native English backgrounds, and tense usage in abstracts has been pointed out as being quite complicated.

Many style guides and publication manuals for writing research papers provide advice on tense usage, some, in detail and others, briefly (American Psychological Association, 2020; Coghill & Garson, 2006; Gastel & Day, 2016; Glasman-Deal, 2021; Robinson, et al., 2008; Swales & Feak, 2012; Wallwork, 2016). For instance, American Psychological Association (2020) provides a list of recommended verb tenses for different sections of the paper (p.118): the past and present perfect for literature review and method/description of procedure; the past for reporting of results; the present for discussion of implication of results/presentation of conclusions, limitations, future directions, etc. The ACS Style Guide (2006) provides a brief explanation about tense (p.43): “Simple past tense is correct for stating what was done, either by others or by you”; “Present tense is correct for statements of fact”; “Present and simple past tenses may both be correct for results, discussion, and conclusion.” Gastel and Day (2016) state:

Most of the abstract should be in the past tense, because you are referring to your
own present results. Likewise, the materials and methods and the results sections should be in the past tense, as you describe what you did and what you found. On the other hand, much of the introduction and much of the discussion should be in the present tense, because these sections often emphasize previously established knowledge (p. 200).

Some style guides for scientific writing stress the importance of distinction between the present and the past: “the Present Simple reflects a belief that the findings are strong and reliable enough to constitute a permanent truth (Glasman-Deal, 2021, p.53).”

Given the fact that the abstract is a summary of the main points of each of the main sections of the paper, advice on tense usage for each section of the RA would suffice. However, tense usage in abstracts is quite complicated as acknowledged by Swales and Feak (2012). In fact, it is not difficult to find abstracts that are written only in the present tense, especially in the physical sciences. Such use of the present tense is thought to have an effect of making the abstract “sound more dynamic” (Wallwork, 2016, p.225) or “a strategic matter” (Swales & Feak, 2012, p 387). Swales and Feak (2012) suggest that considerable disciplinary and individual tense variation in the sentences dealing with results may exist. Glassman-Deal (2020) also notes that results and implications can be expressed either in the past or present simple tense.

Previous studies on tense usage in abstracts have shown that it is closely related to the rhetorical moves of abstracts, suggesting that tense usage can vary across disciplines. Salager-Myer (1992) examined verb tense and modality in 84 medical English abstracts of three types of text (research papers, case reports, and review articles). She reported that the most frequently used tense was the past (51.4%), which was observed in the methods and the results moves and the present (32.8%) was mainly used in statements of the problem, the conclusion, and recommendations. Within the text of research papers, the most frequently used tense was the past tense (66.6%), followed by the present tense (23.5%). Samraj (2008) compared 40 abstracts of two related disciplines in environmental sciences. She observed that in both disciplines the most frequently observed tense was the past, mainly used in the moves of the purposes, the methods, and the results while the present was used in the moves of backgrounds and conclusion.

Some studies examined abstracts in Applied Linguistics. Based on 94 abstracts from three Applied Linguistics journals (Language Learning, Applied Linguistics, and TESOL Quarterly) published between 1990 and 1991, Santos (1996) revealed the following: 1) The dominantly used tense observed in the Situating the research move (Move 1) was the present simple and the present perfect (89%). 2) Both the present and the past were used in the Presenting the research move (Move 2), and the tense choice...
between the present and the past was affected by the grammatical subject used with the verb. 3) In the Describing the methodology move (Move 3), the past was almost exclusively used. 4) In the Summarizing the results move (Move 4), the past was the preferred choice (78%) compared to the present (22%), suggesting “reference to one’s own research results requires a narrower claim” (p.494). There was no mention of tense usage in the Discussing the research move (Move 5). Pho (2008) and Tseng (2011) also studied Applied Linguistics journals’ RA abstracts and their findings were in line with Santos’ results. Pho compared 30 RA abstracts from three journals, two from Applied Linguistics and one from Educational Technology, and reported that the distribution pattern of tense usage was similar across the journals. Tseng (2011) replicated Santos’s study by using 90 RA abstracts from the same journals that Santos examined but published between 2005 and 2007 to examine whether the abstracting practice changed. This study provided further information on tense usage in the Discussing the research move (Move 5): the present tense was dominantly used in Move 5.

More recently, Ishikawa (2021) investigated tense usage in a total of 50 RA abstracts from five disciplines in Engineering (Applied Chemistry, Mechanical Engineering, Applied Physics, Information Science, and Architecture). Analysis revealed that the most frequently used tense across the disciplines was the present tense including the present perfect, accounting for as high as 82% of all the verb occurrences. The comparison of tense distribution of each journal showed that the percentage of the past tense usage in the Applied Chemistry abstracts was much higher (46%) than those of the other journals (ranging from 3% to 16%). In the Applied Chemistry abstracts, 58% of all the verbs in the past was found in the Results move, followed by 27% in the Research methods move. The findings suggest that tense usage in Engineering abstracts can be different across Engineering disciplines.

Apart from Ishikawa’s study (2021), the studies mentioned above were conducted from 10 to 30 years ago. Because some aspects of the linguistic features of RAs are known to be changing (Hyland & Jiang, 2017), it is worth investigating tense usage in recently published RAs’ abstracts. This study, therefore, examines tense usage and modality in recently published RAs’ abstracts in the fields of Applied Linguistics and Engineering. The reason for selecting these two fields is that the field of engineering urges graduate and even undergraduate students to write abstracts in English. On the other hand, instructors teaching academic English writing to engineering students often have backgrounds in Applied Linguistics. Therefore, it is important for writing instructors to know how abstracting practice is different between the two fields. The present study addresses the following questions.
RQ 1 Are there any differences in tense usage and modality between Applied Linguistics and Engineering RA abstracts?

RQ 2 How are tense usage and modality related to the different rhetorical moves of the abstract?

Method

Corpus Design

Two corpora were created, each representing the Engineering abstract corpus (the ENG corpus) and the Applied Linguistics abstract corpus (the AL corpus). The AL corpus is comprised of a total of 30 abstracts, taken 10 each from three high-impact journals: the *TESOL Quarterly (TQ)*, *English for Specific Purposes (ESP)*, and *the Journal of English for Academic Purposes (JEAP)*. The ENG corpus is comprised of a total of 20 abstracts, 10 each taken from two high-impact journals, *the IEEE Transactions of Robotics (TR)* and *the Journal of Applied Physics (AP)*. All the RAs were published between 2021 and 2022. Only data-based RA abstracts were selected because the rhetorical organization and linguistic features of abstracts can vary among different types of research: empirical research, theoretical research, review articles, etc. The size of the AL corpus is 5,455 words and the ENG corpus, 3,325 words. The average length per abstract is: *TQ* 189 words; *ESP* 179 words; *JEAP* 177 words; *TR* 148 words; *AP*185 words.

Procedure

Finite verbs and modals were searched and classified according to its tense and voice, or kind of modals, and frequencies of occurrences were counted. Then, the communicative function of a sentence where the finite verb or modal verb occurred was identified. Move analysis was based solely on the content of the text to avoid “a circularity of the identification of rhetorical moves and linguistic realization (Pho, p.223)” although some researchers (e.g. Waard, et. al., 2012) suggest that tense usage is associated with the rhetorical division of the abstract and helps identify the move. A discourse unit for move analysis in this study is a sentence although different segments of text have been proposed (e.g. Mizuta, et. al., 2004). The framework for move analysis used in this study is Pho’s five-move model (2008), which was based on Santos’s model (1996). Pho (2008) integrated sub-moves proposed by Santos and added questions to help identify rhetorical moves (see Table 1). In addition to the five moves, the category *others* was added because a sentence sometimes serves multiple communicative functions as word limits of abstracts make the text condensed. For example, the following sentence taken from the *TQ* abstracts serves two communicative purposes; the
Describing the methodology (DTM) move is embedded in the Presenting the research (PTR) move.

1. The present study investigated the extent to which L1 English speakers (n = 23) and L2 English learners (n = 107) at varying vocabulary levels (1000-5000) could produce the derivatives of 90 headwords in a decontextualized derivative recall test.

Table 1

<table>
<thead>
<tr>
<th>Moves</th>
<th>Function/description and question and Santos’ submove</th>
</tr>
</thead>
<tbody>
<tr>
<td>Move 1: Situating the research (STR)</td>
<td>Setting the scene for the current research (topic generalization) Question asked: What has been known about the field/topic or research? Santos’s submoves: 1A - Stating current knowledge and/or; 1B - Citing previous research and/or ; 1C - Extended previous research and/or ; 2 - Stating a problem</td>
</tr>
<tr>
<td>Move 2: Presenting the research (PTR)</td>
<td>Stating the purpose of the study, research questions and/or hypotheses Question asked: What is the study about? Santos' submoves: 1A - Indicating main features and/or; 1B - Indicating main purpose and/or; 2 - Hypotheses raising</td>
</tr>
<tr>
<td>Move 3: Describing the methodology (DTM)</td>
<td>Describing the materials, subjects, variables, procedures,… Question asked: How was the research done?</td>
</tr>
<tr>
<td>Move 4: Summarizing the findings (STF)</td>
<td>Reporting the main findings of the study Question asked: What did the researcher find?</td>
</tr>
<tr>
<td>Move 5: Discussing the research (DTR)</td>
<td>Interpreting the results and/or giving recommendations, implications/applications of the study Question asked: What do the results mean? So what? Santos’s submoves: 1- Drawing conclusions and/or; 2 - Giving recommendations</td>
</tr>
</tbody>
</table>

Results and Discussion

The frequency of finite verbs and modals observed in the AL corpus is 336 of which 5% (16) belonged to modal verbs and that in the ENG corpus is 210 of which 11%
belonged to modal verbs.

**Distribution of finite verb tense and modals**

Overall, the tense distribution pattern across the two fields was strikingly different (Figure 1). The present tense was far more frequently used in the ENG corpus (77%) than the AL corpus (49%). On the other hand, the percentage of verb occurrences in the past tense was only 9% in the ENG corpus compared to that of the AL corpus (42%). Another intriguing difference between the two corpora was the use of modals. The percentage of modal occurrences in the ENG corpus (11%) doubled that in the AL corpus (5%). The present perfect tense was used to a similar extent across the two fields. The raw data of verb and modal count are given in Appendix 1.

These results suggest that tense usage and modality in RA abstracts in the two fields can be very different and academic writing instructors need to be aware of such differences. The reasons for the differences may partly lie in the difference in nature of study. Engineering is a discipline that aims at coming up with better and more efficient structures and designs by using science and mathematical principles. Then, the aim of research is to propose a new method, a new design, or a new model, etc. by discussing what *can* be done with their proposal. In fact, the modal *can* accounts for 78% of all the modal occurrences in the ENG corpus (see Appendix 3). In contrast, the types of modals used in the AL corpus have more variations; among them, the occurrences of *could/might* and *may* are high, suggesting that the authors of the AL abstracts took care to tone down their claims since the research of applied linguistics deals with language learning or teaching that involves complex cognitive processes, so it is difficult to state that their claim constitutes a permanent truth. The different nature of study may also affect the selection of tense between the present and the past. Engineering uses science and mathematical principles, so the research and the results are thought to be replicable, and the use of the present tense is thought to be more appropriate. In contrast, applied linguistics deals with people and complex cognitive processes, i.e. more variables, which means that the research and results are not always replicable. Then, it can be expected that the authors of AL abstracts tend to opt for the past.

**Figure 1**

*Distribution of Tense and Modals in the AL and the ENG Corpus by Study Field*
Some variations were observed across the journals in both fields (Figure 2). Regarding the three AL journal abstracts, the present was used more frequently in ESP (64%) than TQ and JEAP (40% and 44%), and the past was used less frequently in ESP (29%) than TQ (50%) and JEAP (45%). This point will be discussed more in detail in relation to the rhetorical moves in the following subsection. With regard to the two ENG journal abstracts, the percentage of verbs in the present (89%) in TR was much higher than that of AP (67%). The opposite can be said for the past tense usage. This tense usage in the TR and AP abstracts are in line with Ishikawa’s results (2021).

In Ishikawa’s study, the present tense was almost exclusively used in the Computer Science related journal’s abstracts. TR (IEEE Transactions of Robotics) used in this study is also a journal based on engineering and computer science. As pointed out by Ishikawa, if the present is the dominant tense used in abstracts in Computer Science or its related areas, then, the information that the present is the preferred tense in abstracts may benefit both writing instructors and students.

**Figure 2**

*Distribution of Tense and Modals in Abstracts Corpus by Journal*

<table>
<thead>
<tr>
<th>Journal</th>
<th>Present</th>
<th>Past</th>
<th>Present Perfect</th>
<th>Modals</th>
</tr>
</thead>
<tbody>
<tr>
<td>TQ</td>
<td>40%</td>
<td>50%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>ESP</td>
<td>64%</td>
<td>29%</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>JEAP</td>
<td>44%</td>
<td>45%</td>
<td>5%</td>
<td>6%</td>
</tr>
<tr>
<td>TR</td>
<td>89%</td>
<td>2%</td>
<td>1%</td>
<td>8%</td>
</tr>
<tr>
<td>AP</td>
<td>67%</td>
<td>14%</td>
<td>5%</td>
<td>13%</td>
</tr>
</tbody>
</table>

**Move analysis of finite verbs and modals**

Figures 3-1 and 3-2 show how tense and modals were distributed in each rhetorical
move in the AL and ENG corpus. The raw data of the occurrences are given in Appendices 2 and 3.

**Figure 3-1**

*Distribution of Verb Tense and Modals by Move in the AL Corpus*

![Bar chart showing verb tense and modals distribution in the AL Corpus.](image)

**Figure 3-2**

*Distribution of Verb Tense and Modals by Move in the ENG Corpus*

![Bar chart showing verb tense and modals distribution in the ENG Corpus.](image)

The distribution pattern of verb tense in the different moves in the AL corpus in this study is generally in line with the findings in previous studies on AL abstracts (Santos, 1996; Pho, 2008; Tseng, 2011) except the tense distribution pattern of the *Summarizing the findings* (STF) move. In the STF move, the percentage of the present tense together with the present perfect is 41% in this study while that in Santos’s study was 22%. Close examination of tense usage across the three AL journals revealed that the percentage of the present tense in the STF move in ESP (60%) is quite high, compared to those of the other two journals (35% and 20%) (Figure 4).

