

CITE

Critical Issues in Teacher Education

**Critical
Issues in
Teacher
Education**

**The Journal of the Illinois
Association of Teacher Educators**

Volume XXX, 2023

ISSN 2165-4913

CRITICAL ISSUES IN TEACHER EDUCATION

The Journal of the Illinois Association of Teacher Educators

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The purposes of the publication of CITE are to:

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2. Inform teacher educators about current research, promising practices, and significant issues concerning teacher education; and
3. Provide a forum for discussion of significant issues and problems in teacher education.

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The Effects of Fostering Body Awareness in Teachers:
Possibilities for Teacher Education

by

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Abstract

The purpose of this study was to examine the impact of increased body awareness on the practice of five teachers. To serve this purpose, a workshop was designed and conducted to foster the teachers' presence experience through heightened body awareness. Qualitative data was collected through semi-structured interviews, reflection papers, and informal observations. The findings illustrate the teachers experienced a greater awareness of the relationship between body, thought, and emotions; improved interactions with students; and a better understanding of how presence can be experienced while teaching. Implications for fostering body awareness through professional development for teachers are discussed.

Contemporary education is often based on a dualistic conception of mind and body initially suggested by Plato and later embraced by Descartes (Peters, 2004). More recently, there has been a call for a reformed curriculum that transcends the dualism of Western philosophy and considers teaching and learning from a broader perspective that includes the physical, social, and spiritual planes of existence (Peters, 2004; Rodgers & Raider-Roth, 2006). The result has been a growing effort to add these vital dimensions of human existence to the curriculum through contemplative studies, such as meditation, tai chi, Buddhism, yoga, mindfulness, and presence (Lindahl et al., 2017).

In the contemporary research literature of the West, the term "mindfulness" has been used as an inclusive term to capture the primary goals and outcomes of the eastern traditions that cultivate awareness. Kabat-Zinn (1994), who initially brought mindfulness to prominence, provides an encompassing definition for mindfulness as "Paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" (p.4). Interest in mindfulness has grown exponentially in the past decades. The number of empirical studies associated with enhancing mindfulness has increased from less than a 100 in 2006 to 1500 in 2013 (Schonert-Reichl & Roeser, 2016b).

Similarly, there is a growing literature on the potential benefits of mindfulness-based interventions for teachers and students. For example, a recent review of nineteen studies demonstrated that mindfulness could have a positive effect on anxiety, burnout, depression, anger, and stress (Lomas et al., 2017). Further, it can increase teachers' health, emotional regulation, compassion and empathy, well-being and satisfaction, and job performance. In another review of the educational literature, Hwang et al. (2017) identified multiple benefits of mindfulness, including the alleviation of stress; the enhancement of positive emotions; and the positive impact on interpersonal relationships with students due to the cultivation of pro-social dispositions, such as empathy, perspective taking, and a loving, kind attitude towards self and others.

The purpose of this study was to conduct a phenomenological examination of how these benefits can be realized through a specific approach to mindfulness known as the presence experience. To serve this purpose, a professional

development workshop on the presence experience was designed and conducted. This study will provide a 1) description of the workshop, 2) data that illustrates how teachers perceive the presence experience in their classrooms, and 3) recommendations for improving classroom instruction by enhancing the presence experience.

Literature Review

Recently, there has been an increasing interest in body awareness as a tool for enhancing performance across the professions. Improving professional practice through body awareness is based on a conceptualization of mind as embodied, i.e., bodily experience serves as the basis for the contents of the mind (Lakoff & Johnson, 1999; Rome, 2014; Varela et al., 2016). The concept of the mind as embodied was introduced philosophically by a group of thinkers who challenged the mind – body dualism of Descartes. These included Nietzsche (Spinello, 1981), who asserted that human existence occurs exclusively through the body; Sartre (1966), who regarded the body as the primary expression of existence; and Merleau-Ponty (1962), who described perception as a bodily relationship to the environment.

Working from this premise has led to new professional practices in psychotherapy (Cortright, 1997), therapeutic counseling (e.g., Geller, 2017; Gendlin, 2003), and medicine (e.g., Goli, 2010; Lowen, 1976). In psychotherapy, cultivating a bodily awareness can remove energy blocks, reprocess energy pathways, and enhance the flow of bioenergy in the body. Precedent for enhancing energy flow through awareness can be found in psychotherapy of both Jung (1971) and Freud (2010), who helped patients become aware of unconscious behaviors (complexes) to unblock or redirect energy. Fostering the flow of energy through living tissue later helped provide a conceptual basis for the field of bioenergetics (Goli, 2010).

Bioenergy medicine emphasizes holistic healing based on foundational ideas from the scientific literature on body-centered psychotherapy and mindfulness-based therapies (Goli, 2010; Lowen, 1976; Shapiro, 1980). Recent work in biology and medicine have established that feelings of stress, pressure, and anxiety can be reduced by an increased flow of bioenergy enhanced through practices developed within traditional healing systems (Eiden, 2009; Goli, 2010; Lindahl et al., 2017; Schonert-Reichl & Roeser, 2016a). The specific approach taken in this study is called Bioenergy Economy (BEE) (Goli, 2010). Gendlin (1992, 2003) developed something similar in therapeutic counseling that he called “focusing”, which involves fostering a “felt sense” of physical sensations that can often pass unnoticed but given attention can serve as an important source of information about the environment. During the session, the therapist pays particular attention to the bodily sensations as a source of information for interpreting the interaction with the client. Preparing for the session involves controlled breathing, grounding, and scanning the body for physical sensations (Geller, 2013, 2017).

Fostering body awareness can influence three distinctly different domains of awareness: intrapersonal, interpersonal, and transpersonal. The first is intrapersonal awareness, which refers to a person’s relationship with *self*. Intrapersonal awareness involves all aspects of the self, including the physical, emotional, cognitive, social, and spiritual dimensions (Wilber, 1996, 2000). Fostering the awareness that body, thought, and emotion are interrelated is foundational to developing intrapersonal awareness (Wilber, 2001; Dreher, 2003). It is a first step to developing the positive emotions that can alleviate emotional disorders and reduce negative thoughts (Rogers, 1961). Indicators of emotional and mental well-being include qualities such as attentiveness, body and sense awareness, focus, availability, authenticity,

compassion, flexibility, openness, acceptance, and curiosity (Childs, 2007; Kabat-Zinn, 1990; Langer, 2005).

Strategies for relaxing the body and alleviating emotional stress include controlled breathing, grounding, and scanning the body (Kabat-Zinn, 1990; Varela et al., 2016). During controlled breathing, participants are encouraged to foster their concentration and attention by focusing on the inhalation and exhalation of their breath. One of the most widely practiced body postures involves becoming “grounded”. Grounding is adopting a relaxed sitting or standing position while practicing controlled breathing (Rome, 2014; Shapiro, 1980). By consciously attending to their body posture and alignment, practitioners can improve their mental and emotional states to increase their effectiveness (Cuddy, 2015).

The second level of awareness is Interpersonal, which refers to relationships with others and occurs “as a giving as well as a receiving of the self” (Buber, 1971, p. 6). Sartre (1966) believed the body to be a primary vehicle for relating to others, “I exist in my body: this is the first dimension of being. My body is utilized and known by the Other: this is the second dimension” (p. 460). Fostering interpersonal awareness involves cultivating an openness to whatever the other offers us, engaging with our whole being in the interaction, and staying aware of our awareness (Siegel, 2007). These interpersonal outcomes are enhanced by cultivating the integration of body, thought, and emotion and can lead to an increased sense of compassion, empathy, a heightened awareness of nonverbal emotional clues, and ultimately to enhanced, healthier interpersonal relationships (Carman, 2008; Langer, 1989; Schoeberlein & Sheth, 2009; Wilber, 2000).

The ideal dispositions for interpersonal awareness have been described by Buber through his concept of *I-Thou* relationships in which two or more persons are engaged in an empathetic, synergistic relationship completely attuned to how the other is feeling, thinking, and sensing (Buber, 1971). In *I-Thou* relationships, there is no win-lose; goals are accomplished through the joy of participation, and there is a sense of mutual becoming among those involved. Like dancing, each person can express him or herself while moving in harmony with the others. The opposite are *I-It* relationships, those relationships in which the other is treated as an object that can be observed, measured, or categorized (Buber, 1971; Eiden, 2009). Like playing chess, *I-It* relationships are goal oriented, competitive, and focused on winning (Senge, et al., 2004).

As its name suggests, transpersonal awareness transcends both intrapersonal and interpersonal awareness (Rowan, 2005). It is an experience of a higher self, a spiritual presence of *supreme being* or of *being one with the world* (Harper, 1991; Osterman & Shwartz-Barcott, 1996; Rowan, 2005; Merleau-Ponty, 1962). Much of the work on this level of awareness has been done in the field of transpersonal psychology, which is concerned with exploring alternative states of consciousness, often occurring on a spiritual level. Transpersonal psychology recognizes that “Seeking for the divine, whether called God, Brahman, Buddha-nature, Reality, Being, Truth, Love, or anything else, has been a major aspiration and force in all cultures and periods of history, yet it has been virtually ignored by traditional psychology” (Cortright, 1997, p.13).

Dacher (2006) described this level of awareness as occurring beyond intra/interpersonal boundaries. The dimensions of physical and psychological have been transcended, and there is no external/internal or subject/object. “When those boundaries disappear, relating to others is the same as relating to oneself” (Silsbee, 2008, p. 51). So far, the research literature on presence is limited, perhaps due to the difficulty of defining and researching presence, as evidenced by Marcel’s

description of presence as “a mystery in the exact measure in which it is presence” (1949, p. 22).

Presence is the state of mind that comes with all the dimensions of reflection; the quality of our availability to receive whatever the other brings to us, to sense our own participation in the interaction, and to be aware of our own awareness. We are open to bear witness, to connect, to attune to our students' internal states. This is professional presence that entails us being personally present (Siegel, 2007, p. 263).

Presence in Teacher Education

Historically, cultivating awareness has not played a significant role in learning how to teach. However, recent studies suggest that greater awareness or mindfulness leads to a greater sense of self (Ergas, 2018), better emotional regulation (Draper-Clarke, 2020), and in general, a greater sense of well-being (Hue & Lau, 2015; Powietrzyńska & Noble, 2018). Although these findings may seem more connected to the personal rather than the professional lives of teachers, several scholars have suggested that these benefits lead to teachers with greater resilience and stamina (Zimmerman, 2018), thus bearing directly on the professional lives of teachers. Further, Meijer et al. (2009) have argued that when teachers make appropriate connections between their personal and professional lives, their connections with students are enhanced, thus facilitating their ability to motivate and manage students. Hirschberg et al. (2020) confirmed that daily mindfulness practice can lead to improvements in instructional supports and classroom organization.

Like mindfulness, the presence experience is associated with awareness. Rodgers and Raider-Roth (2006) have defined it thusly, “Presence from the teacher's point of view is the experience of bringing one's whole self to full attention so as to perceive what is happening in the moment” (p. 267). Cultivating presence in the classroom has a distinct purpose with intended outcomes. Teachers who cultivate their intrapersonal awareness also increase their connections to students through greater interpersonal awareness as described by Siegel (2007) below:

Presence is the state of mind that comes with all the dimensions of reflection; the quality of our availability to receive whatever the other brings to us, to sense our own participation in the interaction, and to be aware of our own awareness. We are open to bear witness, to connect, to attune to our students' internal states. This is professional presence that entails us being personally present (p. 263).

A professional development program in the form of a workshop was designed to provide five teachers with an opportunity to discuss, practice, and share their experiences of body awareness in their own way and in their own setting. The workshop, which was developed from the Bioenergy (BEE) model (Goli, 2010), was delivered in 14 sessions in 7 pairs of classes over a 10-week period. Each pair of sessions addressed a different theme. The first session of each pair was 2:15' hours (135 minutes), and the second session was 1:15' hours (75 minutes). The first session usually began with answering participants' questions and resolving problems followed by a presentation and discussion of the new theme. During the final half hour of the session, the participants were introduced to a practical task that enabled them to practice the theme through an exercise involving body awareness.

Typically, the second session began with teachers' feedback from their formal and informal practices. They frequently requested additional practice on the practical tasks. The instructor posed questions, added comments, and contributed additional

ideas as appropriate. (For a fuller description of the workshop, see Ahmadi et al., 2017.)

Theme 1: Whole-Body Experience

The Whole-Body Experience session familiarized participants with body postures that lead to an increase flow of energy and a balanced, relaxed state of being. The task involved a focus on breathing, spine alignment, body balancing, and body scanning. When these postures are successfully enacted, the participant is said to be grounded.

Theme 2: Whole-Body Perception

The primary purpose of the Whole-Body Perception theme was to demonstrate the interrelationship of body, thought, and emotions by helping the participants feel more unity, harmony, and higher levels of body awareness. The Whole-Body Perception practical task involved showing the participants how to ground themselves at a seated position, with their soles completely spread on the earth, eyes closed or half-closed, and the spine aligned with the back of the chair.

Theme 3: Awakening Senses

The Awakening Senses theme was intended to foster an awareness of the relationship between inner and outer. It focused on heightening an awareness of the environment by awakening the senses of hearing-seeing-smelling to an increased openness to the environment. The purpose of the practical task for this theme was for participants to experience their environment more directly.

Theme 4: In/Out Unity

The purpose of this theme was to promote a higher level of interpersonal relationships with others in the world. The practical task for this session involved body grounding and breathing awareness, experiencing wholeness and harmony with breaths and awareness of cycles inside and outside, and experiencing awareness of "in/out" and borderlessness.

Theme 5: Awareness Expansion Experience

The purpose of this theme was to develop an understanding of transpersonal experience as a way of being. To do so, the instructor compared the relationship between doing and being through the metaphor of dancing. Dancing involves movement and action, but there is almost no focus on the outcome: it is action taken for its own sake. The Awareness Expansion Experience practical task involved body grounding and awareness, individual body boundaries' awareness, and expansion by focusing on music.

Theme 6: Body Boundaries' Awareness

The purpose of the Body Boundaries Awareness theme was to understand how the three experiences of intrapersonal, interpersonal, and transpersonal awareness pertained to classroom teaching. The associated practical task involved pairing up and standing in front of a person at 10 feet distance, grounding the body/awareness, and inviting the partner towards self while exploring emotions, boundaries, and boundary awareness.

Theme 7: Intercorporeal Dialog

The primary purpose of the Intercorporeal Dialog theme was to show how awareness at each level (intra/inter/transpersonal) could foster more satisfying and effective participation within a single human system consisting of many smaller subsystems. It involved pairing, grounding the body/awareness, feeling the palms of the partner, and becoming aware of the bodies' feelings, thoughts, and movement.

Methods

The participants were five teachers from the Midwestern region of the United States. Three participants were kindergarten teachers, and the other two taught in

middle-school. One kindergarten teacher and the two middle school teachers had five years of teaching experience or more. Two kindergarten teachers were in their first year of teaching. The workshop was open to teachers of all grade and experience levels and was advertised in nearby school districts via poster and e-mail.

Due to the subjective nature of the experiences in this study, a phenomenological approach was employed for the study design and data analysis (Hesse-Biber & Leavy, 2011). The entire research design was intended to understand a human experience within the context of organic and evolving qualitative research design. Context was focal to the study and the whole process was fundamentally interpretive (Creswell, 2013). The methodology was selected for the purpose of exploring and understanding the participants' experiences through their eyes.

Data was collected through interviews, reflection papers, and informal observations. Semi-structured interview protocols were used at the beginning, midway through the workshop, and at the end of the workshop (Kvale & Brinkmann, 2009). In addition, the participants submitted seven reflection papers in response to the thematic prompts of the workshop, in addition to keeping their journal. Prompts were designed to address participants' reflections about different themes of the workshop. Participants were also asked to log their experience in journals. The participants were also observed informally during the workshop sessions; the questions they asked, the ideas they shared, and their participation in the discussions or practical tasks were noted by the researcher. The researcher/intervention instructor kept a journal of her experiences to provide an informal record of participant observations and to keep a record of the problems, challenges, misconceptions, and different issues that arose throughout the study (Patton, 2002).

Data analysis entailed organizing the data, reviewing the data base, coding, designating themes, representing the data, and interpreting the data. These were not conducted as linear activities, but rather as interconnected and spiral (Creswell, 2013). Data analysis was an ongoing process from the beginning of the study, involving reflexive journaling, data organization, and open coding. The researcher read extensively and checked the data regularly. Essential changes took place at any point the researcher believed the change would lead to more in-depth and richer data.

There were three rounds of coding, as well as several cycles of coding during each round. The first round of coding was based on an analysis of individual change from the beginning to the end of the workshop. In the second round of coding, the individual cases of development were compared, and three recurring themes were discovered: self, relationship, and consciousness. This insight led to the development of three categories during the third round of coding: intrapersonal, interpersonal, and transpersonal relationships. Member checking, peer debriefing, and consulting the literature were employed throughout the coding process.

Results

In the following sections, the participants provide testimony that asserts their conscious efforts to stay aware of their bodies during classroom episodes. Their ability to relax their bodies in a classroom setting provided related positive benefits for their mental and emotional states of being. Their increased energy and awareness led to better interpersonal relationships through a greater empathy for their students, new insights into their role as a teacher, and a broader view of the classroom as a complex network of inter relationships. On a few occasions, the

teachers commented on transpersonal experiences during which they felt a special connection to a larger sense of awareness, where they experienced a quiet contentment in their work, felt outside of themselves watching their actions as one part of a larger system, or they lost track of time so that the activity and the goal became indistinguishable.

The first category of participant data was associated with the participants' experience of themselves as individual selves. Several comments reflected the workshop focus on the integration of body, thought, and emotion. Participant 4 described how her increased intrapersonal awareness has made her more aware of her senses, more sensitive to her environment and led her to a new state of being while teaching. She is more comfortable in her body and more relaxed in her teaching:

I'm also thinking realizing that my whole body can hear has affected me. I think it has made me more sensitive to stimuli in the environment and the stimuli that surround me. I realized that my sight is very powerful and my smell. They kind of control the other senses and pull more weight than touch, hear, or taste. Currently I am working on making them more balanced in my body and for all of them to be equal... I feel like a sense of calm and just *being* happen in my body... I am at one in my body, and I feel so relaxed.

Participant 2 discussed her new awareness of the relationship between her body posture and her emotions in classroom settings. She saw it as bidirectional, that is, her body posture could affect her emotions, and conversely, her emotions could affect her body posture:

What I am surprised about is how often my emotions- anxiety, frustration, tiredness- affect my body position and how much that changes the way I present myself to my students and others... Now, when I feel tension or stress in my body, I stop and think, why am I feeling tension or what is causing this? ... I also noticed that if I have had an emotional day/ or bad news, that I carry the emotional pain in my body and I have a hard time getting rid of it.

Participant 3 discovered that she was able to use her new body awareness to change her emotional state in her classroom. For the first time, she was able to relax her body, thus enabling her to relax emotionally, and most importantly, to interact more positively with one of her students:

One day, I was feeling very stressed about a student and for about 30 minutes I was very agitated. I complained to a coworker, wrote e-mails about it, and thought constantly about the student and the situation. After about 30 minutes, I noticed the tension in my back. I let it go. That is, I let the muscles relax, and that also allowed my mind to go away from the stress. Throughout that day, I was still mad at the student, but I was able to relax physically and emotionally, and mindfully from it. This is the first time I ever remember doing this consciously in my life.

In summary, the study participants stated that the workshop on body awareness had heightened their awareness of their bodies; the importance of body posture to mental and emotional states; and the relationship between their body awareness and their feelings about teaching. They also shared examples of situations in which they adjusted or relaxed their body to better interact with students and achieve their instructional goals.

Data that referred to communications, collaborations, or the characteristics of the complex network of relationships existing between or among two or more individuals was categorized as Interpersonal. The comments suggested the teacher's heightened awareness of others and the context that led them to new insights into their role as a teacher. This relationship is illustrated by the participant

quotes below, beginning with Participant 1, who commented on simultaneously becoming more aware and accepting of her students' behavior:

I do notice that and so then I would try to remember that when there is something really frustrating not to be frustrated with that and to remember that they're only 5 and 6 and we are all human and we all make mistakes and you maybe there is an underlying reason that's why it's happening. So, I think it was a good thing for my students in my class... I think I'm more aware of their thoughts and you know what they're thinking in the moment, they're more able to communicate with me and without disruption and the same for me. I'm able to communicate the information to them without being interrupted.

The increased awareness of the participants towards their students was related to an increased awareness of the interrelationships that constituted the context for their teaching. This is illustrated by Participant 3's comments below:

I do feel that I was open to new ideas, and I was not set in my habits. For example, I was able to remove myself emotionally at times and observe what was happening in my classroom... I was really listening to what they said... I was thinking more and once they finished, I kind of paused and let everybody pause 5 or maybe 3 or 4 seconds and then I moved on; so that's one thing that I wouldn't have done before without this workshop.

The greater awareness of students and the context influenced the teachers' understanding of their role. For example, the following comment from Participant 2 is a good example of how her increased awareness of her students and classroom relationships led to changing her role in the class. She became more aware of the roles she took based on the situation and needs of the students:

I decided to let them teach themselves and I would be just an observer, a facilitator of sorts and just let the lesson happen.... They learned by doing and discovering and talking to each other and asking questions and trying different things. I learned by watching and not controlling or being controlled just letting them learn. I felt so good at the end of the day and even said "this is why I became a teacher!" I don't fully know if this is a two-person relationship or if it is controller-controlling or what. But I know that it felt really good to connect in this way with my students and that they really enjoyed the class.

In summary, the participants increased self-awareness led to a greater awareness and empathy for their students' needs. In a larger sense, they also became aware of their classroom as a complex network of relationships, made strategic changes in their teaching and expressed positive effects in themselves and their teaching. They reported becoming more open and accepting, listening more attentively, and consciously changing their role. As Participant 5 stated: "I think I'm maybe more understanding of why students are acting the way they're acting and before I wasn't really thinking about that. I was just focusing on myself and wondering why they are not following my directions.

Data related to the Transpersonal category emerged in the data later, after the study was well under way and was relatively limited compared to the two other categories. Examples of data coded in this category include comments like "I see *being* as synonymous with authentic" or "I'm really engaged and lose track of time" or "I could tell that I was really in the moment with them". In general, participants' comments coded as transpersonal reflected a sense of wholeness, unity, connection, or timelessness. One example came from Participant 5, who stated:

It feels like one unit during that time...Just when they're engaged, into the activity that we are doing...like the... like when I'm doing something that I'm really engaged, and I lose track of time and when they're doing that, I have

the same feelings... So it was kind of connected during that time. I wasn't necessarily thinking that I was separate from them.

The participants discussed transpersonal concepts related to their bodies, thoughts, and emotion. For example, Participant 1 described her transpersonal experiences as:

My understanding of openness and unity is when my body, mind, and emotions are all working together to make me feel whole. My mind is at ease and resting, my emotions are calm and relaxed, and my body releases tension and begins to *be...* I recognize these moments more often; big and small. I have observed moments of presence in my teaching including moments such as engaging in activity with my students and watching as they problem solve to complete an activity. I have also noticed presence in having conversations and discussions with my students about various topics, concepts, and/or ideas.