The comparison of tense usage between the two ENG journals (Figure 4) revealed:
1) the present tense was dominantly used in every move in TR, but the present perfect and modals also occurred in the Situating the research (STR) move. 2) The past tense was used in the Describing the methodology (DTM) move both in TR and AP, but the percentages were small (AP) (29%) or extremely small (TR) (6%), which is contrary to what is generally said. 3) The use of the past tense was also found in the Summarizing the findings (STF) move in AP together with the verbs in the present and modals.

Figure 4

Distribution of Verb Tense and Modals in Different Moves by Journal
Conclusion

The present study addressed the following research questions: 1) Are there any differences in tense usage and modality between Applied Linguistics and Engineering RA abstracts? and 2) How are tense usage and modality related to different rhetorical moves of the abstract? Analysis revealed that 1. the present tense was dominantly used in every move in the ENG corpus, accounting for 88 % and 67 % of all the finite verbs in each engineering journal, 2. The present and the past tense were more or less equally used in the AL abstracts, with the past tense dominantly used in three rhetorical moves – Presenting the research, Describing the methodology, and Summarizing the findings, and with the present tense mainly used in the two moves – Situating the research and Discussing the research, 3. Interestingly, modals were used more in the ENG abstracts than the AL abstracts, which may be related to the nature of study, 4. The present perfect tense was also used in the AL abstracts in the three journals and the ENG abstracts in one journal mainly in Situating the research, accounting for 4 to 6 % of all the verbs in each journal. The study has indicated that cross-disciplinary differences in conventional practices do exist in tense usage in RA abstracts, which points to the need to raise ESL/EFL academic writing instructors’ awareness towards such cross-disciplinary differences in RA abstracts.

Caution should be taken when generalizing some of the findings as the size of corpus is not sufficient. Despite the limitations, the results of the present study offer some pedagogical implications: When we teach academic or research writing to ESL/EFL students, it is important to explain how tense is used with which communicative purpose and some conventions in tense usage in abstract writing exist between different fields of study.

References


## Appendices

### Appendix 1

*Distribution of Verb Tenses and Modals per Journal in the AL and ENG Corpora (occurrences)*

<table>
<thead>
<tr>
<th></th>
<th>Applied Linguistics</th>
<th>Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TQ</td>
<td>ESP</td>
</tr>
<tr>
<td>Present</td>
<td>47</td>
<td>64</td>
</tr>
<tr>
<td>Past</td>
<td>59</td>
<td>29</td>
</tr>
<tr>
<td>Present Perfect</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Modals</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Total (N)</td>
<td>118</td>
<td>100</td>
</tr>
</tbody>
</table>

### Appendix 2

*Occurrences of Finite Verbs and Modals in Each Move (AL Corpus)*

<table>
<thead>
<tr>
<th></th>
<th>STR</th>
<th>PTR</th>
<th>DTM</th>
<th>STF</th>
<th>DTR</th>
<th>STR+</th>
<th>PTR+</th>
<th>DTM</th>
<th>DTM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Present</strong></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>act.</td>
<td>44</td>
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<td>7</td>
<td>49</td>
<td>37</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>162</td>
</tr>
<tr>
<td>pass.</td>
<td>34</td>
<td>10</td>
<td>5</td>
<td>44</td>
<td>30</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>134</td>
</tr>
<tr>
<td>Past</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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*Note. Pr. Pf. = present perfect, act = active voice, Pass. = passive voice.*
Helping Students and the Public Engage in Hawaii’s Self-Sufficiency in Food Production

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Abstract
Compared to growing crops outdoors in a field, controlled environment agriculture (CEA) involves growing crops in structures that protect the crop from the environment and provide more favorable growing conditions. These structures typically include greenhouses, glasshouses, shadehouses, and buildings. With the increasing importance of food security, food safety, and food self-sufficiency for Hawaii, it is vital for people to be aware of the importance of CEA for Hawaii’s self-sufficiency in food production. The objective of this paper is to describe and discuss the approaches I have used to engage students and the public on what CEA is, how it works, and its value and benefits to Hawaii’s agriculture and food production.

I have used various methods and approaches to engage students and the public inside and outside the classroom.

Each spring semester, I have taught about CEA in my TPSS 300 Tropical Production Systems course. This course covers all aspects of the commercial growing of crops outdoors in fields and indoors in CEA structures.

Being a faculty in the Tropical Plant & Soil Sciences (TPSS) Department at the University of Hawaii at Manoa (UHM) has given me the opportunity to mentor university students in their research projects dealing with CEA. I have mentored UHM undergraduate students with their UROP (Undergraduate Research Opportunities Program) and HSGC (Hawaii Space Grant Consortium) funded projects. Brylin Nelson, an undergraduate student in the Tropical Agriculture and the Environment program, worked with me on a UROP funded research project on the “Effects of Martian Soil Simulant and Artificial Lighting on the Growth of Fast Crops.” Funded by a HSGC Undergraduate Fellowship, Aleca Borsuk, an undergraduate student in the UHM Mechanical Engineering Department, worked with me on her research project “Spatial Optimization of Artificial Lighting for Space Grown Amaranthus Caudatus.”

I have had the opportunity to help mentor UHM College of Engineering students with their CEA related research projects. Preston Tran and his undergraduate team in the UHM Mechanical Engineering Department worked on a Box Farm Project which involved building an autonomous automated robotic hydroponic plant growing system. They won first place in the University of Hawaii College of Engineering Francis J. Rhodes Montgomery innovation competition for their project. I also assisted Byron Fonseca and his undergraduate team in the Mechanical Engineering (ME) Department on their ME 481 Final Design Tropical Greenhouse System Refinement project.
I have presented papers at the Annual Conferences of the American Society for Horticultural Science including “LED Lighting Effects on Hydroponically Grown ‘UH Manoa’ Lettuce” at the ASHS Conference in Chicago in August, 2022. I developed a new course TPSS 491 Experimental Topics “Controlled Environment Agriculture” which I taught in the Fall 2022 semester. With Brylin Nelson, we wrote an article on CEA entitled “Controlled Environment Agriculture for Homeowners” for the Hanai’Ai publication. I recently gave a Honua Highlights talk at the Laulima Symposium on “Controlled Environment Agriculture: Help Meet Hawaii’s Food Security and Self-Sufficiency in Food Production.”

Using various approaches have helped me make students and the public more aware of what CEA is and how it can help Hawaii’s agriculture.

Additional index words. Controlled environment agriculture, food security, urban agriculture, indoor farming

I. Introduction

Compared to growing crops outdoors in a field, controlled environment agriculture (CEA) involves growing crops in structures that protect the crop from the environment and provide more favorable growing conditions (Gomez et al., 2019). These structures typically include greenhouses, glasshouses, shadehouses, and buildings (Figure 1). With the increasing importance of food security, food safety, and food self-sufficiency for Hawaii (Hollier, 2014), it is vital for people to be aware of the importance of CEA for Hawaii’s self-sufficiency in food production.

Objective. The objective of this paper is to describe and discuss the approaches I have used to engage students and the public on what CEA is, how it works, and its value and benefits to Hawaii’s agriculture and food production.

II. TPSS 300 Tropical Production Systems

Each spring semester, I have taught about CEA in my TPSS 300 Tropical Production Systems course (TPSS Dept., 2023). This course covers aspects of the commercial growing of crops outdoors in fields and indoors in CEA structures (Kobayashi, 2017) (Figure 2). It compares crop management systems, techniques, and technologies in protected and open field production of tropical crops for sustainability and environmental protection.

III. Mentoring University Students

Being a faculty in the Tropical Plant & Soil Sciences (TPSS) Department at the University of Hawaii at Manoa (UHM) has given me the opportunity to mentor university students in their research projects dealing with CEA. I have mentored UHM undergraduate students with their
UROP (Undergraduate Research Opportunities Program) (UROP, 2023) and HSGC (Hawaii Space Grant Consortium) (HSGC, 2023) funded projects. Brylin Nelson, an undergraduate student in the Tropical Agriculture and the Environment program, worked with me on a UROP funded research project on the “Effects of Martian Soil Simulant and Artificial Lighting on the Growth of Fast Crops” (Nelson and Kobayashi, 2022a; NREM Dept., 2022) (Figure 3). Funded by a HSGC Undergraduate Fellowship, Aleca Borsuk, an undergraduate student in the UHM Mechanical Engineering Department, worked with me on her research project “Spatial Optimization of Artificial Lighting for Space Grown Amaranthus Caudatus” (Borsuk and Kobayashi, 2016; UH News, 2017) (Figure 4).

IV. Mentoring Engineering Students

I have had the opportunity to help mentor UHM College of Engineering students with their CEA related research projects. Preston Tran and his undergraduate team in the UHM Mechanical Engineering Department worked on a Box Farm Project which involved building an autonomous automated robotic hydroponic plant growing system (Trifonovitch, 2019) (Figure 5). They won first place in the University of Hawaii College of Engineering Francis J. Rhodes Montgomery innovation competition for their project. I also assisted Byron Fonseca and his undergraduate team in the Mechanical Engineering (ME) Department on their ME 481 Final Design Tropical Greenhouse System Refinement project.

V. Professional Presentations and Articles

I have presented papers at the Annual Conferences of the American Society for Horticultural Science including “LED Lighting Effects on Hydroponically Grown ‘UH Manoa’ Lettuce” at the ASHS Conference in Chicago in August, 2022 (Kobayashi & Nelson, 2022) (Figure 6). I recently gave a Honua Highlights talk at the Laulima Symposium on “Controlled Environment Agriculture: Help Meet Hawaii’s Food Security and Self-Sufficiency in Food Production” (Kobayashi, 2022). Brylin Nelson presented her UROP funded research at the UHM Undergraduate Showcase Conference (NREM Dept. 2022) (Figure 7).

Brylin Nelson and I wrote an article on CEA entitled “Controlled Environment Agriculture for Homeowners” for the Hanai’Ai publication (Nelson and Kobayashi, 2022b). I also wrote an article “Controlled environment agriculture and artificial lighting to grow plants” for a local landscape magazine Hawaii Landscape (Kobayashi, 2021)

VI. Miscellaneous Presentations

Our lab provided a display at the Earth Day with CTAHR event at the University of Hawaii at Manoa where different organizations, student clubs, and departments set up table displays showcasing sustainability (Figure 8).
I developed a new course TPSS 491 *Experimental Topics* “Controlled Environment Agriculture” which I taught in Fall 2022 (Table 1). I guest lectured in TPSS 364 *Horticulture: Theory & Practice* on “Protected cultivation and controlled environment systems”.

**VII. Conclusion**

Using various approaches have helped me make students and the public more aware of what CEA is and how it can help Hawaii’s agriculture.

**VIII. Acknowledgements**

Undergraduate Research Opportunities Program (UROP), University of Hawaii at Manoa.
Hawaii Space Grant Consortium (HSGC), University of Hawaii at Manoa.
College of Engineering, University of Hawaii at Manoa.
American Society for Horticultural Conference.
Hanai’Ai, Sustainable and Organic Agriculture Program, College of Tropical Agriculture and Human Resources.
Honua Scholars.

**IX. Literature Cited**


X. Tables

Table 1. Course syllabus for TPSS 491 Experimental Topics “Controlled Environment Agriculture”. This course was first taught in Fall 2022.

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<th>Week</th>
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<td>Crop growth and development. Growth analysis. Yield analysis.</td>
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<td>Environmental impact on crop production. Monitoring environmental factors.</td>
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<td>Crop modeling and simulation.</td>
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<td>Precision agriculture.</td>
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<td>9</td>
<td>Oct. 21, F</td>
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<tr>
<td>11</td>
<td>11</td>
<td>Nov. 4, F</td>
<td>Crop sensors and equipment for monitoring plant status.</td>
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<td>Artificial and supplemental lighting.</td>
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<td>Nov. 25, F</td>
<td>Non-Instructional Day</td>
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XI. Figures

Figure 1. Oasis Biotech is an indoor farming system (plant factory) in Las Vegas, NV. It produces leafy greens using hydroponics and light emitting diode (LED) lighting.
Figure 2. TPSS undergraduate students propagating poinsettia cuttings. Students grew potted poinsettia plants for their annual Christmas poinsettia sale in December.

Figure 3. Brylin Nelson, a Tropical Agriculture and Environment major, received a grant from the Undergraduate Research Opportunities Program (UROP) at University of Hawaii at Manoa to do research with me on growing vegetables in simulated Martian soils.
Figure 4. Aleca Borsuk, a mechanical engineering student at the University of Hawaii at Manoa, presented her Hawaii Space Grant Consortium (HSGC) funded research at the American Society for Horticultural Science Conference in Atlanta, GA in 2016.

Figure 5. Box Farm is an autonomous hydroponic growing system for vegetables that was designed and built by engineering students at the University of Hawaii at Manoa.
Figure 6. I presented two posters on our controlled environment agriculture research at the American Society for Horticultural Conference in Las Vegas, NV in 2019.

Figure 7. Brylin Nelson conducted research with me on growing vegetables in simulated Martian soils. She received an Undergraduate Research Opportunities Program (UROP) grant and presented her research at the University of Hawaii at Manoa Undergraduate Showcase virtual conference in 2021.
Figure 8. Our lab’s controlled environment agriculture display at the Earth Day with CTAHR event sponsored by the College of Tropical Agriculture and Human Resources (CTAHR) at the University of Hawaii at Manoa in 2022.
Beyond Intelligence: A Survey of Grit and Fear of Failure as Interrelated Non-Cognitive Invariants in Academic Performance

Educational Psychology
Paper Session

In this paper, we present the results of a systematic literature review about two determinants; grit and the fear of failure. While there exist a significant empirical and theoretical body of knowledge on each, research into their interrelatedness is disproportionately scant and often fragmented, given their invariant role in the academic context. We include perspectives of empirically supported pedagogical augmentation for learner and educator consideration.

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Beyond Intelligence: A Survey of Grit and Fear of Failure as Interrelated Non-Cognitive Invariants in Academic Performance

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ABSTRACT
Institutions of higher education maintain a burgeoning interest to identify factors beyond the intellective that predict academic achievements. Determining the prevalence and consequence of these performance mediators is vital for these institutions in improving academic quality and optimizing the use of scarce resources. Similarly, students that are cognizant of these factors may engage strategies to improve performance. In the current paper, we present the results of a systematic literature review about two determinants; grit and the fear of failure. While there exists a significant empirical and theoretical body of knowledge on each, research into their interrelatedness are disproportionately scant and often fragmented, given their invariant role in the academic context. While we acknowledge the strong correlation between these two constructs and personality traits, evidence suggests that mitigating strategies can affect their influence. Accordingly, we include perspectives of empirically supported pedagogical augmentation for learner and educator considerations.

ACM Reference Format:

1 INTRODUCTION
A student’s academic performance is realized to be a significant proxy variable in predicting the likelihood of eventual college graduation [1]. Researchers have concealed their approaches to studying academic performance by considering the intellective (cognitive) and non-intellective (traits and skillset) as sine qua non. Intelligence, the inherent aptitude to learn new concepts and perform complex analyses [2], have been shown to have a strong correlation at about \( p = .50 \) to academic performance [3]. However, this aptitude should not be assumed the sole or even predominant predictor of academic performance [4]. Cognitive ability test results cannot explain a 50% variance in academic performance. This implies that there are other mediating factors at play. We focus on two of these non-intellectives: fear and grit. We acknowledge that these invariants are by no means exhaustive and are juxtaposed as interwoven constructs to provide a new lens by which to view and support academic achievement. Accordingly, this survey of the literature delves into the interrelatedness of these well-researched concepts from cognitive and psychological perspectives.

The first of these invariants, the fear of failure, is related to the implicit achievement motive that drives behavior [5]. The fear of failure has been associated with sub-par grades. Lerche et al. [5] accounts for these outcomes as its negative effects on cognitive processing. A student’s self esteem is tightly associated with their academic performance, as such the fear of failure invites a host of strategies to reduce the effect of failure. One such costly strategy is to self-handicap by indulging in behavior to purposely inhibit performance such as improper preparation or drug and alcohol abuse, so that any potential failure may be attributed to that barrier and not indicative of poor cognitive abilities [6]. Other, more effective strategies are associated with grit such as increased and purposeful effort in preparation and practice, and rebounding well after failure. Duckworth et al. [7] defines grit as a higher order personality trait exhibited by a perseverance and passion for long-term goals adding that it includes, yet transcends beyond simply resilience to failure. Its significance to academic performance is well supported Duckworth et al. [8] in a longitudinal study of West Point cadets, proposed that grit was even a better prognostic indicator of successful completion than intelligence. The separation of the intellective and grit as the non-intellective is nicely distilled in the quote attributed to Albert Einstein, “It’s not that I’m so smart, it’s just that I stay with problems longer.” Similarly, fear significantly hampers cognitive abilities [5].

The interrelatedness between grit and the fear of failure, varies by the domain context and is entangled through a sundry of explanatory variables. Primarily, a person’s personality affects how the individual subjectively appraises threats and is contingent with available psychological coping resources such as that associated with grit [9]. The appraisal process yields emotions. In our context, the threat appraisal may result in anxiety and fear responses [10]. However, since this appraisal is shaped by values, beliefs, goals and available resources, the event may be perceived as non-threatening or just challenging. Lee [9] demonstrated a negative correlation between grit and the perception of academic failure noting its effect on students’ appraisal. Grit is also subjected to personality traits. The OCEAN personality model comprises five orthogonal dimensions of openness, conscientiousness, extraversion, agreeableness and
neuroticism. Grit is most closely associated with conscientiousness with correlations ($r = 0.77$, $p < 0.001$) [7].

Our motivation for the work, as with most scientific endeavors, begins with formulating a hypothesis by observing a particular phenomena. That being, higher intelligence does not necessarily directly translate to academic achievement in isolation, and the interaction of these non-cognitive contributors need to be studied in an effort to formulate effective mitigation strategies.

The remainder of the paper is structured as follows: In the next section we present an overview of the methodology applied in the literature review. In sections 3 and 4 we extend our cursory look at grit and the fear of failure, then examine their relationship through intermediate and explanatory variables in section 5. We present empirically supported recommendations for educators and learners in section 6 then conclude in section 7.

2 METHODOLOGY

To guide the work we applied a snowballing strategy [11]. At the onset we identified a baseline set of meta-analysis papers for snowballing iterations. Using the keywords "Fear", "Anxiety", "Grit" compounded by "Academic Performance", we formulated our search strings for Google Scholar, IEEE Xplore, ERIC, and PubMed. The sources for this synthesis include journal articles, book chapters, conference papers, and electronic publications between 2010 and 2022. We filtered out overlapping samples (e.g., dissertations that were later published as journal articles) from our analyses. In addition critiques, reviews, and conceptual papers were sought to determine if some concepts were later refuted or revisited by the original authors. Our stopping indication occurred when a significant number of new references became circular.

3 GRIT

Grit has been well studied as an influencing factor of academic performance and achievement [12], [13]. It exemplifies the importance of sustained practice in expertise development [14].

The domain of practice is important in leveraging the affordances of grit. It is most advantageous in domains where tasks are difficult but well defined [15]. This is especially pertinent to collegiate performance with established parameters and metrics for success. Grit may actually be counter-productive in domains where novelty is required within ill-defined tasks. In these settings, there should be a willingness to abandon unsuccessful strategies and methods. This is juxtaposed with the persistence characteristic of grit. The magnitude to which the learner exhibits grit is another moderator of its impact. Individuals at the higher end of the grit spectrum spend a disproportionate amount of time and effort on arduous tasks with the unwillingness to abandon in favor of tasks more aligned with their skill-set in order to optimize the work/reward payoff; a phenomenon termed costly perseverance [16]. Another factor associated with a preponderance of grit, is the amplification of reluctance to seek assistance [17]. Figure 1 illustrates this relationship, with the area about $\alpha$ reflecting diminishing returns and subsequently, costly perseverance.

4 FEAR OF FAILURE

Fear is a preserved evolutionary emotional response to perceived threats [18]. The debilitating aspect of fear is well researched, notably impacting problem-solving, recall, planning, and engagement [19], [20]. A student’s self-worth is intricately tied to their academic achievement [21]. In the collegiate setting, threats to the students self-worth are not only pervasive but considered significant to the psyche, resulting in the potential for debilitating effects in academic performance. Students will even accumulate the fears of previous classroom experiences with them. These learned fears may not be entirely from first-person occurrences but also by social means, observing others’ interactions in the classroom [22]. Fear in the classroom manifests itself in fear-based responses including procrastination and the frequent use of avoidance mechanisms such as excessive talking, off-topic questions, and absences.

When the learners competency is at risk (real or perceived), they may resort to self-protective behaviors such as procrastination or abandoning a task in favor of endeavors associated within higher chances of success. The motivation for insulating from the shame and threat to self-worth is grounded in the fear of failure [23]. This is separate from the fear of being outperformed, whereby students who may be, or perceive themselves less prepared, abandon the quest [24]. Counter-intuitively, graduate students, even with more experience and considered higher performing in the classroom, procrastinate more frequently than their undergraduates counterparts due to an adherence to perfectionist practices [25].

Anxiety relates to fear as within the threat-based stimuli spectrum primarily differentiated by threat analysis results [26]. Students from different cultural, ethnic and linguistic backgrounds are especially prone to stereotype threat, the fear associated with thoughts that failure may reinforce negative stereotypes of their respective groups [27]. Test anxiety is pervasive, negatively affecting anywhere between 25 and 40% of students [28], [29]. Since testing is endemic to the academic experience, forming the basis of most assessment methods and decisions of advancement, this can be significantly detrimental. While there is no evidence that test anxiety is associated with intelligence [20], it disproportionately affects females [19] and African-American children [29].

Impostor syndrome is another psychological construct typical in higher-performing students with lower self-appraisal of their abilities and who often demonstrate a greater external locus of control of their success. Often this self-doubting mindset manifests itself in behaviors such as perfectionism and self-sabotage. Additional, correlations linked with impostor syndrome cite cynicism, exhaustion/burnout, and depersonalization [30]. Conversely, impostor syndrome demonstrated a positive association with academic performance, in its direct correlation with the practice of defensive pessimism. Defensive pessimism is a coping strategy employed by those with impostor syndrome, who anticipate sub-optimal performance as a means of attenuating perceived high expectations by others, as well as, alleviating anxiety, and safeguarding against threats to self-esteem. [1] Moreover, those who engaged in defensive pessimism were found to manage their perceived threats effectively [30].
There exist significant commonalities between the earlier discussed fixed mindset (the implied cause of learned helplessness) and impostor syndrome. These commonalities encompass both those who subscribe to a fixed mindset and those subjected to impostor syndrome [30][2]. First, these ideologies have a prevailing tendency to ascribe perceived failures and/or increased required effort as an internal surrogate measure of lack of intelligence/ability. [3,4,5,6] Secondly, both mindsets also approach goal-directed avoidant behaviors similarly. Specifically, those with a fixed outlook demonstrate adverse behaviors specific to performance-based goals, and likewise, similar behaviors are recognized in those with an impostor syndrome mindset concerning goals based on ability or aptitude.[2]

5 MAPPING THE INTERSECTIONALITY OF FEAR OF FAILURE AND GRIT

We assert the validity of the relationship between fear and grit by constructing a pathway network adapted from Lee’s hypothesized model [9]. In this manner, the linkages in the literature between the two hypothetical constructs and their observable attributes, are presented in Figure 2. The network outlines valenced (+ve) and (-ve) relationships between the intermediary variables addressed antecedently. Leftmost is Grit which is supported by two lower order facets of Perseverance of effort, and consistency of Interest [31]. Both dampen the student’s Perceived Academic Failure and Fear and Anxiety in the student, but enhance Academic Performance. The student’s Fear and Anxiety and Grit causally interact with Perceived Academic Failure via the Threat Appraisal mechanism.

6 RECOMMENDATIONS

Grit and mitigation strategies for fear of failure are to be addressed by educators and the learner alike and in concert. As such we frame the discussion from both perspectives. A multi-faceted approach realizes that both are interrelated and should be addressed aggregatesly.

6.1 Admissions and Retention Processes

Cognitively loaded testing with a high emphasis on the intellective has wrought adverse impacts on the collegiate admissions processes due to the debunked assumption of its power to predict future performance[4]. Secondly, testing based on acquired declarative knowledge and achievement widens the disparities for racial groups when these scores translate to decisions about access[32]. A clearer understanding of these invariants and their inclusion within the process would allow colleges to better understand the extent of support required to augment student learning. Changing the narrative by including or emphasizing grit and coping into university admissions criteria. A candidate who on their own persists despite hardship prior to college should excel given the support and scaffolding. This is in light of the disparity in preparation between high-funded and low-funded school districts.

The transition from high school to university is strife with fear and anxiety. This adjustment was found to be a significant predictor of early academic performance[33]. This variable is related to the underlying social support, and the student’s relationships with their parents. Therefore the support given to the student by the university and its culture is pivotal. Another manner whereby the university could support the student is by addressing their economic concerns. A student’s family socioeconomic status is both directly and indirectly tied to academic achievement[34]. Socioeconomic status is affected by race and ethnicity, grade level, and the neighborhood of the family [35]. Many of these factors contribute to the explanatory variable termed social capital or the contribution of values critical for educational development [36].

6.2 Structuring of Tasks

Grit is best leveraged in structured task sets, therefore it is critical for educators to provide this structure with feedback. Similarly
Communicating and structuring tests relieves some of the anxiety associated with testing. Learning objects and cognitive load. Cognitive load theory examines the role of cognitive processing in relation to learning and applies this knowledge to devise instructional procedures [37]. Recommended strategies to reduce cognitive load is chunking, or structuring concepts in a manner as not to overload the students working memory. In [38] one of the authors saw improvement in performance for junior software engineers by using this practice.

6.3 Teach Study, Practice and Test Taking Strategies

Effective study skills or knowing what, how and when to study may reduce the anxiety associated with test taking [20] [39]. While some anxiety is considered healthy, high levels of test anxiety results in significant distress as a precursor to testing and may result in poor performance [40]. This diminished performance is explained by cognitive capacity being curtailed as working memory is subsumed by anxiety thoughts [41]. Gritty behaviors include increased study and practice time. Crede et al. [42] found high predictive validity of study habits, skills and attitude to academic performance. The work furthermore asserts that these may be the one of the strongest non-cognitive predictors. It should be noted that the quality of practice rather than the quantity is pivotal to academic performance, therefore deliberate and well structured habits are necessary for the learner [43].

Educators may alleviate the fear and anxiety about testing by providing students with study guides explaining the structure and topics to be covered [44]. Gamifying content and administering practice tests are effective methods to build confidence and reduce test anxiety [45]. Similarly, students working in teams to predict and practice potential questions performed better on tests [46]. Salend further suggest a myriad of student strategies including tacking easier questions first and reduce anxiety by not arriving early for exams.

6.4 Promoting a Growth Mindset

The potential of promoting a perspective in learners to mitigate fear of failure and promote grit may be best understood by differentiating fixed and growth mindsets. An individual’s ability is considered innate and permanent from the perspective of a fixed mindset. In contrast, a growth mindset sees ability as being developed incrementally over time. Remarkably mindsets vary across domains. The individual may possess a growth mindset in their ability to play the violin, yet view their aptitude in mathematics as fixed. The growth mindset sees ability as being developed incrementally over time. Remarkably mindsets vary across domains. The implications of shifting towards a growth mindset across all domains has strong ramifications for how a student sees fear and grit.

When faced with failure, a closed mindset does not offer a healthy manner to recover. It seeks to accept or even conceal the deficiency [47]. Students with this mindset feel as if they are constantly judged and failures are considered to validate a lack of aptitude in a particular domain. This promotes fear and risk averse behaviors as there is something to lose with attempting new tasks. The growth mindset embraces failure and views it as an opportunity to learn and overcome that deficiency. Difficult tasks are sought out instead of avoided. This approach is critical to the perseverance component of grit and in overcoming the fear associated with failure.

A fixed mindset may be learned and unlearned, however for academics it may be deeply entrenched in some individuals. Dweck offers that labeling and praising the learners abilities fosters the view of their aptitude towards tasks as permanent and fixed. Instead,
educators should identify and acknowledge instances of positive change, persistence and good learning practices. Having the learner reflect and identify areas of fixed mindsets and its irrationality is instrumental in initiating change.

7 CONCLUSION

We surveyed the literature on fear of failure and grit in the academic setting, and how they interrelate. In our exploration we noted that the literature suggests that these non-intellective factors affect vulnerable learner populations disproportionately. We urge the educators and the scientific community to continue to study these structures and how they may be operationalized towards learner success is higher education. Accordingly we encourage students self evaluate about grit and fear as they navigate their pathways through the academy.