Similarly, Participant 3 commented:

In some circumstances, I can let go of the end goal and actually make the goal the process. I see that now, whereas before I would never have seen it that way. Now, I am able to actually SEE what is happening in my room and with my students and make better choices and observations about the students, the lesson, and my teaching. This realization is freeing, and I feel that it will change my perspective on some of the lessons and activities in my classroom.

Discussion

The findings from this study demonstrated that the participants experienced an increased awareness of the relationship between body, thought, and emotion. By understanding how each influences the other, the participants could better use their body awareness to change their thoughts and emotions. For example, one participant became aware that her muscles became tense when she got angry at a student. She used her body awareness to release the tension, and as a result, she felt less judgmental of the student's behavior and more invigorated with her work. The increased awareness of their body, thoughts, and emotions appeared to be associated with an increased awareness, empathy, and compassion for the students' point of view. That led them to understand the dynamics of the classroom differently, as well as their role within that system. Thus, the increased body-mind connections led to changes in their relationships with their students and in their teaching strategies.

A limited amount of evidence was associated with transpersonal experience, as evidenced by a sense of connectedness, timelessness, and unity. For two teachers, it appeared that a greater awareness of others increased a greater feeling of connection with the wholeness of the classroom context. In this case, these teachers were more likely to see their role with a complex network of classroom relationships and themselves as facilitators within that system. While this study was too short in duration to see the impact of a sustained effort to foster body awareness in the classroom, it is conceivable that the emergence of transpersonal experiences could transform the teacher's understanding of herself, her relationship with students, and her perspective on learning and teaching.

Possibilities

The important role of interpersonal relationships is well established in the education literature on teaching and learning. (e.g., Noddings, 2005). Less well established is the potentially powerful role of body awareness for fostering positive interpersonal relationships. However, the findings from this study suggest that

cultivating an awareness of body posture, bodily sensations, and sensory perceptions can play an important role in developing positive classroom interactions. Employing these strategies helped the participants become aware of bodily tensions, judgmental thinking, and negative emotions while teaching. They responded by adjusting their postures, engaging their senses, and relaxing their bodies, thus leading to better dispositions and enhanced interpersonal relationships with students.

The insights that teachers experienced during the study suggest additional possibilities for enhancing teacher reflection through the cultivation of intra-, inter-, and transpersonal awareness. In addition to practice with controlled breathing, grounding, and body scanning in an after-school setting; teachers should be encouraged to remain aware during their teaching by nonjudgmentally observing themselves, their students, and the classroom dynamics. They should also be shown how to develop on-the-spot, in-the-moment connections among their body sensations, their interactions with students, and their instructional strategies. Findings from this study suggest that increased body awareness can lead to new teaching strategies through reflection-in-action (Schon, 1983). Such an approach would use a holistic approach to professional development for teachers by encouraging both analytical and synthetic learning processes (Senge et al., 2004).

This study also suggests some possibilities for reconsidering how experiential learning is conceptualized. The quality of any experience may be increased, even when following familiar processes or engaged in routine behaviors, if the learner's awareness is heightened prior to the experience. For example, increased awareness of body posture may trigger new reflections, even if the instructional methods and student interactions remain largely unchanged. This was demonstrated in the study findings when teachers' new awareness of their bodies led them to richer reflections on their experience, changes in their dispositions, and improved interpersonal relationships. In sum, the data from this study suggest that the learners' level of awareness will affect the quality of their experience and the level of thinking that results from the experience.

The findings from this study suggest that professional development to foster the experience of presence has physical, cognitive, emotional, and social benefits for teachers. These studies confirm earlier findings that mindfulness-based interventions can alleviate stress, enhance emotional well-being, and promote pro-social behaviors, thus making it easier to thrive within the work environment for teaching (Lomas et al., 2017). Furthermore, practicing body awareness in a classroom setting can facilitate a greater appreciation for teaching to the whole child and how to facilitate positive interactions between students and teachers. Increasing awareness can also provide creative insights into strategies that promote learning through positive classroom dynamics. Teachers can use their experience of presence to become self-directed in their development of pedagogic strategies in their classroom.

Future studies should promote further explorations of presence through body awareness in classrooms. More information is needed on how the presence experience can be integrated into educational settings for optimized learning and teaching. In addition, the contribution of the presence experience to teacher preparation should be investigated. Presence can provide a platform for the teachers to experience wholeness and harmony in both their teaching and their lives.

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Student Perspectives toward ICT Integration in Learning Mathematics and Physics

by
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Abstract

The COVID-19 pandemic presented an opportunity for schools to further embrace technology in learning. Integrating user-friendly information communication technology (ICT) tools that make learning more effective and enjoyable is key to increasing the success of educational programs. This case study explores 12th-grade students' perspectives on the use of Google Classroom and GeoGebra in the learning of mathematics and physics and sought to understand how technology influenced their perspectives on STEM. Examining learners' feelings and experiences with the use of ICT can form the basis for improving ICT-integrated lessons to ensure maximum engagement. Findings indicated students had positive attitudes toward the integration of ICT in learning. The participants found the ICT tools to be convenient for their learning, affordable, and improved their accuracy in the analysis and presentation of experimental data. Some of the challenges students encountered included instructors' limited ICT competence and prohibitive mobile device policies.

With the rapid development of emerging technologies, the use of information communication technology (ICT) has also increasingly attracted the attention of educational stakeholders in Kenya (Tondeur et al., 2015). The Kenyan Ministry of Education in collaboration with other international agencies has been making a concerted effort to roll out the use of ICT in high schools. Relatedly, in what seemed to be a move in the right direction, the Kenyan Ministry of Education responded to the paralysis of face-to-face learning in August 2020 by encouraging educational institutions to adopt online virtual learning. However, most institutions were ill-prepared for this shift due to poor infrastructure. Even after rolling out this initiative, there has been a myriad of challenges that teachers and learners alike have faced, hence the need for this study of ICT integration.

Additionally, since the program was hastily implemented due to pandemic concerns, this study aimed to shed light on what instructional accommodations seemed to work in the teaching of mathematics and physics. The need to integrate ICT programs that are user-friendly and effective in teaching and learning is in line with the Kenya Vision 2030, (NESC, 2007) which aims to transform the country into a technological hub by the year 2030.

The current study explored 12th-grade students' perspectives on ICT integration in the learning of mathematics and physics and sought to understand the ways in which integrating ICT has influenced students' perspectives about mathematics and physics. In the aftermath of the Covid-19 pandemic, teachers were forced to adopt different ways of teaching to ensure that learning was minimally interrupted even when schools were closed at the height of the crisis. As a result, teachers embraced the use of technology in their teaching out of necessity in ways that they may not have been open to previously and which may, ultimately, hasten ICT integration. This study was conducted to answer the following questions:

1. What are 12th-grade Kenyan students' experiences in mathematics and physics when integrating ICT?

2. What are students' perspectives about the effectiveness of using ICT to learn mathematics and physics?
3. What suggestions do students have to improve ICT-integrated learning?

The findings of this study may help teachers and schools in Kenya and elsewhere to be cognizant of students' feelings toward and experiences with the use of ICT in teaching and provide insight on effective and efficient STEM learning. To achieve this goal, findings from this study can be used as the basis for planning and development of ICT-integrated lessons to improve student engagement and thereby promote a sense of ownership toward meeting lesson objectives and enhancing students' engagement in mathematics and physics.

Background

Technological advancement has seen the rise of many learning platforms where students do not need to be physically present in a classroom. Integrating technology into the classroom can make learning more effective and enjoyable (Heggart & Yoon, 2018). One advantage of these platforms and technology tools is students' ability to use mobile devices to connect to the Internet from remote locations at any given time (Al-Mekhlafi, 2020). These tools facilitate access to online learning environments and can encourage knowledge sharing and collaboration among students and their teachers while encouraging students to study on their own and become self-dependent (Al-Mekhlafi, 2020; Setiawan et al., 2020).

There is a considerable body of research that has discussed the integration of ICT in teaching STEM (Kolikant, 2012) and demonstrated its positive impact on student learning (European Schoolnet, 2017). ICT constitutes software used to convert, store, protect, process, transfer, and acquire information regardless of place and time (Shanmugam & Balakrishnan, 2019). Integration of ICT into teaching is not meant to replace traditional teaching methods but rather to complement them (Fitri et al., 2020).

For instance, high school mathematics and physics are among the essential subjects for every student who aspires to pursue a career in STEM. The instructional practice of teachers and the knowledge and learning acquired by students in these courses are critical for developing problem-solving, logical thinking, and reasoning on daily basis, and are essential to help prepare a scientifically literate society (Henson, 2022; NRC, 2012; UNESCO, 1993). To excel in mathematics, high-level cognitive processes such as critical thinking, reasoning, and imagination are required (Rajagopal et al., 2015). In this respect, sticking to the traditional pencil, paper, and board teaching approach is not sufficient to cultivate higher-level thinking skills and cognitive processes. Therefore, integrating ICT in the teaching of mathematics and physics in Kenya provided an opportunity to enhance students' understanding and make learning enjoyable.

Most commercially available learning software is out of reach for many schools, especially in developing countries because of the costs of user licenses (Rajagopal et al., 2015). School districts and individual schools, like the one in this study, turn to obtaining open-source software such as Google Classroom (<https://classroom.google.com/>) and GeoGebra (<http://www.geogebra.org>) to support teaching and learning.

Google Classroom is a free e-learning platform that was developed by Alphabet Inc. for academic institutions and was launched in 2014. Its primary purpose is not only to allow teachers and students to share files efficiently, but also to enable teachers to create, distribute, and grade assignments online (Kassim, 2020). During the COVID-19 pandemic, ICT applications such as Google Classroom

were rapidly embraced as integrated technology in learning (Wan Hassan et al., 2020). GeoGebra is another free technology tool that has several features to support mathematics teaching with structured activities meant to encourage discovery and visualization in mathematics classroom learning. These two ICT tools were integrated into the mathematics and physics lessons in the 12th-grade classroom and the focus of this study is on how students perceived them.

Perceptions of these ICT tools can be observed as a combination of individual students' values, feelings, beliefs, and actions, which lead students to either embrace or reject the tools (Joshi, 2019). According to technology acceptance theory (Davis, 1989), the user's attitude towards a given form of technology determines whether or not they will embrace and use the technology. The Perceived Ease of Use (PEOU) and the Perceived Usefulness (PU) of the technology by the user determine their Behavioral Intention, (BI) to embrace the technology (Al-Marroof et al., 2018; Ansong-Gyimah, 2020). In the case of this study, it was necessary to reveal students' perceptions toward the integration of ICT in learning to know if learning objectives were being achieved and to make necessary adjustments based on students' PEOU and PU.

Based on the unified theory of acceptance and use of technology 2 (UTAUT2), Açıkgül and Şad (2021) found that one of the strongest exogenous predictors of a student's intention to perform a specified behavior using an ICT tool in learning is hedonic motivation. In other words, the pleasure or satisfaction students get from using an ICT tool in mathematics or science increases their intention to use the technology. Similarly, Medina-Cruz et al. (2018) pointed out that students appreciate the use of ICT in class because they tend to learn better; the tools facilitate science comprehension, and learning is more pleasurable and interesting. Relatedly, Heggart and Yoon (2018) found that Google Classroom made the learning atmosphere more relaxed by allowing students to interact dynamically with peers and classroom content while remaining focused on learning. These results suggest that ICT can motivate students to learn science, which can lead to higher rates of school achievement (Medina-Cruz et al., 2018).

Convenience in getting the required information using an ICT tool also plays a role in determining students' perceptions of using the tool. Heggart and Yoo (2018) found that students valued how Google Classroom made it easy to access material required for their science course. Students were impressed that information needed was in one place, enabling them to submit assignments and contribute to the discussion with little difficulty. Additionally, students embraced Google Classroom (Ansong-Gyimah, 2020; Fitri et al., 2020) and GeoGebra (Rajagopal, et al., 2015) because they are easy to use. In these studies, students were enthusiastic about the applications because the process of downloading, installing, and running them was easy, and the instructions and features in the applications were easy to understand and follow (Fitri et al., 2020).