REFERENCES


Pharmacists’ Delivery of Health Education to Prevent Diabetes in the New Orleans Hospitality Industry Workforce

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**Title:** Pharmacists’ Delivery of Health Education to Prevent Diabetes in the New Orleans Hospitality Industry Workforce

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Pharmacists’ Delivery of Health Education to Prevent Diabetes in the New Orleans Hospitality Industry Workforce

Objectives: This proposed project seeks to impact the lives of hospitality workers in New Orleans, Louisiana. New Orleans is a tourism mecca, holding multiple annual major festivals throughout the year including the Carnival based Mardi Gras celebration, as well as music and arts festivals such as the New Orleans Jazz and Heritage Festival and the Essence Festival of Culture. New Orleans heavily relies on its large hospitality industry which brings the city approximately $8.7 billion in revenue each year. While the industry helps to maintain the local economy, jobs in hospitality offer little in terms of benefits and wages. According to the Data Center, hospitality workers make an average of $22,069 annually. This income range may leave the workers in a state of “working poverty”, earning too much income to qualify for government sponsored assistance, yet unable to afford health insurance coverage. This often results in hospitality workers paying a health insurance penalty during income tax season. Additionally, hospitality workers may need to work overtime hours and/or two jobs to make ends meet, leaving no room for self-care, doctor appointments, and overall stress management. These factors together comprise a perfect recipe for long-term poor health outcomes. According to the American Diabetes Association (ADA), 84 million American adults have prediabetes and nearly 90% of them do not know it. With decreased healthcare access, the authors suspect many hospitality workers may unknowingly have this condition. Project objectives include prediabetes screening, focused health education and connection to further healthcare resources. Pharmacists are trusted community based healthcare professionals and ideally placed to deliver this health information to the public.

Methods: This prospective cohort study will provide one-on-one prediabetes education to hospitality workers in the Greater New Orleans area. The hospitality worker cohort includes persons working in restaurants as waiters, waitresses, busboys, hostesses. This cohort also includes those working as bartenders and hotel housekeepers. Pharmacists and pharmacy student interns will work with multiple local hospitality venues to deliver the interventions where the participants are working. Participants will be screened for type II prediabetes using the ADA pre-diabetes risk assessment. After their risk score has been calculated, participants will be provided health education tailored to their result. The education will include lifestyle modifications and dietary changes suggested by the ADA for diabetes prevention. Participants will be given a pre and post survey on this information. Participants will also be provided a handout of the key health information, as well as a directory of Federally Qualified Health Centers (FQHCs) in the Greater New Orleans area. Follow up via phone calls, text messages, or in person will occur for participants who screened positive for prediabetes at 2 weeks, 1 month, and 3 months after the health education session.
Pharmacists’ Delivery of Health Education to Prevent Diabetes in the New Orleans Hospitality Industry Workforce

**Potential Impact:**
We hypothesize that these interventions will increase patient awareness and understanding of prediabetes. We also hope the interventions will encourage participants to commit to beneficial lifestyle changes. By providing hospitality workers linkage to affordable care, there may be decreased progression to a diagnosis of type II diabetes. With pharmacy professionals’ early intervention focused on increasing knowledge, awareness and access to affordable healthcare, it is possible to achieve positive health outcomes for this worthy population.

**References:**

Title of submission
Psychological Distress + Burnout = An Unsustainable System for Adult English Language Teachers

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Abstract

Purpose

As an adult English Language Teacher (ELT) for the past 18 years who has experienced burnout symptoms and witnessed others who have exhibited signs, I realize that there may be many reasons why ELTs experience stress and some extent of burnout. While each ELT’s experience may differ, there may be common causes, coping mechanisms, and suggestions that stand out.

Theoretical Framework

I will approach this study with psychological distress (Mirowsky & Ross, 2003), burnout theory (Maslach et. al., 1997), and the ethics of care (Noddings, 1984) in mind. Meanwhile, I will also examine how the educational system, precarious working conditions, and COVID-19 has contributed to the degree of burnout that some adult ELTs experience and how their experiences affect their personal lives and well-being, and professional relationships. Finally, I query as to whether this is a sustainable system for adult ELTs, the ELT profession, and employers.

Methodology

I will use a mixed methods approach, which includes a survey, focus groups, and semi-structured interviews. The participants, adult ELTs in Ontario, Canada at least three years teaching experience. Participants will be invited to complete a Likert-type survey via TESL Ontario’s and Tutela’s websites. Ideally, I would like to have at least 20 participants for the survey, two groups of five for the focus groups, and a subset of the participants for semi-structured interviews.
The survey will collect basic demographic information about adult ELTs who self-identify as contract employees and have experienced burnout symptoms such as fatigue, anxiety, and depression. Information collected will include what sector they work in, the age of their students, who their students are, class size, location, number of hours they work in a week, how many years of experience they have, the challenges that they face, which burnout symptoms they have experienced, and what the potential reasons are/were.

Next, I will conduct focus groups to discuss participants’ experiences with burnout in more detail. In particular, I want to know how they have dealt with their symptoms and how their experience has affected their personal lives and well-being. Finally, I hope to contact a subset of the participants for semi-structured interviews. This would provide a more in-depth representation of some contract adult ELTs’ thoughts, feelings, and behaviours in respect to their challenges, burnout experience, and how their experience has affected their professional relationships. It is also an opportunity to get their recommendations on reducing stress and transforming working conditions.

**Expected outcomes**

It is anticipated that this research will add to the existing literature by revealing additional causes and effects of stress and the extent of burnout for some contract adult ELTs in Ontario, Canada, how they have coped, and what they recommend as solutions. I also hope that this study will encourage other adult ELTs to share their experiences, help them cope, and heal. Moreover, it might help non-adult ELTs understand and empathize with adult ELTs and the profession.

**Educational importance of the study**
Wider implications may surface and call for further research on adult ELTs and their learners in Canada and other countries. It could also lead to similar research being conducted with other care professionals and their patients/clients in Ontario, other provinces, and/or countries. In conclusion, this study could fill a gap in adult ELT research in Canada, it is a timely issue, and there are potential educational, administrative, and political implications as we continue to navigate through the uncertainty.
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Title: Anti-Asian Racism and Racial Justice in the Classroom

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Abstract:

In this presentation, we discuss the urgent issues and concerns about anti-East Asian racism in our society and share several pedagogical strategies to counter anti-East Asian racism. We begin by discussing the history and context of anti-Asian racism in the US, from which we trace the historical origins and contexts of anti-Asian racism, violence, and stereotypes in popular culture and media. After that, we present several anti-Asian racism teaching strategies and practices, drawn from and influenced by the creative artworks of East Asian or Asian American contemporary artists, such as Lisa Wool-Rim Sjöblom, Amanda Phingbodhipakkiya, and Monyee Chau, who demonstrate subverting racism against Asians during the COVID-19 global pandemic.

We developed three pedagogical strategies to confront anti-Asian racism: art intervention/subverting racism, anti-racial gaze, and anti-racist memes. Art intervention/subverting racism is the practice of creating art interventions against racism or subverting covert and overt racism in educational, social, and political areas. We offer this strategy as one of the most significant ways of both creating art against racism (Kraehe & Acuff, 2021). Overt racism is the intentional and/or obvious harmful attitudes or behaviors towards another minority individual or group because of their skin color or ethnicity, and covert racism is racial discrimination that is concealed or subtle rather than obvious or public (Kalwant, 2018). Anti-racist gaze is to analyze photographs, films, graphic art, and new and virtual media to expose and address White gaze and other racialized gazes. Students make the critical examination of symbols, images, and popular and visual culture to address and challenge racial biases and racism in society. Anti-racist meme offers a way of creating and expressing an image or video to share anti-racial messages and ideas distributed through social media. This practice often targets on racial memes circulating on social media that reinforce the stereotypes and
derogatory images of a specific group or people.

Engaging our students with three pedagogical strategies and endeavors in our classrooms, we emphasize that our students can create and share anti-racist art works challenging current racial concerns and issues. Through anti-racist art projects, many students realized the power of art towards social justice education, demonstrating that they can become agents of cultural change beyond the mere consumer of culture (Goodman, 1996; Iftikar & Museus, 2018). Based on our reflection on the projects and students art examples. We encourage educators to address anti-Asian racism and social justice in their classrooms.

References:
Multilevel Modeling: A Study of the Relationships among Mathematics Achievement, Family Income of Students and School Urbanicity Using Hierarchical Linear Modeling

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Abstract

In a time when the United States is rapidly changing culturally and economically, it is important that researchers continuously take strides to understand the impact of these changes and evolutions. Precisely, shifts in urbanicity and family income have exhibited both negative and positive impacts on youth education achievement (Entwisle et al., 2007; Mahyuddin et al., 2009). This study assessed the relationship between the specific variables of mathematics scores, family income, and urbanicity. Hierarchical linear modeling (HLM) was used to examine the significance of the variation of mean mathematics scores across schools. Participants for this study included 8304 eighth graders from urban and rural school districts. The results indicated that there was a significant variation in mean mathematics scores across U.S. middle schools. Urbanicity explained only 1.62% of this variance, though urbanicity was found to be a significant predictor of mathematics scores. Family income significantly predicted students’ mathematics scores in each middle school across the U.S. The implication of this finding is that measures could be taken to improve the family income situation of students to improve their mathematics scores.

Keywords: mathematics scores, Urbanicity, family income
Multilevel Modeling: A Study of the Relationships among Mathematics Achievement, Family Income of Students and School Urbanicity Using Hierarchical Linear Modeling

For decades, researchers have tried to understand and determine the influences of student and school characteristics on academic achievement (Entwisle et al., 2007; Mahyuddin et al., 2009; Ocumpaugh et al., 2016). Student characteristics including engagement (Wang et al., 2017) and motivation (Skinner et al., 2009) have been found to be positively associated specifically with math achievement. Similarly, literature has shown other significant predictors of reading and math achievement including the urban-rural continuum (Miller & Votruba-Drzal, 2015) and family income (Haveman & Wolfe, 1995; Mayer, 1997; Serbin et al., 2013). To our knowledge, seldom has there been research examining both family income and urbanicity simultaneously on math-specific achievement, the aim of this study was to examine the relationships among these specific variables in hopes of understanding more deeply the impact of both school urbanicity and student family income on mathematics achievement.

Literature Review

There are a number of factors that researchers have determined as predictors of student academic achievement in the United States including both student characteristics and school characteristics (Carbonaro & Covay, 2010; Miller & Votruba-Drazl, 2015; Murphy, 2007). Two specific factors often studied, especially as the country continues to transform economically and culturally, are family income and urbanicity. In the following literature review, family income will be considered first by itself, followed by recent findings and gaps in the literature on family income and urbanicity on achievement.

Family Income and Achievement
Factors that influence achievement are crucial to understand and determine for the sake of future success academically and career-wise (Farkas, 2011). Students from low-income households are, on average, found to rank lower on achievement test scores, school grades, high school graduation rates, and grade retention (Sirin, 2005). This difference from disadvantaged students’ more advantaged peers is noted as early as nine months of age (Halle et al., 2009). In addition, Lee and Burkham (2002) found that by the time low-income students began their education in kindergarten, they were already .5 to .7 standard deviations below their peers, and this gap continues throughout the entirety of their education (Reardon, 2011).

One approach that researchers have taken has included a deeper look into the theory and direct pathways between income and achievement. For example, Bradley and Corwyn (2002) found that lower-income students were less likely to develop basic academic, social, and behavioral skills. Furthermore, in a study conducted by Serbin et al., (2013), hierarchical regression analyses were used to test a transitional theory on the problem. Researchers found that students from low-income households were likely to lack access to cognitively stimulating materials, enriching experiences, and positive parenting. As a result, academic achievement across the board was negatively affected. That is, due to these issues in low-income households, students did not exhibit basic skills and abilities to transition through adolescence, resulting in poor academic achievement, and furthermore, poor lifetime patterns of achievement.

Urbanicity, Family Income, and Achievement

There has been a major shift in poor populations throughout the last few decades according to a current researcher (Fisher, 2007; Miller & Votruba-Drzal, 2015; Murphy, 2007). Specifically, while urban areas were once considered the poorest areas in America, it is now rural and suburban areas that are most impoverished. Reasons for this include the loss of
manufacturing jobs, the demolition of project-based public housing, and an increased cost of living in urban areas (Friedhoff et al., 2010). With this impactful shift in communities, researchers have attempted to understand the effect urbanicity has on family income, and vice versa, on academic achievement.

In a study conducted by Miller et al., (2013), the urban-rural continuum was analyzed in relation to family income and early childhood academic achievement in reading and math skills. Results of the study showed that income gaps in achievement were worsened in urban areas compared to both rural and suburban areas. However, urban areas often showed greater improvements in early academic skill development compared to rural areas. In a follow-up study, Miller and Votruba-Drzal (2015) found similar results and concluded that further research needed to be examined to understand these factors more deeply for policy makers to make sound decisions around content and program development in educational systems across the urban-rural continuum.

**Goals of the Current Study**

While recent research has started showing a strong relationship between family income, urbanicity, and achievement, there is still work to be done. Therefore, the purpose of this study was to explore the impact of family income and school urbanicity on mathematics achievement and to understand the variation of mathematics scores across middle schools in the United States and how much of this variation is accounted for by urbanicity. The following research questions were then developed to understand the relationships among the variables of interest for this study:

1. Is there a significant variation in mean mathematics scores across U.S. middle schools?
2. Is family income of middle school students a significant predictor for mathematics scores?

3. Does school urbanicity significantly influence middle students’ mathematics scores?

4. How much variation in mean mathematics scores across U.S. middle schools is explained by urbanicity?

**Methodology**

**Research Design**

This study was a quantitative longitudinal study that used Hierarchical Linear Modeling (HLM) to analyze how student and school characteristics predicted mathematics scores. HLM was used because it was the most appropriately advanced and specialized analytic technique for this complex, nested data structure. Data used was part of the National Education Longitudinal Study of 1988 (NELS: 88). Though follow-up studies took place in 1990, 1992, 1994, and 2000, this research work focused on the data collected from 1988 through 1992 only.

**Participants**

NELS:88 was initially launched in the spring of 1987-1988 with an initial sample of 24,599 participants consisting of eighth grades students and one of their parents, two of their teachers as well as their school principal. The eighth-grade cohort was surveyed over time, but the sample was modified during each of the first two follow-ups. The analysis for this current study used the 1988 and 1992 data of the National Education Longitudinal Study, which consisted of school and student data from 1988 through the second follow-up, in 1992, when most cohort members were in the 12th grade. The NELS 1988 through 1992 data file contains 27,394 cases representing all respondents who participated in any of the first three waves - base year, first follow-up, or second follow-up ("Quick Guide to Using the NELS:88/2000 Data", ...
n.d). After cleaning the data for this study, only 8304 cases with complete data for all variables were used for the analysis.