Students' motivation seemingly changes based on the degree of curiosity and features of a given tool. A learning software that incorporates captivating features can engage students and maintain their attention during instruction. Software developers strive to make applications more interesting in order to reduce boredom during learning. Shanmugam and Balakrishnan (2019) found that ICT stimulated students' interest to learn science because of a variety of captivating multimedia elements incorporated into the science lessons. Bu, Henson, and Nyirenda (2022) demonstrated that mathematics teaching that incorporated GeoGebra for 3D design-based learning benefited student learning and engagement. Similarly, Chalaune and Subedi (2020) demonstrated that students who used GeoGebra in their mathematics lessons showed stronger motivation and

attentiveness when learning subject matter because they perceived its features as interesting and relevant.

Students also tend to focus on the relevance that GeoGebra (Rajagopal, et al., 2015) and Google Classroom (Al-Marroof & Al-Emran, 2018; Ansong-Gyimah, 2020; Kassim, 2020) have on the learning content. Students are likely to embrace an ICT tool if they can make a direct connection between the task at hand and how the ICT tool can be used to accomplish it. They first want to establish if the software is beneficial for them and has the potential to enhance their knowledge and skill. In Kassim's (2020) study, students indicated that Google Classroom was highly useful because it helped them be more productive, allowed them to access materials conveniently and submit assignments quickly, and enabled them to interact with the lecturer and other students without necessarily needing to be on campus.

Student perceptions stretch beyond the TAM and UTAUT2 models, to show the influence of Bandura's (1986) social cognitive theory that emphasizes social learning through modeling. This influential theory in the psychosocial and education fields suggests that an individual's behavior acquisition can be attributed to observing and imitating a model within the context of social interactions and experiences. The permanence of the modeled behavior depends on the social status of the model and the level of reinforcement that the learner receives (Miller, 2015). This theory can be applied to understanding students' perceptions and adoption of ICT based on their teachers' perceptions and practices. In a study by Shanmugam and Balakrishnan (2019), students who observed teachers adopting a particular ICT usage in teaching and learning in science were more inclined to consider adopting the tools themselves. By observing teachers using ICT, students acquired skills, knowledge, beliefs, and attitudes that they were able to use. Based on this theory, students can either develop positive or negative perceptions towards ICT-integrated lessons based on the attitudes of their teachers towards the same. The teacher's expertise in delivering knowledge based on current needs such as ICT advisement is highly regarded by students. Hence, students begin to show interest and motivation towards incorporating ICT in their learning when they observe their use of ICT to simplify learning.

In summary, the integration of ICT in mathematics and physics represents a pedagogic shift aimed at enhancing students' experiences while reducing negative perceptions and anxiety. From the reviewed literature, it can be concluded that ICT integration in STEM learning arouses students' interest. The learning software makes abstract mathematical and scientific concepts easier to understand because the models facilitate visualization and exploration during the learning process (Rosyid & Umbara, 2019). The software makes learning interesting, enjoyable, and easier because students are involved in a variety of activities (Triet et al., 2020). ICT affords students opportunities for self-study and self-exploration while fostering collaboration, increased agency, and voice among peers, which can lead to quality learning (Heggart and Yoo, 2018). For an ICT tool to be embraced by students, it ought to not only be perceived as easy to use but should also be viewed as enjoyable and relevant to the content being studied (Kolikant, 2012).

Methodology

We conducted this case study with five 12th-grade students over a period of four weeks. We decided on five participants to achieve a student-computer ratio of 1:1 at the school and to ensure maximum potential for student engagement during learning. Upon receiving the Institutional Research Review Board approval, we selected the 5 participants for this case study through random sampling from a population of 50 students who had returned consent forms. Although the school was

striving to integrate ICT in teaching and learning, the student-computer ratio was about 9:1 at the time of the study, limiting opportunities that students have to employ ICT in their studies. Most of the students however had access to their parents' smartphones at home, so they could still log in to the learning apps at home.

The participants were guided to sign-up for Google Classroom and GeoGebra accounts, which they could access at any given time from remote locations using a computer or mobile phone provided they had Internet access (see Al-Mekhlafi, 2020). We then created course materials on Hooke's Law in physics and Linear equations in mathematics and added the participants to the online classrooms. Two collaborating teachers practiced with the students how to navigate through both apps, access the course materials, and post assignments. After familiarizing themselves with the apps, participants learned and practiced the two topics through the apps for three weeks in compliance with the existing syllabi. We decided to incorporate the two teacher colleagues as collaborative research members to enhance the credibility and accuracy of the research findings, as advocated by Smagorinsky (2008) and Efron and Ravid (2020). One of the teachers was the school's ICT Integration Coordinator and taught mathematics, while the other teacher partner taught physics.

We made use of three data sources to ensure that our findings were credible and trustworthy (see Efron & Ravid, 2020). During the lessons, teachers observed the students as they worked in Google Classroom and used GeoGebra and also video recorded what students were doing in the classroom. The observations allowed the research team to systematically watch and record students' behavior, online class participation, and on-task performance. Secondly, students completed an online modified survey, Science Motivation Questionnaire II (SMQ II) originally developed by Glynn et al. (2009).

The open-ended questionnaire was designed to establish the relationship between student experiences and motivation using ICT during teaching and learning of science (Glynn et al, 2011, Shanmugam & Balakrishnan, 2019), and adapted for this study by substituting the word Science with Physics and Math as permitted by Shawn M. Glynn (2011). This was informed by a similar substitution and translation in Pixel (2018), which succeeded in keeping the original questionnaire's consistency. Students were asked to describe their experiences, perceptions, and feelings about integrating ICT and to provide suggestions for improving their learning experiences. The questionnaire was developed using SurveyMonkey and was emailed to students to quickly gather a variety of information about them and their opinions, perceptions, and attitudes (Efron & Ravid, 2020).

A focus group and individual interviews were conducted with the five student participants to allow them to elaborate on their questionnaire responses. Efron and Ravid (2020) point out the inability of questionnaires to bring out a relationship of trust with participants and find out, in-depth, how each participant feels about the issue being investigated. As a compromise, they suggest that follow-up interviews with selected participants can be done to provide more insights into participant responses. Conducting the interviews via Zoom presented a more convenient way to meet the students and record the conversations which would later be retrieved and easily transcribed verbatim without necessarily the need for other recording equipment.

There were aspects of behavior important to the study that could not adequately be captured in the questionnaires or interviews. Such important cues as nonverbal behaviors, gestures, and body language can be best captured through observations. Therefore, direct observations to record student behavior during learning were utilized (Duesbery & Twyman, 2020). The research collaborators

directed students in the lab as they closely observed and recorded field notes using an observation protocol. The observational notes provided reflections and insights about the classroom happenings and were used to understand the learning environment within the ICT-integrated lessons.

The first step in analyzing data was to manually transcribe the interview recordings. The next step was reading through the transcriptions several times to better understand the data. We carefully condensed the vast amount of transcribed data into a meaningful structure that gave us a better understanding of the information. We then truncated unnecessary words and phrases irrelevant to the interview and highlighted keywords or sentences that were mentioned repeatedly within the transcripts. Simultaneously, researcher insights were recorded on the margins of the transcript pages to capture an understanding of the conversations as we developed codes. The next step was code reduction which involved combining similar or related codes from the data. The remaining codes with similar contexts were grouped in a chart to organize the data into thematic clusters that emerged. From this point, categories were further tabulated to identify overarching themes which brought meaning to the data collected and provided a deeper understanding of participants' experiences.

For the questionnaire data, we collected and organized raw data from each student's responses separately after which we highlighted words and phrases that repeatedly occurred among the participants to develop initial codes. Efron and Ravid (2020) advocate for code reduction in another round of coding to reduce similar or related codes from the data collected. Code reduction continued until saturation and then cluster codes were placed into categories. To further refine emerging categories, we examined the data represented by each category and confirmed the congruency between the data and the categories (Efron & Ravid, 2020). Finally, to obtain deeper insights into overall student perceptions toward ICT integration, we considered the relationship of topics within the categories and arranged the topics hierarchically in a logical order.

Careful attention to detail in collecting, analyzing, and interpreting the data promotes the trustworthiness of the study and usefulness of the findings to help shape the school's decisions and future actions. The reliability of the original survey instruments and protocols adapted in this study was previously established from peer-reviewed journal articles (Glynn et al., 2009; Shanmugam & Balakrishnan, 2019). Additionally, to enhance the trustworthiness of this research data triangulation was conducted to thoroughly and more accurately answer the research questions.

The most common methods to enhance the trustworthiness of qualitative research studies are triangulation, disciplined subjectivity, thick description, member checking, and peer review (Efron & Ravid, 2020). Throughout this study, we made efforts to systematically ensure trustworthiness. Firstly, peers were involved in all the initial stages of framing research questions, reviewing the literature, and designing the methodology. Colleagues were also involved in each phase of the research data collection of this study. Constructive feedback from these peers enhanced the trustworthiness of this study. The use of different data collection sources as stressed by Efron and Ravid (2020) also allowed for accurate capturing of authentic student voices which were valuable components of the findings of this study.

Findings

The purpose of this study was to explore 12th-grade students' perspectives on ICT integration in the learning of mathematics and physics and to understand the ways in which integrating ICT has influenced their perspectives on the two courses. To achieve this goal, students' learning experiences when integrating ICT, their

perspectives about the effectiveness of using ICT, and their suggestions to improve learning in ICT-integrated lessons were examined.

Findings from the questionnaires, interviews, observations, and a focus group indicated that the participants had positive attitudes toward the use of ICT, specifically Google Classroom and GeoGebra, in learning Mathematics and Physics. The presentation of the findings below is organized according to four main themes interpreted through the data analysis. Participants found the ICT tools to be convenient for their learning. A discussion of the cost of acquiring and accessing the ICT tools and the effectiveness of the tools in regard to the accuracy in the analysis of experimental data is provided. Lastly, the findings on some of the challenges encountered by the participants during their learning and their suggestions for improvements to realize efficacious learning experiences in ICT-integrated learning are highlighted.

The results indicate the participants were largely comfortable with using technology not only for learning but also for other leisure activities. This group of learners also referred to as digital natives (based on their age group), reported being proficient and confident in the use of ICT as a result of the amusement they derived from it (Howlett & Waemusa, 2018). The participants reported using the internet for an average of 4.5 hours per day. When asked how they passed this time, one student (labeled as SK) explained that she used her time for academic work, which she admitted was much greater than when using traditional paper-and-pencil learning. The motivation to stay longer on Google Classroom was because it was like a 'one-stop-shop' where she could find all the materials she needed within the app and even elsewhere on the internet. Consequently, the students utilized their learning time efficiently without having to waste it on other activities, and they found the two online tools to be time savers as the required learning resources were saved in one place. Hence, students minimized time wastage in physically looking for materials from different places and having to move from one place to another in search of all the learning materials.

MN felt that working on assignments online on GeoGebra was more convenient and enjoyable. She produced neat work unlike when working in her notebook. During online interactive activities such as drawing graphs, students felt comfortable following instructions to come up with a final graph. They preferred the interactive tool over the often tedious steps involved in graphical work which include selecting a simple and uniform scale, plotting the axes, and manually locating each point on the graph. All these steps require more time and concentration, unlike the graphical function on GeoGebra that requires the students only to input the coordinates to generate the graph with just a click of a button. Students felt that this simplified their work and saved them valuable time which would be dedicated to other productive activities that added to their understanding of course content.