**Data Collection**

The data came from the Nationally representative, longitudinal study of eighth grades students in 1988 (NELS:88), which was administered by the National Center for Educational Statistics. Students took an online mathematics assessment and survey. Students’ parents, principals, and mathematics and science teachers, as well as the school’s lead counselor, completed surveys on the phone or through the Web. The first follow-up of NELS:88 took place in 1990 when most of the sampled participants were in a transition status from 10th grade to 11th grade. A second follow-up took place in early 1992 when most sample members were in the second term of their senior year. The third follow-up took place in 1994 when most sample members had completed high school, and the last follow-up was in 2000.

**Measures**

**Level-1 variables.** The level-1 variable in this study consisted of the outcome and the predictor variables. The outcome was mathematics scores while the predictor was the family income of students. Mathematics scores used for this study were standardized mathematics scores ranging from 0 to 100. Educational Testing Service (ETS) developed the mathematics test, and students completed the test for each wave of the study during the survey sessions in school or off campus. The family income variable was operationalized as annual family income from all sources in 1987 and was collected through a survey item stating that “What was your total family income from all sources in 1987?” Family income was categorized into various levels, coded with numbers ranging from 1 through 15 (for example, 1 = “NONE” and 15 = “$200,000 or MORE”) (see Table 4).
**Level-2 variable.** The level-2 predictor for this study was school urbanicity and consisted of three levels coded as urban= 1, suburban= 2, and rural= 3. To obtain a more meaningful interpretation of intercepts and slopes in models where urbanicity was included, the two levels of urbanicity were recoded as urban= 0 and rural= 1. The documentation of this study obtained from the National Center for Education Statistics website indicated that urbanicity was created directly from Quality Education Data (QED) with classifications as used by U.S. Census (urban implies central city while rural refers to outside Metropolitan Statistical Area).

**Analysis**

The first step in data analysis for this study included data cleaning. The data was imported into Python and missing cases were dropped. Missing values of level-1 and level-2 variables were handled by deleting cases associated with the missing values. Students who did not complete the mathematics test were not included in the analysis. The data was then saved in a CSV file and uploaded into SPSS, and the SPSS file was finally uploaded into HLM7 for analysis.

Preliminary analysis for this study included descriptive statistics of the data as presented in Table 1. These descriptive statistics were used to understand the distribution of the continuous variables and to find out if there were outliers in our data. The independence, normality, and homoscedasticity assumptions of random errors at level-1 and level-2 were tested and met. Visualizations including the plot of mathematics scores versus Family Income were created to understand the relationship between outcome and level-1 predictor as shown in Figure 4 in the results and discussion section. This visualization provides information about the variation of the mean mathematics scores (intercept) and the effect of Family Income on mathematics scores (slope).
Model Specification and Selection

First, the models were specified based on the research questions. Each model was suitable for answering a specific research question as already discussed. The Intraclass Correlation from Model 1 was useful in understanding the appropriateness of applying hierarchical linear modeling to this study. Moreover, this model could also serve as a base model for comparing other models. According to Raudenbush and Bryk (2002), researchers should always answer the question of whether a predictor should be included at level-1 and level-2. Thus, researchers decided whether the coefficients of level-1 predictors should be random or fixed at level-2. Moreover, if predictors are included in the models, the predictors should be added progressively starting from a univariate model to bivariate and so on.

Model construction for this study included adding predictors, as this approach has been noted in the literature as being more efficient compared to starting with several predictors and eliminating those that are not significant. By adding predictors, researchers were able to analyze variance at the level-1 coefficients ($\beta_0j$ and $\beta_1j$) that were explained by the added predictor. This study used a single level-1 predictor of interest to keep the models simple. Additionally, fitting several level-1 predictors could result in redundancy and multicollinearity. A single level-2 predictor was added to examine how much variance was explained by this variable in the intercepts, as well as to investigate if this predictor significantly influenced the relationship between the level-1 predictor and outcome. Descriptive statistics including mean, median, and skewness were used to check for the normality of the continuous variables included in this study to avoid misspecification.

Moreover, the decision to specify the level-1 coefficients as fixed or random was based on the visual plot of the level-1 equation as shown in figure 1. The slopes on the plot appeared to
be parallel and therefore were determined fixed. Models, such as the random coefficient regression model and the full model, could also be used to answer the research questions that were answered with Models 2 and 4 respectively. However, these random coefficients and full models with random slopes were not used because the variances of their level-1 slopes were not significant. Therefore, the level-1 slopes for Model 2 and Model 4 were specified as fixed so that the iterative algorithm could converge faster.

As indicated in Figure 1, the fixed intercepts ($\gamma_{00}$) for all the models were approximately the same, indicating that any of the models could be equally used to estimate the fixed intercepts or mean mathematics scores across schools. Level-1 slopes were not specified in Models 1 and 3 because these models had no level-1 predictors. Consequently, these models had no fixed or random components for the slopes and there were no variances ($u_{ij}$) for the slopes. Also, there were no $\gamma_{11}$ for these models since there were no slopes.

The slopes for Models 2 and 4 were specified as fixed so there were no random components or variances for the slopes of these models as well. Since Models 2 and 3 were having fixed slopes and were not predicted by urbanicity, the effects of urbanicity ($\gamma_{11}$) on the slopes were set to zero. Since Models 1 and 3 had no level-1 slopes, these models had no variance-covariance matrix due to the absence of slope variance ($u_{ij}$). Models 2 and 4 had fixed slopes and consequently had no variance-covariance matrix due to having no slope variance ($u_{ij} = 0$).

Results

Results of Preliminary Analysis

The mean and median of level-1 variables were similar in value, and the skewness of each variable was within the range of 1- to 1, which indicated that the variables followed a
normal distribution. Since urbanicity (level-1 variable) was nominal, its frequency distribution was visualized through a bar chart as shown in Figure 3. The level-1 equation was also graphed to visualize the nature of the intercepts and the slopes across schools, whether the intercepts and slopes were random or fixed. Figure 1 indicates that the intercepts were random, and the slopes were fixed. However, only a hypothesis test can determine if the variances of the slopes and intercepts are significant.

**Results of HLM models**

**Research question 1.** The null model (model 1) was used to address this question by hypothesizing that, $H_0: \tau_{00} = 0$. The results of this hypothesis are found in Table 3. These findings revealed that there was a significant variation in mean mathematics scores across U.S. middle schools, $\chi^2(853) = 3828.69, p < 0.05$ with $\tau_{00} = 27.54$. Additionally, the Intraclass Correlation for the null model was computed as follows:

$$ICC = \frac{\tau_{00}}{\tau_{00} + \delta^2} = \frac{27.54}{27.54 + 75.43} = 0.2675 = 26.75\%.$$  

An Intraclass Correlation of 26.75% was sufficient for this study to be analyzed with hierarchical linear modeling.

**Research question 2.** The model of the level-1 predictor with random intercept and fixed slope (model 2) was used to answer this research question. A significant test was conducted with a null hypothesis, $H_0: \gamma_{10} = 0$. The results indicated that the family income of middle school students significantly predicted mathematics scores, $t(853) = 74.49, p < 0.05$ (see Table 3).

**Research question 3.** A level-2 predictor-only model with random intercept and no slope was used to address this research question. A hypothesis test was performed with a null hypothesis stating that $H_0: \gamma_{01} = 0$. The results of the hypothesis indicated that urbanicity
Research question 4. Models 2 and 4 were used to answer this research question. Model 2 served as a baseline model because urbanicity was added to Model 2 to obtain Model 4. Therefore, the additional variance accounted for by urbanicity was computed by analyzing the proportion of variance explained by urbanicity in the intercept. The calculations were done as follows:

\[
PVE = \frac{\tau_{00}^{(\text{Model 2})} - \tau_{00}^{(\text{Model 4})}}{\tau_{00}^{(\text{Model 2})}}
\]

\[
= \frac{15.40 - 15.15}{15.40}
\]

\[
= 0.0162
\]

\[
= 1.62\%
\]

A PVE value of 1.62% implied that an additional 1.62% of the variance in the intercept was explained by adding urbanicity as a level-2 predictor to the baseline model. Further analysis indicates that adding urbanity to model 2 does not improve the model as indicated by the non-significant chi-squared test of the difference between the deviance statistics of Model 2 and Model 4.

Discussion and Conclusion

This study focused on using HLM to understand the variation of mean mathematics scores across middle schools in the U.S and how much of this variation was accounted for by school urbanicity. Relationships between mathematics scores, family income, and urbanicity were also explored. HLM results for this study indicated that there was a significant variation in mean mathematics scores across U.S. middle schools. Urbanicity explained only 1.62% of this variance though urbanicity was found to be a significant predictor of mathematics scores. Also,
family income significantly predicted mathematics scores of students in each middle across the U.S. The implication of this finding is that measures could be taken to improve the family income situation of students to improve their mathematics scores. Moreover, further studies can focus on testing other variables that accounts for a greater proportion of variance in the school mean mathematics scores.
Reference


Appendix

Table 1
*Descriptive Statistics for Level-1 Variables*

<table>
<thead>
<tr>
<th></th>
<th>MATHSCORE</th>
<th>FAMILY_INC</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>8304.00</td>
<td>8304.00</td>
</tr>
<tr>
<td>Mean</td>
<td>51.08</td>
<td>9.55</td>
</tr>
<tr>
<td>Median</td>
<td>51.16</td>
<td>10.00</td>
</tr>
<tr>
<td>Min</td>
<td>31.66</td>
<td>1.00</td>
</tr>
<tr>
<td>Max</td>
<td>71.93</td>
<td>15.00</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>10.11</td>
<td>2.67</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.04</td>
<td>-0.62</td>
</tr>
</tbody>
</table>

Table 2
*Description of Models with the Nature of Intercepts and Slopes*

<table>
<thead>
<tr>
<th>Models</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 1</strong></td>
<td>Null model, no level-1 predictor, no level-2 predictor with random intercept and no slope.</td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
<td>Level-1 predictor only model with random intercept and fixed slope</td>
</tr>
<tr>
<td><strong>Model 3</strong></td>
<td>Level-2 predictor only model: Means-as-outcome model with random intercept and no slope.</td>
</tr>
<tr>
<td><strong>Model 4</strong></td>
<td>Level-1 and Level-2 predictors with random and fixed slope model</td>
</tr>
</tbody>
</table>
Table 3  
*HLM Model Results*

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma_00 (\beta_{00})$</td>
<td>50.70*</td>
<td>50.80*</td>
<td>50.79*</td>
<td>50.88*</td>
</tr>
<tr>
<td>$\gamma_01 (\beta_{01})$</td>
<td>-</td>
<td>-</td>
<td>-1.3*</td>
<td>-0.87*</td>
</tr>
<tr>
<td>$\gamma_{10 (\beta_{1j})}$</td>
<td>-</td>
<td>1.06*</td>
<td>-</td>
<td>1.06*</td>
</tr>
<tr>
<td>$\gamma_{11 (\beta_{1j})}$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Random Effects</td>
<td>Var (u_{0j}) = $\tau_{00}$</td>
<td>27.5*</td>
<td>15.40*</td>
<td>27.01*</td>
</tr>
<tr>
<td>Var (u_{1j}) = $\tau_{11}$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Var(r_{ij}) = $\sigma^2$</td>
<td>75.43</td>
<td>72.45</td>
<td>75.46</td>
<td>72.47</td>
</tr>
<tr>
<td>$\tau_{01}$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*p< 0.05, note that p-values for $\sigma^2$ are never calculated because level-1 residuals are always present.

Table 4  
*Family Income Levels and Codes*

<table>
<thead>
<tr>
<th>Family Income Level (Range)</th>
<th>Family Income Level Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>NONE</td>
<td>1</td>
</tr>
<tr>
<td>LESS THAN $1,000$</td>
<td>2</td>
</tr>
<tr>
<td>$1,000 - $2,999$</td>
<td>3</td>
</tr>
<tr>
<td>$3,000 - $4,999$</td>
<td>4</td>
</tr>
<tr>
<td>$5,000 - $7,499$</td>
<td>5</td>
</tr>
<tr>
<td>$7,500 - $9,999$</td>
<td>6</td>
</tr>
<tr>
<td>$10,000-$14,999 $</td>
<td>7</td>
</tr>
<tr>
<td>$15,000-$19,999 $</td>
<td>8</td>
</tr>
<tr>
<td>$20,000-$24,999 $</td>
<td>9</td>
</tr>
<tr>
<td>$25,000-$34,999 $</td>
<td>10</td>
</tr>
<tr>
<td>$35,000-$49,999 $</td>
<td>11</td>
</tr>
<tr>
<td>$50,000-$74,999 $</td>
<td>12</td>
</tr>
<tr>
<td>$75,000-$99,999 $</td>
<td>13</td>
</tr>
<tr>
<td>$100,000-199,999 $</td>
<td>14</td>
</tr>
<tr>
<td>$200,000 OR MORE $</td>
<td>15</td>
</tr>
<tr>
<td>{MISSING}</td>
<td>98</td>
</tr>
</tbody>
</table>
Figure 1: A comparison of fixed effect across models

Figure 2: A comparison of random effects across the models
Figure 3. An illustration of how students are distributed across different urbanicity levels.

Figure 4. A graphical illustration of level-1 equation with family income (FAMILY_I) predicting mathematics scores (MATHSCOR).
Strengthening Identity Through Policy: On Cree Language and Culture Revitalization

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Maskwacis, Alberta
Canada
Ph.D. Student
University of Alberta
a) Introduction:

The topic of Language Learning for Canadian First Nations is very important to address, because the Cree people are not using the language. UNESCO’s Language Vitality and Endangerment framework establishes six degrees of vitality/endangerment based on nine factors. According to this framework, the Cree language of the Cree nations in Canada is characterized as “vulnerable” to total loss (United Nations Educational, Scientific and Cultural Organization, 2010). The pragmatic policy approach supported in this ethnographic history critically engages with political events that affected the First Nations in Canada and focus on the policy needed to address Indigenous issues in Canada. To illustrate the imperial intentions of policy affecting First Nations in Canada, the topic of indigenous languages has a historical context to address. The need to understand natural law and Indigenous Worldview will be shared. A decolonial framework will be used to describe the discourse between Indigenous Nations and the Canadian Government. A bilateral agreement is the governmental tool needed to strengthen the relationship-building with First Nations. The tensions that arise along this process of policy are real and must be addressed to attain strategies for language learning in the Canadian education system. The purpose of this policy proposal will be to find out what is causing the language loss among students in Cree nations and to increase support for Cree language revitalization in the Canadian education system. I argue that if Canadian education systems are committed to decolonization, reconciliation, language revitalization, and seeking truths they should offer language revitalization as a priority in the language policy presented by the Government of
Canada’s department of Canadian Heritage Foundations’ newly revised Indigenous Languages Act.

Positionality as a researcher and as an Indigenous Scholar:

The community of Maskwacis runs the risk of losing the language, traditional ways of knowing and identity essential to being Cree. Because of the lack of language education and the lack of the Maskwacis Plains Cree language, the early Christian communities in North America formed an alliance with strong Cree speakers. The Church learned the language but not the traditional ways of knowing. This led to a lack of traditional values within the home fires of the families in the communities of Maskwacis Cree Nations over time. Without a sense of belonging, the Cree sought refuge elsewhere—to increase a sense of connection to the language. Local gangs and acts of violence towards one another are problems. A sense of hopelessness runs rampant through indigenous nations across Canada. To define the issue in relation to education and learning, it is important to examine issues with the literature used for guiding educational practices. Indigenous issues across Canada are unique and understanding the issues requires applying unique frameworks and methodologies. Indigenous education, for instance, requires the implementation of traditional thought processes inherent to indigenous ways of knowing. I will start by elaborating on my perspective as an Indigenous educator.

First and foremost I will address the value of wakotowin (family). Indigenous children and the indigenous nations are guided by our elders, because of their expertise in the value system of natural laws. The late Chief Wayne Roan Sr. of the Mountain Cree and Earle H. Waugh of the University of Alberta together worked on understanding and
sharing the indigenous knowledge of Nature’s Law, in 2004, in the document “Understandings Held by Indigenous People; Focusing on Alberta’s Heritage Peoples: Anishnawbe, Assiniboine, Beaver, Blackfoot, chipewyan, Cree, Dakota, Dene, Dogrib, Kainaiwa, and Tsuu T’ina” (Roan & Waugh, 2004). I locate myself as a grassroots person from the Louis Bull Tribe in Maskwacis, AB. I acknowledge the Foundations of Nature’s Law and their critical importance to:

1. Understanding the Indigenous Worldview
2. Understanding Indigenous Knowledge

The outline of a content summary of ‘Nature’s Law’ Understandings Held by Indigenous Peoples pertains to legal systems that affect Indigenous nations in Canada, though it only scratches the surface. I suggest the legal system because Canadian policy is written for Indigenous people. I address the significant differences in the Indigenous understandings of law with a Cree worldview.

“This clearing of the ground will demonstrate that, while history does help in comprehending Indigenous law (in this report we use the words “Indigenous” and “Indigenous” more or less equivalently), for Indigenous peoples that law was based upon certain intuitions about the cosmos, the world, animals and the humans that we can only designate by our word “natural,” despite its inadequacy. The social devotion to this “nature” constituted the foundations for Indigenous law.” (Roan & Waugh, 2004).

An interview conducted with a Cree elder, the late Wayne Roan Sr., explains how to mobilize Cree cultural teachings and why the church stopped learning the Cree language. It was not an education system used to support learning for an Indian child. It
was a system for taking the Indian out of the child through laws not governed by Indigenous ways of knowing:

“Indigenous Peoples have long argued that despite an absence of formal codes of law among Amerindian tribes, a larger, comprehensive sense of law did exist, and it shaped life in much the same way as British Common Law has shaped legal life in Canada. Together with trans-tribal social mores, political agreements such as treaties, religious ritual and myths about the common source of all life, and the myriad details of everyday responsibility, these elements point to and affirm the existence of a truly all-embracing legal consciousness. Indeed the Cree had a phrase Kihchi weyasosewin kisipikaskamihk (literally, the ultimate, all-over-the-World-Law).” (Roan & Waugh, 2004).

Roan stresses the relevance of race and race culture in his explanation of the Cree conception of “natural law”:

“ This is the reason why we have an elder to tell us the teachings of our culture. They have to have the stability, understanding and the training. But, by the time you are old, you earn the white hair and this means wisdom; then, you have something to say and this is when you are ready to do these things that were taught to you. Nowadays, it is not that way, the white takes their church wherever they may travel; whereas, the Indian earns it. The white makes their own laws on what goes to them; where the Indian seeks the laws in a natural law and in what they see and to talk, these are under the natural law. An Indian has a wide road to follow; whereas, the whiteman’s road is narrow and this is when they go overboard. THIS IS THE DIFFERENCE. Also, the white man’s church, it says,
“Thou shalt not” and in the Indian law, we say “This is the right way”. (Roan, 1989).

This is the example of the different perspectives on the topic of education policy, because it is a control factor for all Indigenous education systems in Canada. The traditional knowledge, Indigenous education system, and value system are all embedded in the Cree language. So the disconnection between language learning is not applied through the use of policy. The language learning is applied through a guided order of teachers who live in a good way within a spiritual connection to the Cree language. Therefore this connection supports the identity of indigenous ways of knowing with the individual, family and community.

Second, in the policy guided by the federal legislation, is about Indian control of education. The control to educate the indigenous peoples of Canada started with the renowned and well known Indian residential schools, by which elders across the country have been impacted. The loss of identity started in the education system by euro-colonial educators. Former students of residential schools have spoken of horrendous abuse at the hands of residential school staff: physical, sexual, emotional, and psychological (2009, FNSP). The abuse issues led to shame and abandonment of the language and Indigenous traditional knowledge for the Maskwacis Cree People. Alcohol and drugs are an epidemic on the reserves and on indigenous nations and lands. Addiction issues continue to affect individuals, families, communities, and nations that lead to broken families, lack of parenting skills, and educational learning levels at extreme lows. There is a great concern for the lack of higher levels of learning achievements on-reserve education systems. Acknowledging the issues pertaining to
the levels of identity loss is only part of the solution to confront the government on how
to help with healing programs and initiatives. The healing programs must include the
territory of Treaty six, as well as gaining permission to increase support for healing on
the lands through ceremony and education land-based learning. The political context
must be addressed to gain approval from the federal government legislation. This is not
an easy task with the multi-dimensional systems that are in place within legislative
parties.

Indian residential schools operated under the guise of helping to educate the indigenous
children of the country but their real function was hardly to educate. The Indian
education system from a federal perspective continues to support the approach of local
control of education with limitations, because of the Federal government's obligation to
take care of Indigenous issues. Education is also included within the numbered treaties
of Canada.

Third, I position myself as a Cree person with grassroots from Maskwacis, AB. As a
researcher and scholar my philosophical understanding resides within our ethical and
spiritual space of Cree Natural laws. I attempt to position myself alongside our elders in
my views on indigenous children learning within a system of colonial education and how
the control of education has distorted an indigenous lens because “evidence-based
policies and practices have been used to marginalize indigenous bodies around the
world, particularly through forced cultural assimilation, theft, and the plundering of
indigenous land (Shiva 1995; Smith 1999)” Shahjahan (2011). This means evidence-
based education proponents are unknowingly perpetuating a colonial discourse. The
understanding of colonial discourse has evolved to seek the elders’ advice of who I am
as an Indigenous thinker, educator and knowledge seeker of Indigenous ways of knowing. I will refer to the elders interview I have been guided to use, before he started his journey onto the next life. In the interview, the late Elder Wayne Roan Sr. explains how unique indigenous peoples are:

“When you want to learn the truth about God’s Law, you have to live with it every day. It does not contract you, it does not mobilize you and it does not make you a hypocrite—it does not give you this narrow road that makes you into a hypocrite (whiteman take their church wherever they go). These people never give themselves a chance to look at what’s around them.”

Roan (1989).

I use this interview excerpt, not to get into trouble but to seek attention for critical indigenous inquiry and thought. I use this interpretation because it is difficult to understand how the dominant structure of policy acknowledges a responsibility to care for, educate and support indigenous nations of Canada, yet the children are forced to be in that space under both federal and provincial legislation because the Indian is the responsibility of the Crown. The British Queen of Canada explains she is our mother, and it is law. This is why I believe education and learning gets messy and is mired in contradictions. Elder Roan states that we cannot operate as indigenous peoples under a foreign law because this law is not indigenous law, it is not natural law for the indigenous peoples of Canada. It will never be true traditional indigenous knowledge education. “And it is here in the Western Hemisphere that the knowledge still remains intact. Of how we are to walk in peace and harmony with the Creation, that knowledge was here before the strangers came and it is here still.” -Art Solomon, “What we say we
are,” in Songs for the People; Teachings on the Natural Way (1990).” (Roan & Waugh, 2004).

The Treaty is the process protecting inherent rights and autonomy for indigenous education systems. The numbered treaties still have control over indigenous education at the local level, and the federal government calls it local control of Indian education...

b) Review of related and relevant literature about the social problem and previous approaches to the policy problem: A Brief History:

Canada’s Indigenous populations have been recognized at the international level by World leaders at the United Nations Organization. Through hard work, sacrifice, and determination, Indigenous leadership of the country of Canada has gained a voice of advocacy, self-determination towards self-governance, sovereignty, and human rights. This history of continuous fighting for the rights of Indigenous peoples has led to a national inquiry, then a national apology for the atrocities committed to the First Peoples of Canada. The support of the Truth and Reconciliation Commission’s calls to action brings forward the need to address a healing process needed because of the residential school era for Canada’s indigenous populations.

Mandate:

The truth and reconciliation commission of Canada set a precedent for the government to adhere to provisions set forth for indigenous nations across the country.

Education 6. We call upon the Government of Canada to repeal Section 43 of the Criminal Code of Canada. 7. We call upon the federal government to develop with Aboriginal groups a joint strategy to eliminate 2 | Truth and Reconciliation Commission
of Canada educational and employment gaps between Aboriginal and non-Aboriginal Canadians. The new legislation would include a commitment to sufficient funding and would incorporate the following principles:

i. Providing sufficient funding to close identified educational achievement gaps within one generation.

ii. Improving education attainment levels and success rates.

iii. Developing culturally appropriate curricula. iv. Protecting the right to Aboriginal languages, including the teaching of Aboriginal languages as credit courses.

v. Enabling parental and community responsibility, control, and accountability, similar to what parents enjoy in public school systems.

vi. Enabling parents to fully participate in the education of their children.

vii. Respecting and honoring Treaty relationships. 12. We call upon the federal, provincial, territorial, and Aboriginal governments to develop culturally appropriate early childhood education programs for Aboriginal families. (Truth and reconciliation, p. 1).

Treaty obligations and acknowledgment of the historical treaty rights will increase the process to support the strengthening of indigenous languages.

This issue must be written formally to the federal government so communication is passed and processed at the bi-lateral governmental agreements within the treaty six territory. The non-government organization that will support this process is known as the Treaty six office, located in Edmonton, AB. The international treaty office, which is located in Maskwacis will also be required to strengthen this development of language to have the Government of Canada acknowledge the Declaration of Indigenous rights.

"WE ARE CALLING ON YOU TO OPEN UP YOUR MIND, TO BE WILLING TO LEARN
THESE STORIES, TO BE WILLING TO ACCEPT THAT THESE THINGS HAPPENED. THIS IS NOT AN ABORIGINAL ISSUE, IT'S A CANADIAN ISSUE.” Wilton Littlechild, TRC commissioner, June 2015. The acknowledgment of this agreement would take precedence for teaching within the indigenous education school strategies. Elder Jimmy O’Chiese has his own outdoor classroom and lessons in Jasper National Park. He resides in Brule, close to Hinton, AB, and has sought out permission from Jasper National park to host and teach indigenous land-based pedagogy. O’Chiese spent four hours speaking with the New Trail team to share some of his teachings about Indigenous culture and history. The experience was miles from classroom learning — story-based and, unlike western-style teaching, there was no easy bullet-point list of take-aways. As listeners, we were challenged to delve into the stories and each pull out our own meaning — a first-hand demonstration of teaching and learning in an Indigenous way (P. 22 UofA alumni).

Indigenous peoples in Canada have been largely subject to policies done to them rather than with them. Based on history and the acknowledgment of the residential school era, it is pertinent in all education programs in Canada to address the assimilation tactics to heal from the language genocide. These colonial tactics to assimilate Indigenous children of Canada led to the loss of identity for Indigenous peoples across the country. Indigenous peoples were unable to create any political agendas, let alone negotiate because treaties were not recognized at a political level. This started more at the cost of Canada when Prime Minister Trudeau announced an implementation to the white paper, in 1969.
“In 1969, the government of Canada introduced a White Paper on Indian Policy, which called for the removal of the Indian Act, the transfer of reserve lands to individuals, and the removal of the federal government’s fiduciary duty. It was regarded as the final instrument in the long-standing policy of Indian assimilation. Indigenous leaders vehemently opposed the imposition of the White Paper recommendations as they believed the recommendations would result in significantly worse living conditions that those that existed in the era that followed the Residential School debacle. Confronted by Indigenous opposition to the White Paper from coast to coast, the federal government withdrew the initiative in 1971, replacing it with “Core Funding Program” - supplying indigenous groups with resources to promote their causes through research, publication and legal action”. (Indigenous Corporate Training Inc [ICTI], 2014)

In the late seventies and early eighties, a political coalition was formally formed by the treaty nations within the treaty six territories. This coalition was formed and the organization called itself the Indian association of Alberta. That later included Treaty seven and eight leadership. It was during this time a strong political statement was made on behalf of all Indigenous nations of Canada. At the same time at a National level, the National Indian Brotherhood was formed with help of the late Gorge Manual. Addressing the moral relativism to the networks of power and operation by lobbying the Government of Canada to acknowledge the need to recognize the human rights of the indigenous nations in Canada. “They make all sorts of commitments, but they don’t live up to them” (1972, Ernie Simpson). The topic of Indigenous coalitions and meetings did take place as far back as before the signing of the Treaties, because the “relationship
with the people of the nation chose the Chief who gathered and sought advice from the elders” Roan (2006). These chief and warrior meetings took place in our oral stories that have been passed down for generations. It would be now the sixth generation with me in my years on earth when hearing our elder’s stories about meeting with other nations on how to explain that we are just as human as any other peoples of the world. My late grandfather spoke in a concerned voice and would stare at me with worry in his eyes. “I believe that Aboriginal students engaged in conflict and identity politics would benefit from developing a critical race analysis to provide both Aboriginal students and their advisors with knowledge to understand and potentially challenge the effects and processes of racialization that have historically, legally, and politically divided Aboriginal communities and families.” (Denis et al., 2007).