Further, the longer time periods required for students to learn through the two apps were attributed to the enjoyment derived while learning online. For example, RM reported on a physics game in Google Classroom:

I found the short game really enjoyable. It acted as an icebreaker before the start of the math topic (linear equations) and I really enjoyed the game. I also enjoyed doing the physics experiment, especially having the chance to adjust the springs to the different strengths and seeing how their extension varied- an opportunity I would not have gotten when doing the usual lab experiment. I enjoyed it and found myself going on and on without being bored.

Most of the learning took place in the school's computer lab and the students were in agreement that they were able to totally immerse themselves in learning. The quiet

environment afforded them a relaxed atmosphere conducive to learning, unlike the typical classroom environment with many distractions that hinder concentration or make learning tedious. Even when using their parents' phones to access the learning platforms at home, the students reported it was easy to find a relaxed environment to learn and they were able to fully concentrate and enjoyed engaging in learning activities. Unlike the traditional classroom in which teaching/learning is conducted at a fixed place and time, the students were impressed with the convenience that comes with the use of mobile devices like phones and laptops to access the course materials at times and places that suited their learning.

Even though the Kenyan government covers tuition and fees for public high school students, parents in day schools have to meet the cost of lunch and other indirect expenses such as school uniforms and supplemental learning materials like geometrical sets, mathematical tables, and graphing books. This is beyond the means of most parents as noted in the study by Wambugu and Mokoena (2013) which reported that the majority of households in Kenyan rural and slum areas have incomes that are below the expenses required to pay for the education of one secondary school student.

Students were impressed by the fact that signing up for both the Google Classroom and GeoGebra accounts was free. Additionally, they were relieved to discover there were no hidden fees or extra charges. One student stated:

...with all the required learning materials available online, I did not have to bother my parents about buying stuff like graph papers, rulers, and additional exercise books, and have them incur additional costs that would have further strained their already low income.

With the poor economic status of their parents, such online learning resources have the potential to significantly reduce the cost of education. In the end, the use of ICT would lessen the financial burden on the parents and help retain students who would have otherwise dropped out because of the inability to afford all the required materials.

It is also worth noting that most laboratories in public high schools depend on government funding for equipment and supplies. With the progressively growing student enrollment and inadequate support for the labs, it is a common occurrence for students to share the equipment during science practical sessions. During exam situations, students are not allowed to perform experiments collaboratively, and instructors had to be creative and have the experiments done in shifts to accommodate all the students. Additionally, limited lab space, resources, and equipment further exacerbated the experiment sessions, which often exceeded the stipulated exam hours and unfairly disadvantaged some students.

Free online resources, such as the simulated pendulum and spring used in this particular Google Classroom lesson, allowed the students to learn and practice independently without the need for schools to incur additional costs purchasing laboratory supplies. If such technology was to be adopted, the school would only require an internet connection while the students often would access the simulations through mobile phones which they already own. However, the existing mobile phone policies at this school and at many others prohibit students from using mobile phones in school, although there is considerable evidence of their potential to revolutionize e-learning (Howlett & Waemusa, 2018).

The participants observed that the online experimental simulations in the Physics course on Google Classroom helped enhance the accuracy of their experimental results and simplify the processes that were previously difficult for them. The simulator could not be affected by environmental factors that otherwise could alter the experimental results. In physics experiments, for example, teachers

normally allow a range of values for experimental data to accommodate the errors caused by human or environmental factors. Instances such as these are not desirable for disciplines that demand a high level of precision, and training students under such error-prone conditions does not help emphasize the need for accuracy. The use of ICT resources can help reduce these errors.

Similarly, some computer software can help students who are prone to errors when writing their assignments to avoid such errors and present neat work. LF admitted she usually has difficulty plotting graphs and felt her written work was almost always untidy. She liked the graphing function in GeoGebra which only required her to input experimental data and the program generated a graph that she felt was neat and presentable. She opined that students need to make use of such software to minimize errors and have visually appealing work. Having such work, according to her, helps arouse student interest in the courses and enhance their understanding of the content.

The above finding seems to be contrary to those of a study by Hamisi, Bilinga, and Mgaya (2018) that established that students' overreliance on computer programs in note-taking and learning, in general, could potentially lead to laziness and poor organizational skills. Their findings suggested that students who overly depended on computer software to perform simple learning tasks were more likely to have poor handwriting skills and speed, truancy, and a distortion in their ability to compose and organize work because of lack of practice. They further opined that active learning that includes writing helps students to gain a better grasp of the material and allows them to experiment and learn from their mistakes, thereby making them conversant and competent in their content area and language of instruction. Accordingly, instruction that integrates ICT should serve as appropriate complementary learning tools for conventional forms of course delivery rather than replacing them altogether since it is through errors and failure that people also learn. So, even as ICT is integrated into learning, teachers need to observe and assess the students to ensure that the need for accurate results and neat work does not override their understanding of content.

Another important finding of this study was the ability of Google Classroom to enhance interactions and engagements between students, teachers, and content. A major strength found in this study was open communication even outside school hours, so long as the participants had access to the internet. Through the chat function, students had a chance to ask questions and seek clarification on the content they did not understand. One student observed she was impressed by the fact that she could always get help from the teacher whenever she needed it through the chat function. Furthermore, this function enabled students to share ideas on the content as they engaged with the teacher or among themselves, creating a repository of class content that they could easily refer back to whenever they needed to remind themselves.

One issue with the asynchronous discussion board for this Google Classroom was in the turnaround time of the responses, especially when student queries were not promptly resolved by instructors. Delayed response can be a potential barrier to effective learning through any Learning Management System (LMS). Past research, however, suggests the need for the instructor to avoid over-involvement and maintain a balance between too little and too much participation by determining the appropriate time to jump in when necessary (Aloni & Harrington, 2018). Consequently, the above challenge presented students with an opportunity to develop problem-solving skills. The inconveniences occasioned by delayed responses from instructors resulted in participants trying to come up with ingenious ways of solving the problem at hand, either through trial-and-error for the simulated

experiments or through quick online research. When commenting on the ease of use, for example, SK noted:

.... at first, I had no idea how to move the ruler nearer to the spring to measure the extension. I tried asking the teacher in the comments section of Google Classroom but did not immediately get an answer because it was late in the night and I guess the teacher was already asleep. I did a google search but could not find a way out. I was stuck but then decided to try dragging the ruler, and it worked. I also checked the equilibrium position and movable line boxes which made it easier for me to make my readings, although the instructions did not require us to check the boxes.

The above example demonstrated how the existence of a problem led the student to think and customize their actions to arrive at a workable solution. The learning materials in the Google Classroom could be watched and rewatched multiple times, an advantage students felt the learning platform had over the face-to-face format. This feature of Google Classroom and many other LMS enabled learners to interact with content multiple times until they understood it. The option of downloading some materials and storing them for offline use was another strength that endeared students to the use of this technology in learning because it afforded them the chance to continue their learning in places without internet connections.

Concerning the question of the challenges faced while using ICT, the main problem reported was a lack of clear instructions on the activities participants were required to do. This, combined with instructors' delayed responses to student queries, had the potential to disrupt the smooth flow of the learning process. The students were concerned that these two weaknesses slowed them down as they had to wait longer to get clarification. One way of averting such a design problem would be to have the course content reviewed by multiple parties at the development stage before it is administered to the intended users. Having a "second eye" could improve the content by reducing inconsistencies and ambiguities.

Secondly, the ambiguity, lack of clarity, and delayed responses could be an indicator of instructor technological inexperience or training. Evidence from past research (e.g, Howlett & Waemusa, 2018) points to a variance in ICT proficiency along the digital native and digital immigrant divide. They found some teachers (digital immigrants) were more likely to struggle when integrating technology into their classrooms. The teacher in this study that was less proficient in technology was most challenged to guide their students in ICT-integrated courses. The instructor became a barrier instead of a facilitator to effective learning on the ICT platform (Howlett & Waemusa, 2018). Such a problem could be addressed by having the schools provide professional development to help teachers embrace technology and be comfortable enough to integrate it into their teaching.

As earlier mentioned, the research site and many other high schools in Kenya face a shortage of computers to accommodate the large student population. This presented a challenge to incorporate more participants into our study and informed the choice of five participants to match the number of available computers. One irony of this is the ability of mobile phones to support the functions of the two ICT applications. However, the existing school policies do not allow students to use their phones within the school. This was an issue the participants felt was a barrier to online learning, especially during power outages where mobile devices would come in handy due to their ability to store charge.

Debates have been raging in the recent past over whether or not these devices affect the teaching and learning process and if it is time they are embraced in the classroom. A number of researchers have investigated the impact of mobile technology and its usage on academic achievement and their findings suggest that

powerful learning is possible with mobile devices, but only when properly supported and managed by teachers. Perhaps policymakers should rethink the issue and consider allowing the use of mobile devices that present a cost-effective and reasonably reliable method to integrate ICT in the classroom.

Conclusion and Implications

The future success of education in Kenyan high school classrooms depends on how the integration of technology in learning will be managed at both content and delivery levels. From the findings of this study, it was evident that ICT tools easily facilitated access to online learning environments and encouraged knowledge sharing and collaboration among students and their teachers. Students were engaged, encouraged to study on their own, and became self-dependent. Learning was simplified and students developed positive attitudes toward STEM courses.

Educational stakeholders should be encouraged to integrate ICT into classroom teaching and learning. The classroom consisting of digital natives was most comfortable with the use of technology. Concerted efforts ought to be, therefore, geared toward designing ICT-integrated lessons which are more engaging and enjoyable. The online learning applications and materials should be designed to be reasonably affordable to ensure equitable access to technology by all learners.

Rather than prohibiting mobile devices and hindering the potential of integrating ICT in learning, schools and policymakers should construct policies and systems to promote the proper use of mobile devices in the classroom environment. Based on their availability, versatility, and reasonably low cost, mobile phones can aid in supporting the integration of technology in the classroom and improving student attitudes toward STEM. Finally, teachers need to be given adequate training on how to manage, utilize, and effectively integrate technology into their classroom learning activities.

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Self-Determination and Children with AD/HD: A Synthesis of the Literature

by

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Abstract

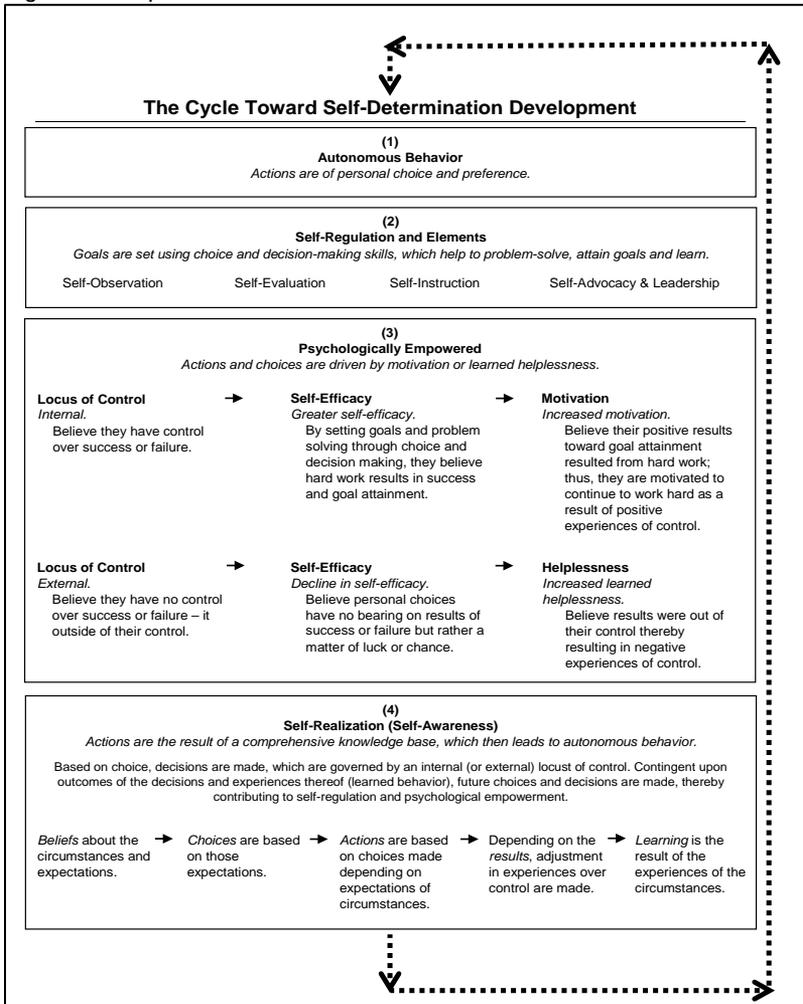
There is no known empirical research on self-determination of children with AD/HD. The purpose of this paper is to discuss the definitional framework of self-determination, the relevance of self-determination for children with disabilities, particularly those with AD/HD, and implications for future research as it relates to children with AD/HD. Children with AD/HD are less successful in school compared to children without AD/HD. This may be due in part to a lack of social skills, social awareness, opportunities to learn how to make appropriate choices, decisions, or problem-solve based on previous outcomes of the same, and their ability to understand why they should or should not do it again. All of these opportunities are essential elements that contribute to successful self-determination. Their lack of success may be attributed to poor self-determination skills.