The response to the 1969 White Paper was called the Red Paper when the Indian Association of Alberta presented it as the Citizens Plus (the Red Paper). “It marked a significant watershed moment in the history of Indigenous leaders fighting on behalf of their nations for their land and recognition of their rights.” (Joseph, 2020). The response also represents that the wrath of the White paper elicited was formidable because it included acknowledgment of the “Citizens Plus”. “Indians should be regarded as “Citizen Plus”. “In addition to the rights and duties of citizenship, Indians possess certain additional rights as charter members of the Canadian community” (Joseph, 2020). This argued for integrating indigenous peoples into mainstream society with a special acknowledgment of citizenship. This included but not address immigration status. If not without research, how would education systems and or organizations understand this
historical intersectionality for identity issues that indigenous peoples have gone through? Additionally, to address the most important issue of the treaty, the Indigenous leadership understood that the White Paper included this statement:

“In a “just society”, all Indians would be “equal” to other Canadians i.e. the distinct legal status “Indian” would be eliminated, the Indian Act would be repealed, all treaties would be voided, ownership of the land would be transferred to Indian individuals, and the Department of Indian Affairs would be dismantled.” (Joseph, 2020).

It is through honoring our past leadership that the intelligence and thankfulness of their strong voice were heard and demonstrated the strength of the leaders before that. The main point here is that since 1876 from the signing of the treaties, Indigenous peoples have had to negotiate, address and fight for their rights to the land and for their identity of nations to strengthen their connection to the land since settlers have arrived on turtle island.

The Red Paper again was a response to the Prime Minister of Canada with the Citizens Plus from the Indian Association of Alberta Chiefs and leadership. The Indian Association of Alberta was a political coalition grouped by elected members of the Tribes in Alberta. The organization was formed well before any elected representatives were allowed to address the government of Canada. The organization is proof that Indigenous nations have always had their form of self-government and are organized through traditional governance laws of Indigenous knowledge through natural laws. The Liberal Government did acknowledge this Red Paper, “Confronted by Indigenous opposition to the White Paper from coast to coast, the federal government withdrew the
initiative in 1971, replacing it with the “Core Funding Program” – supplying Indigenous
groups with resources to promote their causes through research, publication and legal
action.” (ICTI, 2014). It is still with supporting documentation that resisting and
challenging oppression uncovers and creates the space that indigenous education
needs to reclaim and assert the importance of values to live in a good way. “This notion
of narrative research is also more reflective of Indigenous communities’ way of relating
to "knowledge." The importance of stories and one's life experiences and the effort to
make sense from these, both individually and collectively, is still highly valued with
Indigenous communities as ways to know and understand ourselves and the world
(Cajete, 1994; Kawagley, 1995; Smith, 1999).” (St. Denis et al, 2000). Being successful
and walking in our moccasins, our aim is to be able to work towards language learning
and identifying reasons to be successful in those places. The narrative thus involves
walking in a good way and supporting relationship building. It starts with teaching the
student the importance of indigenous knowledge and Cree identity.

c) Specification and structuring of the policy problem (researcher’s problem definition);
In the structure of the policy problem, racism is built into past policies because the
subject notion of power emanates from the imperial order of government. Theory of
power and knowledge of power will involve governmentality: positions for subjects to be
governed. In Canada, this is the Indian Act that historically is attached to the numbered
treaties. “From the beginnings of human thought, public policymaking has been a
central subject for study and discussion by social philosophers and practical politicians
alike. Their writings include many moving exhortations, profound insights, fascinating
descriptions, and stimulating ideas that not only are of much theoretical significance, but
also have been of great practical import in shaping contemporary policymaking.” (Yehezkel, p. 73). The advantage of seeking explanations from the historical narrative of political agenda-setting by the imperial government allows theory to open new doors of learning and understanding for those who are in subjective positions of power relations. "By virtue of being subjected to this juridical function of law, the productive function of power at an official and personal (physical) level acts to construct and define subjects in terms of particular identities. Foucault divides theories of governmentality into two types, the social contract model in which individuals agree to give up certain freedoms in order to benefit from banding together, and the notion of ‘divine’ or ‘natural’ law that suggests that the law existed prior to the formation of society” (Danaher, Geoff, Schirato, Tony and Jen Webb (2000), Stewart-Harawira, (2005)).

The functions of law are produced by the histories and can be challenged. “As such, Foucault argues, rather than being the originator of the rule of justice and reason, the law works to cover up the acts of violence that are so often part of the establishment of communities and which involve the contracting in of certain groups and the contracting out of others”(Danaher, Geoff, Schirato, Tony and Jen Webb (2000), Stewart-Harawira, (2005)).

Control of Indian Education by the indigenous nations of Canada could pave the way to a future of self-determination, and its mere possibility could force policy makers to determine whether Indian education is an issue of sovereignty or jurisdiction. It appears to be a “Catch 22” situation, because of the Federal responsibility obligated by the Queen. If the indigenous community wants the federal government to relinquish control
over Indian education, the government retaliates by asking for its release from fiduciary responsibility, ex, from all federal funding for Indigenous education.

“The premises about progress and agents in the philosophy of consciousness is one of the major challenges posed in current debates about social and educational theory. In a wide band of intellectual work called “the linguistic turn,” there has emerged a focus in research on the constitutive role of knowledge in the construction of social life. Our interest here in the linguistic turn is to explore a specific scholarship that both focuses on the relation of power, knowledge, and change, and historicizes the problems of “knowledge.” We call this twofold interest “social epistemology.” Popkewitz, T. S., & Brennan, M. (1998).

Provincial government used for trilateral agreements with First Nations In Canada: The provinces in Canada use the Multicultural language act to address second language learning in education. The provincial government steps in and sets the agenda for supporting multiculturalism in language learning education. Now this formula causes chaos for all levels of government. The multi-layer dimension of governing laws for Indigenous peoples by the Canadian government entails the need for a critique of past or post-colonial discourse analyses. The theoretical approach will include the need to address a critical indigenous methodological approach when seeking truth of power and relationships within Western Government systems. Indigenous scholars around the world have set a precedence to address an approach of Critical indigenous education research centered around the indigenous ways of knowing (really about a privileged sight, of seeing two worlds and understanding different systems of knowledge). “In addition, by anticolonial thought, I incorporate perspectives of indigenous scholars (e.g.
d) Specification of policy research model:

The policy-making process is very tenacious when dealing with Indigenous peoples. First and foremost we must acknowledge within the policy-making process that the Treaties were there for specific reasons in a colonial lens. That is to fully assimilate the Indigenous peoples within colonial laws and that included the education system. Not acknowledging that the First Nations have had their education system in place since the time of the first peoples on the land. So this policy research model that I will refer to is the narrative theory for Indigenous peoples. It is a narrative approach that indigenous nations speak of during the laws transferred to the peoples. Life and research is a ceremony, but there is no model to depict the eclectic dynamics of situating policy in western knowledge systems. The closest but limited model would be a reference to the normative theory of the policy cycle model of the policy process.

This process includes the styles of policy behavior in the policy cycle. This cycle is governed by the state who represents the governmentality of how systemic behaviors work. This approach is written by Micheal Howlett and Sara Guist. The article “The Policy-making process” best describes the styles of policy behavior in the policy cycle, which includes: Agenda-setting, Policy formulation, decision making, policy implementation and styles, policy evaluation styles, and policy development as policy style. Again this is an approach that the governmentality has when implementing policy for support of the works of the Western knowledge system throughout several stages.
Agenda-setting is the systemic or unofficial public agenda and the institutional or formal, official agenda. “In the third type of agenda-setting, inside initiation, influential groups with special access to decision-makers initiate a policy and do not necessarily want it to be expanded and contested in public. This can be due to technical as well as political reasons. Entrance is virtually automatic due to the privilege place of those desiring a decision.” (Howlett & Guist, 2013).

*Future State:*

**Set the strategic context: Construct the Alternatives: Wiyasta kitak kiwaya**

*Mesc host: The basic strategy is regulatory traditional language learning, developed and delivered in the education system for the Maskwacis Cree tribes. The epistemologies will continue the sacred knowledge to be presented within a holistic approach. The holistic approach will introduce basic land-based knowledge and include the ontological ways of balancing the oral narratives that accompany the learning. Within the education system there will be prescribed language learning for the educators to be subsumed in the Cree language learning.*

e) Establish the researcher’s evaluation criteria and mode of application:

The Federal Government of Canada and the relationship between the Indigenous peoples of Canada is binded through agreements made in the numbered treaties. The bilateral relationship is between the department of Indian affairs Canada and the First Nations, Metis and Inuit peoples. Each nation is identified by a number, for example the Louis Bull Tribe is recognized by the federal government as 439. Each status First Nation is acknowledged within the numbered treaties with a membership code. These codes are presented and accepted through band council resolutions in each residing
nation. The elected representatives follow the Indian Act in each nation and can create policies that are managed by the nation's leadership.

Motivation: Language and culture 13. We call upon the federal government to acknowledge that Aboriginal rights include Aboriginal language rights. 14. We call upon the federal government to enact an Aboriginal Languages Act that incorporates the following principles: i. Aboriginal languages are a fundamental and valued element of Canadian culture and society, and there is an urgency to preserve them. ii. Aboriginal language rights are reinforced by the Treaties. iii. The federal government has a responsibility to provide sufficient funds for Aboriginal-language revitalization and preservation. iv. The preservation, revitalization, and strengthening of Aboriginal languages and cultures are best managed by Aboriginal people and communities. v. Funding for Aboriginal language initiatives must reflect the diversity of Aboriginal languages. 15. We call upon the federal government to appoint, in consultation with Aboriginal groups, an Aboriginal Languages Commissioner. The commissioner should help promote Aboriginal languages and report on the adequacy of federal funding of Aboriginal-languages initiatives. 16. We call upon post-secondary institutions to create university and college degree and diploma programs in Aboriginal languages. 17. We call upon all levels of government to enable residential school Survivors and their families to reclaim names changed by the residential school system by waiving administrative costs for a period of five years for the name-change process and the revision of official identity documents, such as birth certificates, passports, driver’s licenses, health cards, status cards, and social insurance numbers. (Truth and reconciliation, p. 2).
f) Specification and application of the policy analysis proposal:

The federal government funds research. The language research should be treated as social care, revelatory and beautiful, because it involves the value of respect. To respectfully build on relationship building. Language learning will be a community-based approach with inquiry and not judgement. The research will involve asking each other questions and trying to understand more about each other. It will require being brave enough to represent, advocate for and offer something new. When you have a legal contract that is binding, all data is shared and nothing is published without that sharing. This is a different way of doing funded research. It is about the attitude brought back towards love, on a cellular level for healing towards health and wellness.

h) conclusion:

These are my personal views on turning conversations into collaboration. This is my story, Acimowihta, with the inevitable ending: anihi tamiya kishtahk. Nitsiykason osawamostosiskwew, ohci niya kisipatnahk. Niya nehiyaw ekwa niya nistoteyan neheiyawewin. My name is yellow calf woman, I am from the Louis Bull Tribe. I am Cree and I understand the Cree way of life. I was raised in a traditional home fire with fluent Cree speakers. Teaching us as children who we are and where we come from. As I grew older, I attended town school instead of the residential school located in Hobbema, now known as Maskwacis. My mother was a teacher in these schools and did not like that tradition was not carried on in the education system. Nevertheless, she abided by the euro-colonial system and supported us as her children to go seek learning by euro-colonial educators in the nearby town of Wetaskiwin. My
parents’ decision was predetermined by our elders in the community. As it was told to
them that our children must learn the ways of the White people in order to survive. The
elders also told her that we would never be seen as equal to white people, we would
never have their privilege, but in order to learn the ways of the white settlers we would
have to teach our children how to think and write like them, so when we can gain
sovereignty of our land, language and way of life, our children will know how to preserve
nehiyawewin.

For indigenous peoples to attain identity, the identity of indigenous peoples must be
acknowledged through the indigenous language, as well as through a connection,
mediated by this language, to the land. Policy discussed in this document highlighted
the importance of acknowledgement of the critical indigenous methodologies of
positionality with the acknowledgement of natural law. Policy is about governmentality
and how it has been conceived historically. As educators we should know our history
and ask ourselves, “What have I done to improve this?”. “The various modes of critical
inquiry endeavor to understand, for example, how the marginalization of people is
constructed and the various forms in which power operates.” (Foucault, 1991b, pp. 11–
12).” Popkewitz, T. S., & Brennan, M. (1998). Language revitalization is one of the most
prominent agenda items discussed, because it is passed due for Indigenous
populations. There is a pressing need to strengthen and support the revitalization of
indigenous languages in the country. This policy proposal only touches the surface of
the contentious relationship between Canada and the Indigenous Nations of Turtle
Island. The Cree worldview presented throughout this paper supports documentation
and legal parliamentary statutes, notes challenges that linger from past relationship-
building efforts and highlights the challenges of building stronger relationships between the Indigenous Peoples of Canada and the State today, for the sake of language revitalization. The incorporation of government policy implementation strategies with the Department of Indian Affairs Canada can strengthen the capacity for language revitalization in First Nations in Canada. This building and strengthening of indigenous languages will enable reform and suggest the structures in Canada that will best communicate success stories of revitalization strategies and identity connections for indigenous students. The purpose of this policy proposal highlights the need to find out what is causing the language loss among the students on First Nations in Canada. It stresses the need to increase support for Cree language revitalization in the indigenous education system. I argue that if indigenous education systems are committed to a decolonization, reconciliation, language revitalization, and offer language revitalization as a priority in the language policy presented by the Government of Canada’s department of the Canadian Heritage Foundation’s recently revised indigenous language act. This Act can be strengthened for First Nations in Canada by adopting the Act in the list of priorities in the Department of Indian and Northern Affairs Canada.

Appendices:
The Use of Ceremonials for Jurisprudence:

The confidence to address problems through ceremony, then, arises out of the conviction that all reality was interconnected and spiritual. Nature’s Law could only be addressed using the ‘language’ of Nature…ceremony. There is no place for our notion of luck, as an unconnected occurrence, here. Nature’s law held that all acts in the world were significant, and that one had to ‘read’ them to interpret what truth there was there. It assumed that one had no prior ‘knowledge’ about some things that happened,’ and one had to ‘find out.’ Finding out was first and foremost an exploration of the collective knowledge of everyone available. The only authoritative means of doing this was through a ceremonial structure, which itself was seen to be derived from Nature’s own character. We can see this by noting the following statements of Ceremonialist Wayne Roan and other Cree Elders at the Mountain Cree Retreat:

For the Cree, everything came from nature’s laws. To ignore these laws would surely mean suffering and deprivation, if not death. To not be properly trained, to not know how to live in the world, was to perish. Many Indians believed, and still believe, that the incoming of Europeans survived because of the Indians’ knowledge of these laws. The laws of the land, that is, nature’s laws remain the ultimate governing force. The Indigenous person understood that he came from these laws, that he was part of these laws, that all things were related to them and had a purpose. He also understood that what is created on earth is what gives you life and that each season offers up and
prepares you for the next. Hence, in Cree tradition the ceremonies follow nature’s rhythm because that is nature’s true way.

The natural law was present in all aspects of life, from everyday activities to the rhythms of the cosmos. This law was seen to be expressed in regular patterns in the universe, and the land. For example, the Cree understood that much of the cosmos was organized into series of fours:
* four forms of life (plane, insect, animal, human);
* four directions (east/west, north/south);
* four seasons (spring, summer, fall, winter);
* four elements (earth, fire, water, and wind);
* four stages of life (child, youth, adult, elder);
* four gifts (to listen, to see, mobility, and speech);
* four steps in human learning (fear, understanding, respect, and ultimately love).

Nature’s law had a direct impact on Cree social life because two principles were held to be uppermost in human life: interconnectedness or the relationship of all existing things, and a balance between all forces that existed. (Wayne Roan et.al. Cree Oral Tradition, Mountain Cree Camp, 2002)

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Title of the submission: A Narrative Inquiry Based on Teacher Experience with The Learning Through Storytelling Curriculum

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Abstract

What can curriculum do? When faced with a global pandemic, lockdowns, and virtual learning, I began working with Roger Thurow and the Hunger Solutions Institute to create an ELA curriculum focused on hunger in 2020 called Learning Through Storytelling. Through the narratives of hunger that Thurow tells in his books and in the Wall Street Journal, I wanted to explore more about the story of hunger and how the use of stories could influence the work of teachers in a tumultuous moment in history. Not only this exchange of stories, but also the stories that teachers and students might put together after participating in the curriculum as well as how could we collectively meet the needs of our students. To do this, I implemented narrative inquiry methods to answer the questions, in what ways do 9-12, public school teachers describe their community’s story surrounding hunger? and how do 9-12, public school teachers report the experience of teaching curriculum within the current context? I conducted semi-structured interviews as well as guided, weekly journal prompts to collect data on how teacher participants used LTS as a curriculum to address hunger.

Keywords

Curriculum, Hunger, Sustainable Development Goals, English Language Arts

Introduction

In 2020, the COVID-19 pandemic crossed all borders of countries, financial means, socio-economic levels, race and ethnicities, and any other distinguishing factor, interrupting much of what often characterizes the ways in which we live our lives as well within education how teachers often label students. The effects of COVID-19 on education and hunger have been devastating and far reaching, and teachers and students have been at the forefront of many of the social issues associated with the pandemic. Students have been rotated between in person and virtual learning, many students who once relied on free and reduced priced lunch have had to adjust to school closings, and in an instant many students
lost meal options which they previously relied on as their main source of nutrition. Teachers have also taken on many more responsibilities while also balancing their own needs with home and family. Along with rising costs of food as well as specific shortages, hunger has skyrocketed in developed nations, along with famine levels in conflict torn areas around the world such as Ukraine, Afghanistan, Ethiopia, Haiti, and Syria. Food systems are being tested worldwide, particularly in the United States where hunger is not often prioritized as a pressing issue. However, according to the World Food Programme, 370 million children missed school meals because of school closures related to the pandemic, and 73 million vulnerable primary school aged children need school meals (World Food Programme, 2020). A seemingly mass exodus from the teaching profession itself has occurred, in fact, recent studies report that there are “36,500 teacher vacancies in the nation… and more than 163,500 positions filled by teachers who aren’t fully certified or are not certified in the subject area they are teaching” (Will 2022). Furthermore, nearly 110,000 restaurants closed in 2020, losing 2.5 million jobs, and sales fell by $240 billion (King 2021). Shortages at once abundant grocery stores became a common scenario in which necessities were limited per family, shelves of toilet paper and cleaning supplies remained empty, and prices of food, particularly meat increased. Lines at food banks and food pantries continue to grow as what seemed to be a system of abundance and security is crumbling before our eyes. One might ask, is this necessarily a good or bad thing? Some say, “if we get this right, the world will never be the same” and I hope that is what we will do in response.

At the center of this context are students and teachers in the classroom across America and around the world who are now faced with quite a few problems. While also confronting the challenges of adolescence, the education community is now faced with the problem of what will we eat and how best to follow guidelines for social distancing, masking, and quarantining. As difficult as the pandemic has been for all walks of life, teachers and
students have been presented with a context that is unlike anything many of us have experienced and continues to impact a world that will forever be changed. Teachers have adjusted between online, in person, and blended learning options losing quality time resulting in an overwhelmingly bleak Nation’s Report Card suggesting no gains, some states stayed the same, but most states declined in both Reading and Mathematics (Nation’s Report Card 2022). While many controversies pervade schools currently, hunger is a constant and underlying problem for almost all students as well as many correlating issues. However, hunger is not particularly dominating the discourse within educational contexts, even while several studies document this increase (Asfaw, et al. 2020; Bauer, et al. 2021) as well as credible research organizations such as the World Food Program and Feeding America. Hunger within the context of English education remains a gap with potential to influence the English education field and the current narrative that dominates discussions of the “new American norm.” The question then emerges, what type of new American norm do we want to create, and what sort of literacy practices might students need? What might we do differently to directly address hunger? And how do we move on to a better world for our students?

**Research Questions**

1. In what ways do 9-12, public school teachers describe their community’s story surrounding hunger?
   a. What does hunger mean to participants?
   b. What does hunger look like in 9-12, public school teachers’ context?

2. How do 9-12, public school teachers report the experience of teaching curriculum within the current context?
   a. How might participants imagine hunger impacting their students and communities?
b. How do 9-12, public school teachers believe that hunger does/doesn't relate to teaching?

What is Learning Through Storytelling?

The Learning Through Storytelling (LTS) curriculum is a secondary ELA curriculum focused on hunger. It is a curriculum that is based on the storytelling of journalist, Roger Thurow based on his books, *Enough, The Last Hunger Season*, and *The First 1,000 Days*. I worked on the first iteration of an online undergraduate course that is offered to students as part of my first assistantship at Auburn Online. For my dissertation, I have created a version for high school students and a CEU course on Canvas for teacher participants. In the Google Classroom, there are six units of the course, the first three units center hunger on a global level, including history and policies in *Enough*, smallholder farmers in *The Last Hunger Season*, and mothers and children in *The First 1,000 Days*. The second half of the curriculum narrows in on the local level, through lessons on planetary health, hunger in America, and student actions projects. Each unit builds on the next with stories from the books, mentor texts, and various types of writing throughout including quick writes, debate topics, poetry, photovoice, reflective essays, and more. Each unit includes an “inspiration station,” which centers on a real-world hunger fighter as well as a “teacher to teacher,” which shares tips from other educators who have already taught the books or similar topics.

Storytelling as an ELA Curriculum

Learning Through Storytelling is the name of the curriculum because it centers on the experience of teachers and the exchange of stories by teaching the books and creating action projects based on the curriculum. All three books are written in a narrative style, centering the history of hunger in *Enough*, smallholder farmers in *The Last Hunger Season*, and mothers in *The First 1,000 Days*. The overarching objectives are that participants will learn through storytelling, generate good outrage, incite inspiration, connect characters in the
books to real emotions and faces, augment teaching about hunger, find their place in the fight against hunger, as well as enlighten and spark empathy. Standards and objectives are aligned with Common Core science literacy and language arts standards, the agriculture, food, and natural resources standards (ASFNR), and the sustainable development goals (SDGs).

Students will be able to use English Language Arts and literacy skills to read and analyze multimodal texts as well as to create these themselves. Unit One is based on *Enough Why the World’s Poorest Starve in an Age of Plenty* in which Thurow and Kilman (2009) describe stories around the world which present policies and subsidies that have led countries into malnutrition and famine. In the next two units, students and teachers focus on the stories of people such as Leonida, Rasoa, Zipporah, and Frances in *The Last Hunger Season* for unit two and Shyamkali, Maria Estella, Jessica, and Brenda, in *The First 1,000 Days* for unit three. In unit four, More than Enough: Nourishing and Saving the Planet, Our New Gordian Knot, students will grapple with the current challenges of food shortages and food insecurity by participating in the Goals Project and Project Kakuma, as well as students will immerse themselves in data-based questions with topics such as managing water, girls leading, and agricultural innovation. In unit five, students will focus on Hunger in America (The Oxymoron of Hungry Americans), in which students will engage in exploring what factors have allowed hunger to continue within an abundant America. Lastly, students are called to action in Lead the Way: A Call to Action which includes six ways that students and teachers can engage in raising the clamor surrounding hunger, including gardening, poetry writing, creating a video, writing an essay like a journalist, creating a podcast, graphic novel, or comic book writing, community organizing, and developing a public service announcement. All materials are delivered to teachers through Google Classroom, along with a Padlet of additional materials, a Flipgrid of writing prompts for each lesson, a NewsELA binder of
selected current events on hunger, and a TED-Ed lesson based on Thurow’s TED Talk, “My Moment of Great Disruption.” Overall, the LTS curriculum consists of the following:

**Learning Through Storytelling Curriculum Units**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Name</th>
<th>Description</th>
<th>Example Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td><em>Enough</em> (History, Impact, and Current Situation of Hunger and Malnutrition — How hunger abides in the 21st century)</td>
<td>Students are introduced to Hagirso as well as the policies and history which have continued to increase hunger throughout the world.</td>
<td>Photovoice in response to Hagirso’s story, VR with places from the book, Why Care? discussion question</td>
</tr>
<tr>
<td>Two</td>
<td><em>The Last Hunger Season</em> (The Importance of Smallholder Farmers in Ending Global Hunger)</td>
<td>Students are introduced to Leonida, Rasoa, Zipporah, and Frances, four smallholder farmer families in Kenya and will learn how they survive through the hunger season.</td>
<td><em>The Last Hunger Season</em> Film Viewing Guide, Food Map, Food Narrative, Photovoice: take a picture of your own family meal</td>
</tr>
<tr>
<td>Three</td>
<td><em>The First 1,000 Days</em> (The importance of good nutrition for Mothers, Children, and the World)</td>
<td>Students are introduced to Shyamkali and Anshika in India, Brenda and Aron in Uganda, Maria Estella and Jorge in Guatemala, and Jessica and Alitzel in Chicago and will learn about the challenges of motherhood across the globe.</td>
<td>Acrostic poem writing, Famine Place Photo Essay, and Famine Series Guided Reading, Create an informational text about the First 1,000 Days for your community</td>
</tr>
<tr>
<td>Four</td>
<td>More Than Enough (Nourishing and Saving the Planet, Our New Gordian Knot)</td>
<td>Students are introduced to the topic of planetary health and the challenge of both nourishing and saving the planet.</td>
<td>Teach SDGs, Goals Project, Project Kakuma virtual interaction, Chicago Council White Papers/ Data Based discussion questions</td>
</tr>
<tr>
<td>Five</td>
<td>Hunger in America (The Oxymoron: Hungry Americans)</td>
<td>Students are introduced to the issues of hunger in America which have</td>
<td>Personal Wellness Plan, Food Waste Project, SNAP Budget Project,</td>
</tr>
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Conclusions

The more I studied this topic, the more I realized how much more could be done to combat the existence of hunger. The topic of hunger has tremendous relevance in our current environment in which hunger continues to increase. For example, The Global Hunger Index notes that 47 countries have ratings indicating “extremely alarming,” “alarming,” or “serious” levels of hunger, and forty-seven countries will fail to reach zero hunger by the UN goal of 2030 (Global Hunger Index 2021). On a local level, Feeding America reports that currently, 1 in 8 people in America face hunger or 38,300,000 people, and 1 in 6 are children or 11,700,000 children (Feeding America 2021). Hunger also seems to be a topic that few can honestly say should continue, as well as at the same time few can say they have not been influenced by in some way.

The story of hunger is remarkable as well because it is something we all experience, as we all eat, and I believe we could all do better to engage with topics surrounding the food supply. I have been amazed at the work that has been done to address hunger through the World Food Prize Laureates as well as activists such as Sophie Healy-Thow and business
owners such as Edezia nutrition’s, Navyn Salem. Even in what I have learned so far about participants, I am completely amazed to understand what people overcome as well as I am inspired by stories of people like Jessica in *The First 1,000 Days*, who desired to be known as an achiever rather than a quitter or Shyamkali, who when faced with the immensity of her situation in India, states, “Greatness? That was a luxury not worth thinking about. How many more children can we support?” I hope as well that through this curriculum, more people will know about the impact World Food Prize Laureates such as Gebisa Ejeta and Rattan Lal have had on their communities. To me, this represents the best of what I can convey to students in a time unlike many of us have experienced.

I am looking forward to continuing this study and believe the work in ending hunger and malnutrition is extremely important as well as it takes a collective community to address issues of students and teachers across the nation. Basing the curriculum on Thurow’s and my own international experiences, studying various aspects of hunger, particularly the role of policy, the experiences of women, and the oxymoron of hungry smallholder farmers, all will help to contribute to a sense of urgency as well as inspiration which will hopefully spur on more work to address hunger in our schools and communities. I hope this study will capture the experience of the teachers and the ability of the curriculum to do this work as well as to create a community across physical borders during a time of great division as well as criticism of teachers. I hope in doing this study I will be able to document our current environment in a way that demonstrates despite all the chaos, how many teachers came together and worked through these issues with their students. I hope it will give teachers and students an opportunity to document their experience through the action projects that are centered around SDGs as well. I hope my audience will gain a deeper understanding of literacy as well as the literacy practices that are embedded in all aspects of our lives. I hope it
might also inspire my audience to do the same type of work within their own communities with an online affinity space to collaborate, share ideas, and spread stories.

Acknowledgements

Thank you to the many additional members of my team, including but not limited to, Kate Thornton, Roger Thurow. Asim Ali, Shawndra Bowers, Katharine Brown, Ryan Schey, Chippewa Thomas, Daniel and Melanie Foster, and the Global Guides

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Keywords: (minimum of 3)
Introduction

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Conclusion

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We would like to thank all those who attended the 2023 Hawaii International Conference on Education. We look forward to seeing you at the 22nd Annual Conference to be held in January 2024. Please check the website for dates and further details.

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