Empirical research in the area of self-determination of children with Attention Deficit/Hyperactivity Disorder (AD/HD) does not exist. The purpose of this paper is to discuss the definitional model and framework of self-determination, the relevance of self-determination for students with AD/HD, implications and contributions to the success of students with AD/HD. Definitions of self-determination vary, however, there are common themes throughout. A summary of these common themes for "self-determination is a combination of skills, knowledge and beliefs that enable a person to engage in goal-directed, self-regulated, autonomous behavior. An understanding to one's strengths and limitations together with a belief in oneself as capable and effective are essential to self-determination. When acting on the basis of these skills and attitudes, individuals have greater ability to take control of their lives and assume the role of successful adults" (Field et al., 1998, p. 2).

Within this definitional framework, self-determined behavior refers to "actions that are identified by four essential characteristics: (a) the person acted autonomously (b) the behavior(s) are self-regulated (c) the person initiated and responded to the event(s) in a psychologically empowered manner and (d) the person acted in a self-realizing manner" (Wehmeyer et al., 1997b, p. 306). *Behavioral autonomy* refers to the actions of a person that are the result of their own preferences, interests and abilities "free from undue external influence or interference" (Wehmeyer, 1997a, p. 180). A person who demonstrates *self-regulation* utilizes "self-monitoring, self-instruction, self-evaluation and self-reinforcement" within their environment, thus, contributing to "goal setting and attainment behavior, problem-solving and observational learning strategies" (Wehmeyer, 1997a, p. 180). Referring to the multiple dimensions of perceived control, *psychological empowerment* involves: (a) personal efficacy (value or worth), (b) locus of control (belief of having control over or influence outcomes), and (c) the motivational domains of an individual (believes outcomes was within their control [e.g., hard work] versus learned helplessness, in that negative outcomes was out of their control). A person acting in a *psychologically empowered manner* does so on the belief that they "(a) have control over circumstances that are important to them (internal locus of control), (b) possess the skills necessary to achieve desired outcomes (self-efficacy), and (c) if they choose to apply those skills, the identified

[desired] outcomes will result (outcome expectations)" (Wehmeyer, 1997a, p. 180). Finally, *self-realizing* actions are a result of a "comprehensive and reasonably accurate knowledge base" that capitalizes on the strengths and limitations of that knowledge base (Wehmeyer, 1997a, p. 181). When a person demonstrates self-determination, they act autonomously, self-regulates their behavior and becomes psychologically empowered and self-realizing (Wehmeyer et al., 1997b). All four characteristics must be reflected in varying degrees of the actions of a person who is self-determined. However, the impact of the degree to which these elements may be expressed may vary over time and across environments (Wehmeyer et al., 1997b). It is at this level of the definitional framework that instructional emphasis will occur, thereby, allowing the development toward self-determination (Wehmeyer et al., 1997b). See Figure 1 for a visual interpretation of the essential elements and process toward self-determination.

Figure 1 Interpretation of Essential Elements and Self-Determination Process



The validation of the definitional framework presented by Field et al. (1998) was tested by Wehmeyer, Kelchner and Richards (1995a, 1996a) through interviews

of more than 400 adults with intellectual and developmental disabilities using self-report measures of self-determined behavior and each of the essential characteristics. The group were divided into two subgroups, comparing each essential characteristic: those who scored high on the self-determination measure and those who scored low. The group that scored high on the self-determination measure held more positive beliefs or exhibited more adaptive behavior with high measures of behavioral autonomy and self-regulation than those who scored low (Wehmeyer et al., 1997b). Component elements used to correlate high levels of self-determination were: choice-making, decision-making, problem-solving, goal-setting and attainment skills, self-observation, self-evaluation and self-reinforcement, self-instruction skills, self-advocacy and leadership, internal locus of control, positive attributions of efficacy and outcome expectancy, self-awareness, and self-knowledge.

Although these elements are life-long and begin when children are very young, some have greater applicability and importance for students in secondary education and transition to predict post-graduation success (Wehmeyer et al., 1997b). With recent advances in federal laws governing services for children with disabilities, the Individuals with Disabilities Education Act (IDEA) and the re-authorized version of Improving America's Schools Act to No Child Left Behind (NCLB) to Every Student Succeeds Act (ESSA), strengthen the emphasis on allowing children with disabilities greater success, both during school and post-school endeavors. Grigal and colleagues (2003) reported that recent revisions to IDEA and Amendments of 1997, P.L. 105-17 further supported student involvement and empowerment by stating:

Students with disabilities be invited to any IEP [Individualized Education Program] for which a purpose is the consideration...of transition services (Assistance to States, 1999, p. 12440), and that the transition services provided to each student be...based on the individual student's needs, [considering] the student's preferences and interests (p. 12475) (Grigal et al., 2003, p. 98).

The Division on Career Development and Transition (DCDT) is increasingly concerned about limited post-secondary outcomes of youth with disabilities and affirms their concerns through recent position statements referencing the same (Field et al., 1998). One of the reasons for the increased focus of self-determination and post-secondary outcomes is that self-determination is highly correlated to positive adult outcomes. Self-reporting measures provide a way to assess self-determination.

The Arc's Self-Determination Scale is a self-report scale used to effectively measure the level of self-determination of individuals with disabilities (Wehmeyer and Kelchner, 1995b). The Scale includes the four primary domains as discussed previously (i.e., *autonomy, self-regulation, psychological empowerment and self-realization*). The Scale was used as a self-report measure in an initial pilot and follow-up field study conducted by Wehmeyer (1996a) for students with cognitive disabilities (primarily intellectual and learning disabilities) in an effort to establish validity and reliability as a student self-report measure.

Dividing autonomy and self-regulation into two sub-domains, the Scale more specifically measures: "(a) independence and (b) acting on the basis of preferences, beliefs, interests and abilities" (Wehmeyer, 1996a, p. 283). Sample questions from the two subdomains for *autonomy* include: "I make my own meals or snacks. I use the post office. I do free time activities based on my interests. I choose my own hair style", relating to independence and preference (Wehmeyer, 1996a, p. 285). *Self-regulation* is represented "first by a story-based format presenting a

problem in the beginning and an outcome at the end" (Wehmeyer, 1996a, p. 285). These story-based prompts require self-regulation skills that are further divided into additional subcategories to better assess the individual's "(a) interpersonal cognitive problem-solving, and (b) goal setting and task performance" (Wehmeyer, 1996a, p. 283). The following is an example story prompt used to help measure interpersonal cognitive problem-solving:

"Beginning - You are sitting in a planning meeting with your parents and teachers. You want to take a class where you can learn to work as a cashier in a store. Your parents want you to take the Family and Child Care class. You can only take one of the classes.

Ending - The story ends with you taking a vocational class where you will learn to be a cashier" (Wehmeyer, 1996a, p. 285).

The second sub-domain of *self-regulation*, representing goal-setting and task performance, is measured by questions that ask students to identify "...one goal in each of three major transition areas (living, working and transportation) and the steps they will need to take to meet each goal" (Wehmeyer, 1996a, p. 285). Outcomes include student responses related to planning and goal setting for each area. Students' scores are based on the number of goals and tasks they generate (Wehmeyer, 1996a).

Scores for *psychological empowerment* are based on items presented using a forced-choice format. Constructs that make-up these items include "...locus of control, self-efficacy and outcome expectancy...which provide an overall indicator for perceived control" (Wehmeyer, 1996a, p. 286). Item foci for *self-realization* include "...self-awareness, self-acceptance, self-confidence, self-esteem and self-actualization" (Wehmeyer, 1996a, p. 286). Eleven factors addressing multiple aspects of self-realization represent the final domain used to measure self-determination skills on The Arc's Self-Determination self-report Scale.

Wehmeyer (1996a) conducted an empirical validation of the self-report with 400 adults with intellectual and developmental disabilities. Participants were divided into two dichotomous groups indicating high or low self-determination skills based on characteristics reflecting those skills. Analysis indicated significant differences between subgroups. High levels of self-determination were found in individuals who demonstrated behavior consistent with essential characteristics of self-determination. In contrast, low levels of self-determination were found among individuals who did not exhibit essential characteristics.

Wehmeyer and Kelchner (1995b) utilized the Scale in a pilot study of adolescents with cognitive disabilities. The pilot included 261 secondary-age students from three States (Texas, Alabama and Virginia). Separate factor analyses were conducted on all four domains, including the two sub-domains for autonomy and self-regulation; at least one unique factor for each area was represented. Concurrent validity was established by correlating scores from the Nowicki-Strickland Internal-External Scale (ANS-IE: Nowicki and Duke, 1974). This assessment measures locus of control. The Intellectual Achievement Responsibility Questionnaire (IARQ; Crandall, Katkovsky, and Crandall, 1965), measures "...student attribution of responsibility for academic success and failure" (Wehmeyer, 1996a, p. 287). Correlations on these assessments yielded ($r = .41$, $p = .0001$) for *psychological empowerment* using the ANS-IE, and ($r = .46$) for *self-regulation*, and ($r = .48$) for *psychological empowerment* using the IARQ.

From the results of the pilot, Wehmeyer (1996a) conducted a follow-up wider field test consisting of "500 students from schools in urban, suburban and rural districts in five States (Texas, Virginia, Alabama, Connecticut, and Colorado) who were identified by their respective school districts as receiving special education

services" (p. 287). Disabilities included: intellectual, specific learning disabilities, emotional disorders, and attention difficulties. Construct and concurrent validity of the instrument was established and was found consistent with The Arc's Self-Determination Scale (see Wehmeyer, 1996a, for detail Factor loading). Internal consistency reliability was calculated using Cronbach alpha and yielded .90 for the Scale as a whole, *Autonomy* yielded .90, *Psychological Empowerment* was .73, and *Self-Realization* was .62 (Wehmeyer, 1996a, p. 291). These significant outcomes are important in that they help identify individuals with high and low self-determination skills. Empirical research shows those with high self-determination are more successful than those with low self-determination.

Positive Adult Outcomes

With the increased focus on self-determination, Wehmeyer and Schwartz (1997c) reported a link between self-determination and positive adult outcomes. Utilizing the Arc's Self-Determination Scale to examine self-determination and positive adult outcomes for youth with intellectual or learning disabilities, 80 participants were surveyed using personal, parent, teacher and telephone interviews. Participants were divided into two groups depending on the results of the Scale (i.e., those with low scores on the Scale had low self-determination skills and those with high scores had high self-determination skills). Nine months post-graduation, a follow-up survey was administered via mail and telephone interviews to determine student outcomes. Although most of the participants still lived at home with their parents, Wehmeyer and Schwartz (1997c) found those with high scores on the Scale (i.e., high levels of self-determination) were more successful and had greater positive outcomes (i.e., desired to live on their own, maintained checking or savings accounts, or both, attained full- or part-time employment with higher income) than participants who had low scores on the Scale. Moreover, those with greater self-determination skills also showed significant differences than those who had poorer self-determination skills as they were more autonomous (i.e., independent) and demonstrated more psychological empowerment (i.e., locus of control over circumstances important to them, self-efficacy, and choice-making). Chi square analyses showed no significant differences among participants across IQ or those who graduated high school or received a certificate of completion; however, five of the 80 participants were classified as having dropped out.

Wehmeyer et al. (1997c) reported overall findings that high self-determination is linked to greater success and more positive adult outcomes. Those with high self-determination maintained their job, were paid more, and had greater locus of control than did those with poor self-determination. Youth who drop out are at a disadvantage in the areas of post-secondary education and training, employment, and overall independence, all of which contribute to positive adult outcomes (Alberton et al., 1997, p. 198). Individuals with poor self-determination are at risk for dropping out of school, thereby resulting in unsuccessful adult outcomes (Wehmeyer et al., 1997c). Among students who drop out, the majority have disabilities, including AD/HD. Given self-determination skills are important predictors of success, pre- and post-graduation, could the utilization of the self-determination scale among secondary students help to offset the risks and the upward trend of dropouts to better inform proactive interventions?

Profiles of School Dropouts

Overall, the national dropout rate is 12 percent of all school-age children (National Center for Education Statistics, 1993, 1997, 2000), and 40 percent of those students have disabilities (U.S. Department of Education, 1993). The majority of students who drop out are those with SLD and BD. It is estimated that of the overall 12 percent of dropouts, students with specific learning disabilities (SLD) make up 17

percent to 42%. Students with BD account for 21 percent to 64 percent of dropouts. (Lichtenstein and Zantol-Wiener, 1988; National Center for Education Statistics, 1993, 1997, 2000).

Scanlon and Mellard (2002) reported that “overall evidence of life experiences of adults with SLD or BD reflect limited quality of relationships and socialization, economic independence, and academic achievement” (p. 239). Self-determination is the application of essential characteristics that contribute to life experiences (Wehmeyer, 1997a). One possibility as to why the majority of dropouts include those with SLD or BD may be attributed to their life experiences prior to deciding to drop out.

Scanlon and Mellard (2002) studied the antecedents and post-dropout experiences of students with SLD, BD and AD/HD. The study included 277 volunteers from a Midwestern community with an annual high school dropout rate of approximately 12.15 percent for grades 9 through 12, ranging in ages 16 to 21 (p. 242). Four separate groups were formed and interviewed using a personal or telephone interview:

- 1) Participants with SLD, BD and/or AD/HD who dropped out, but had attained a GED ($n = 14$),
- 2) Participants without SLD, BD and/or AD/HD who had dropped out and were pursuing a GED ($n = 90$),
- 3) Participants with SLD, BD and/or AD/HD who had dropped out and were pursuing a GED ($n = 52$), and
- 4) Participants with SLD, BD and/or AD/HD still enrolled in high school ($n = 121$).

Interview questions focused on decisions contributing to dropping out and adult outcomes. When asked, "To what do you attribute your problems in school?" respondents in all three groups having SLD, BD and/or AD/HD reported a lack of interest and poor attendance, whereas those still enrolled in school reported difficulties relating to their disability (i.e., reading). All three dropout groups reported that behavioral or emotional disability-related problems (i.e., social and/or cultural) contributed to decisions of dropping out rather than academic or physical disability challenges (Scanlon et al., 2002, p. 252). The majority of students with BD and/or AD/HD reported special education participation (i.e., 90%), despite services being provided to students with SLD. These findings are consistent with Kauffman (1999) wherein students with BD are often poorly served at the secondary level. Due to unsatisfactory and stigmatizing options, students with BD may be placed in other programs that mainly service students with SLD or other disabilities (Kauffman, 1999). As a result, lack of services addressing primary needs may attribute to their decision to drop out (Kauffman, 1999; Colley and Jamison, 1998).

Scanlon et al. (2002) also reported that self-confidence may attribute to whether or not adults who dropped out of high school returned to further their education. For example, those with SLD reported that their reading abilities were "average" or "very good". However, there was inconsistency between self-reports and their qualifying characteristics of having a SLD. Because reading is a primary area of difficulty for adult education participants and individuals with SLD (National Adult Literacy and Learning Disabilities Center, 1999), a generalization may be that participation in adult education programs led to increased self-confidence (Scanlon and Mellard, 2002, p. 252). Considerable overlap between characteristics defining SLD, AD/HD, and BD exists. Given the high number of dropouts have an identified disability, and that choice and self-regulation are important constructs of self-determination, it is important to consider how we're preparing preservice teachers. Are they able to recognize disparities among students with AD/HD, SLD and BD and

understand how to provide more targeted interventions that help to strengthen self-determination skills?

Overlapping Characteristics of Disabilities

In recent updates to IDEA, students with AD/HD may now be afforded services in special education. According to the criteria for identifying children with other health impairments, those with AD/HD may qualify for special education if the behavior is "manifested by heightened alertness to environmental stimuli that results in limited alertness with respect to educational performance" (511 IAC 7-26-12). Moreover, the criteria used to identify children with AD/HD are defined by the American Psychiatric Association's (2000) *Diagnostic and Statistical Manual of Mental Disorders* (4th Ed) (DSM-IV-R). Core features of the disability include impulsivity (i.e., difficulty awaiting their turn), hyperactivity (i.e., talking excessively in class), and difficulties with sustained attention (i.e., not listening to class instructions), three subtypes are proposed in the current clinical view of AD/HD of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; APA, 2000): Predominantly inattentive (PI); Predominantly Hyperactive-Impulsive (PHI); and Combined types (C).

DSM-IV-R amalgamates supplemental criteria to the above three subtypes with "...clear evidence of clinically significant impairment in social, academic, or occupational functioning" (APA, 2000, p. 84). Because school identification processes "rely heavily on the presence of hyperactivity or other externalizing behavior, the implication is that children who may have purely attentional difficulties, may, as a result, experience concurrent academic difficulties, but are not hyperactive...and may not be identified; or, if identified, they will be identified as LD" (Riccio et al., 1994, p. 312). AD/HD may attribute to learning or behavioral disabilities, thereby, creating a perceived overlap of characteristics of AD/HD, SLD and BD (Riccio et al., 1994).

Zentall (1989) found overlapping evidence of self-control disorders for children ages 3 to 6 who were identified as having AD/HD. The Behavioral Rating Scale (BRS) (also referred to as the Kendall Self-Control Rating Scale [Kendall and Wilcox, 1979]) was used to identify these types of behavior. Overlapping characteristics included social problems and aggressive behavior (i.e., peer rejection associated with high rates of negative and off-task behavior.) Due to these overlaps in characteristics of AD/HD, SLD and BD, it is necessary to further examine the overlap in difficulties among these populations. In doing so, more targeted interventions can be provided to help offset the correlational data between strong locus of control, self-determination, and success.

Difficulties Associated with Disabilities and Self-Determination Skill Acquisition

Locus of control, problem-solving and self-regulation are all essential components of self-determination. Behavior of children with AD/HD may inhibit acquisition of skills associated with self-determination, resulting in poor outcomes pre- and post-graduation. Locus of control (internal or external) are strong indicators of strong or poor self-determination.

Adapting to one's own environment includes locus of control and the ability to problem-solve (Wehmeyer (1993a). Locus of control may be defined by *internal* (i.e., reinforcement or consequence is the result of one's own actions) or *external* (i.e., reinforcement or consequence is the result of some other source other than personal actions [e.g., fate or luck]) orientations (Wehmeyer, 1993a). In other words, locus of control contributes to how a person perceives contingency relationships between personal actions and outcomes (Wehmeyer, 1993a, p. 359).

Bar-Tal and Bar-Zohar (1977) found a relationship between academic achievement and locus of control. Greater internal orientations of locus of control lead to greater success for students with and without learning disabilities (Rogers and Saklofski, 1985; Bar-Tal and Bar-Zohar, 1977). Similarly, Ollendick, and Schmidt (1987) found consistent relationships between sociometric ratings of rejection from peers, peer interaction, and external locus of control scores. Students who were rejected more by peers and had greater negative peer interaction also had greater external locus of control scores.

In a study differentiating locus of control scores of students with learning disabilities, Wehmeyer (1993a) found that students with learning disabilities and attentional problems reported greater external locus of control than internal locus of control. Two measures were utilized in this study (a) The Adult Nowicki-Strickland Internal-External Scale (Nowicki and Duke, 1974), and (b) the Intellectual Achievement Responsibility Questionnaire (Crandall, Katkovsky, and Crandall, 1965). Participants included 104 students identified as having a learning disability from schools located in five different states (Texas, Nebraska, New Hampshire, Alabama, and Louisiana).

Although caution is recommended in generalizing results of this study due to a lack of a comparison group, results are consistent with previous studies. External scores for locus of control for students with learning disabilities may help explain repeated failures, labeling with the school systems, segregation among peers and peer rejection (Wehmeyer, 1993a). "Their perceptions influence both how they feel about themselves and how they interact with their environment" (Wehmeyer, 1993a, p. 363). Therefore, experiences "of lack of control lead to perceptions of uncontrollability" (Wehmeyer, 1993a, p. 363). These factors may result in less than desirable adult outcomes (Wehmeyer, 1993a).

Choice- and decision-making, and problem-solving are all essential components of self-determination. Children with AD/HD and/or SLD have shown consistent difficulties associated with these skills (Tant and Douglas, 1982; Zentall et al., 1994, Zentall, 1975, 1990). Unlike choice-making (selecting between alternatives based on individual preferences), decision-making skills refer to a broader set of skills that incorporate choice-making as one component (Wehmeyer et al., 1997b). Problem-solving, choice- and decision-making are interdependent in that success of one depends on the other and vice versa (Wehmeyer et al., 1997b).

Zentall and Ferkis (1993) examined problem-solving skills of children with SLD, both with and without AD/HD. They found that cognitive ability (i.e., short term memory and reading abilities) and cognitive style (i.e., speed, accuracy and time) interactions contribute to problem-solving deficits (Zentall and Ferkis, 1993). By placing more attention to the process of problem-solving, they found that slow and inaccurate computational skills contributed significantly to poor problem-solving (Zentall and Ferkis, 1993).

Problem-solving involves the process of weighing the adequacy of various solutions to a problem (a task that does not present an immediate perceivable solution), requiring the person to respond in order to function effectively in their environment (Wehmeyer et al., 1997b). Within this component, two primary contextual domains of problem resolution exist, including (a) impersonal problem-solving and (b) social problem-solving (Wehmeyer et al., 1997b). Focusing on the latter, social problem-solving is defined as the emphasis on "cognitive and behavioral strategies that enable individuals to interact with one another and to cope in an increasingly social world" (Wehmeyer et al., 1997b, p. 311).

Wehmeyer et al., (1997b) asserts that these component elements are life-long and recommend they be incorporated and enhanced throughout the learning

process of a student's educational career. He further explains that self-determination skills not only need to be taught throughout the learning process, social skills training is also just as important. Social skills training, "while important, social skills training alone is not enough to address deficits in social interactions exhibited by youth and adults with disabilities" (p. 311). In fact, "problem-solving skills are embedded into virtually all decision-making procedures...and one must first engage in problem-solving before decision-making can occur" (Wehmeyer et al., 1997b, p. 311), thus overlapping the instructional emphasis with that of decision- and choice-making.

Because children with AD/HD have difficulties with decision-making, they may also have difficulties with problem-solving. Choice-making, decision-making, and problem-solving all contribute to success or failure in social interactions. As a result, children with AD/HD who exhibit poor social skills may be doing so as a result of poor choice, decision-making, and problem-solving skills. In other words, poor choice- decision-making and problem-solving skills may inhibit success in social interaction for children with AD/HD. Zentall (1993) reported that because students with AD/HD fail to attend to relevant stimuli and build conceptual knowledge needed to problem solve, problem-solving abilities may be inhibited.

Impulsivity is one of the identifiers for individuals with AD/HD (i.e., fast and inaccurate responding to stimuli). If children with AD/HD have difficulty appropriately responding to stimuli, then it would be expected that similar difficulties would exist for choice- and decision-making. Thus, the importance of each consequence and the probability of each occurring would have to occur *prior* to making the decision. In order for effective choice- and decision-making to occur, Wehmeyer et al., (1997b) suggests that children need to learn how to define issues requiring a decision, research and collect information about their situation, and then explore options based on their findings. Impulsivity inhibits this thought process (Zentall, 1993).

Self-observation, -evaluation, -instruction, -reinforcement, and goal-setting and attainment skills are all essential elements of self-determination. Self-monitoring strategies teach children "to assess, observe and record their own behavior" (Wehmeyer et al., 1997b, p. 313). Self-evaluation strategies enable students to track and evaluate their progress on educational activities, including goals and objectives. Self-regulation is the utilization of self-reinforcement strategies (the self-administration of consequences), either positive or negative, that are contingent upon the occurrence of a target behavior. And, self-instruction involves teaching students to provide their own verbal prompts for solving an academic or social problem, which almost always is immediate" (Wehmeyer et al., 1997b, p. 313). Children with disabilities, particularly those with AD/HD, have difficulty with attentional focus and regulating their own behavior (Zentall et al., 2001; Zentall et al., 1998).

Empirical research shows a deficit in self-regulating behavior that overlap characteristics of self-control disorder of children with AD/HD (Zentall, 1989). Hoff and DuPaul (1998) reported children who demonstrated problematic behaviors associated with self-control also experience numerous negative affects among peers (i.e., peer rejection, lying, and stealing). This behavior overlaps essential elements of self-determination in that individuals must self -observe, -evaluate, and -reinforce their own behavior (Wehmeyer, 1997a). Additionally, high levels of self-determination reflects the ability to self-advocate and to have self-awareness and knowledge of situations that also contribute to autonomous behavior (Wehmeyer, 1993a).

In a study examining choice opportunity and self-regulation training on the self-engagement of learning among children with learning and/or behavioral disabilities, Mithaug and Mithaug (2003b) found positive effects of self-regulation instruction on achievement during subsequent independent seatwork (71 percent

increase over baseline) (p. 155). As the opportunity to self-regulate their own behavior increased, the quality of their independent seatwork improved as well. Six children, ages five to seven, participated in the study. "When students are motivated by an optimal opportunity to learn something new and when they know how to set expectations [i.e., goal-setting], make choices [i.e., choice- and decision making], take action, and monitor progress toward their expectations [i.e., self-regulation], their self-regulation improves as their adjustments optimize to maximize learning" (Mithaug and Mithaug, 2003b, p. 155).

Another element used to measure high levels of self-determination is goal-setting and attainment. Wehmeyer et al., (1997b) asserts "goal setting theory is built on the underlying assumption that goals are regulators of human action, which is true for education motivation and achievement" (p. 312). One of the domains included in decision-making and problem-solving was *planning* (e.g., identifying consequences, assessing outcomes, and differentiating between courses of action.). As goal-setting and attainment maintain similar domains used to assess decision-making and problem-solving, and since children with AD/HD have difficulty in these domains, they may also have difficulty with goal-setting and attainment. Overlapping constructs were evidenced in the study by Mithaug and Mithaug (2003b), wherein goal-setting and attainment were components needed for self-regulation training (p. 142).

Self-advocacy and leadership skills are important elements of self-determination. To be an advocate, one must "speak up or defend a cause or person". (Wehmeyer et al., 1997b, p. 313). In order for children to learn self-advocacy and leadership skills, instruction should emphasize how to (a) be *assertive* not *aggressive* (e.g., be self-confident not forceful or confrontational), (b) communicate effectively in one-on-one, small group, and large group situations, (c) negotiate, compromise and use persuasion, (d) be an effective listener, and (e) navigate through systems (e.g., applying for social security) (Wehmeyer et al., 1997b, p. 314). Likewise, knowing one's own strengths and weaknesses supports an individual's ability to use strategies, such as negotiation and compromise to achieve a goal" (Wehmeyer et al., 1997b).

Empirical research shows deficits in choice, decision-making, and problem-solving abilities. (See, e.g., Tant and Douglas, 1982; Wehmeyer et al., 2003; Zentall et al., 1990, 1993, 1994, 1998, 2001). Effective choice- and decision-making, problem-solving and self-regulation require overlapping skills (Wehmeyer et al., 1997b). Due to these skills overlapping, individuals with these disabilities who demonstrate deficits in these areas may also have deficits in acquiring skills to be effective self-advocates or leaders.

Although some children with AD/HD, SLD and BD exhibit deficits in essential components of self-determination (i.e., locus of control, choice- and decision-making, problem-solving, and self-regulation), it is important to assess prospects of self-determination among these populations. Wehmeyer et al. (1997b) reported correlations of high self-determination and positive adult outcomes for students with disabilities. Thus, children with AD/HD, SLD and BD are capable of acquiring skills for self-determination.

Prospects of Self-Determination Among Children with and Without Disabilities

Regulating adjustments to new opportunity affects learning and prospects of self-determination (Mithaug, Campeau, and Wolman, 2003a, p. 61). Any "decrement in achievement or in self-determination prospects can be traced to inadequate adjustment capabilities" because school achievement is a function of adjustments to opportunities for gaining knowledge. (Mithaug et al., 2003a, p. 61-62).

That is to say, “low achievement is due to inadequate adjustments in learning opportunities” and “self-determination prospects are affected by adjustment inadequacies” (Mithaug et al., 2003a, p. 61). Mithaug et al. (2003a) hypothesized that children who are in special education are said to be ‘underachievers’, thereby inadequately adjusting to opportunities to learn (Mithaug et al., 2003a, p. 62). Self-determination prospects are functions of adjustments to opportunities to learn and those who inadequately adjust to opportunities for self-determined gain have lower prospects for self-determination. Therefore, because students in special education adjust inadequately to opportunities for self-determined gain, they are likely to have lower prospects for self-determination (Mithaug et al., 2003a, p. 62).

The Air Self-Determination Scale was used to “assess students’ capacity to adjust to opportunities for self-determined gain. [It] measured how well they connected beliefs about what they needed, wanted, and could do with their expectations, choices, actions, and results. [In addition, it] assessed opportunities for self-determined engagement...of circumstances at school and home and allowed students to engage and control events” that produced the expected gain (Mithaug et al., 2003, p. 63).

Both teachers and students were surveyed using the scale. Some sample items used to determine whether the student had opportunities and the capacity to perform self-determined behavior included:

Capacity to Self-Determine

- Student expresses own interests, needs, and abilities.
- Student sets expectations and goals that will satisfy own interests, needs, and wants.
- Student makes choices, decisions, and plans to meet own goals and expectations.

School Opportunities to Self-Determine

- Student has opportunities at school to explore, express, and feel good about own needs, interests, and abilities.
- Student has opportunities at school to identify goals and expectations that will meet his or her needs, interests, and abilities; to set these goals; and to feel good about them.
- Student has opportunities at school to learn about making choices and plans, to make them, and to feel good about them (Mithaug et al., 2003a, p. 64).

Some sample items used to determine the students’ own perception about their ability to perform self-determined behavior included:

Capacity to Self-Determine

- I know what I need, what I like, and what I’m good at.
- I set goals to get what I want or need. I think about what I am good at when I do this.
- I figure out how to meet my goals. I make plans and decide what I should do.

School Opportunities to Self-Determine

- People at school listen to me when I talk about what I want, what I need, or what I’m good at.
- People at school let me know that I can set my own goals to get what I want or need.
- At school, I have learned how to make plans to meet my goals and to feel good about them (Mithaug et al., 2003a, p. 64).

Mithaug et al. (2003a) field tested the Scale with 72 schools and assessing 450 students with disabilities (including those with AD/HD, LD, BD, intellectual disabilities and physical and sensory impairments) and those without. Of the 450 students, 39 percent were female and 61 percent were males ranging in age from 6 to 25 years old. Of the students enrolled, 82 percent were receiving special education services. The scale reported good reliability using alternative-item tests, split-half test for internal-consistency, and test-retest correlations ranging from .91 to .74 respectively. Validity was established using factor analysis.

Results of the study showed no significant differences on levels of self-determination among students by gender, ethnicity, or age. Students enrolled in general education, however, received significantly higher self-determination ratings than those enrolled in special education (Mithaug et al., 2003a, p. 67). The study provided "indirect evidence to support the claim that self-determination and achievement are correlated because both are a function of the ability to adjust to challenging circumstances" (Mithaug et al., 2003a, p. 74). "The opportunity to learn from a challenge and the adjustment to that opportunity affect learning and achievement. And the opportunity for self-determined gain and the adjustment to that opportunity affect prospects for self-determination. Therefore, achievement does not cause self-determination to increase or decrease, nor does self-determination cause achievement to increase or decrease. Self-regulated adjustments to challenging opportunities cause them to increase or decrease" (Mithaug et al., 2003a, p. 74).

Prospects of self-determination for children with disabilities appear to be equivocal with children without disabilities. However, due to the required ability to self-regulate adjustments to opportunities to learn, children with disabilities appear to be at a disadvantage compared to those in general education (Mithaug et al., 2003a). This is to say that children who are in special education are required to connect beliefs about their needs and wants with their expectations, choices, actions and results. In order to demonstrate a connection between beliefs and expected outcomes, choice- and decision-making, problem-solving and self-regulation skills are required (Wehmeyer et al., 1997b). Empirical research shows that children with disabilities, particularly those with AD/HD, have difficulty with choice- and decision-making, problem-solving and self-regulation. Therefore, findings reported by Mithaug et al. (2003a) are not surprising when considering the amalgamating skills required for self-determination are hindered among children with AD/HD, SLD and BD.

Caution is recommended in generalizing these findings. Socioeconomic status and adjustment capability resulting in opportunities for self-determined gain at home for children with and without disabilities should also be examined. Findings from this study showed children who were in special education also were categorized as low-income. Thus, findings of low self-determination scores could be either or both factors of having a disability and/or being of a lower socioeconomic status (Mithaug et al., 2003a).

Prospects for self-determination were evidenced for general and special education settings. Although capability for adjustment was greater for those in general education, those in special education appear to be at a disadvantage. This may in part be due to either or both barriers of having a disability or a low socioeconomic status. To increase capability for adjustment and allow children with disabilities increased opportunity for self-determined gain, self-determination skill acquisition should be included in the curriculum.

Teaching Self-Determination Skills

A survey of high school transition teachers in Tennessee was conducted to measure teachers' perceptions of self-determination, the importance of it, and

teaching skill acquisition for it (Hughes et al., 1997). Findings showed they used a total of 172 strategies promoting self-determination skills. Ironically, they also discovered the extent to which teachers actually implemented strategies relating to self-determination was unknown.

Results from a similar survey by Agran, Snow and Swaner (1999) showed that even though teachers rated self-determination as a critical part of the curriculum, 55 percent of the respondents indicated that student IEPs or transition plans did not include self-determination goals or objectives, or that they only appeared on "some" of them. Subsequent research by Wehmeyer and Schwartz (1998) revealed analogous findings after examining more than 800 transition goals of IEPs of students with intellectual disabilities who were receiving services in two states. In fact, of all the IEPs examined, not a single goal addressed self-determination of any component (e.g., problem solving, setting and tracking goals, making decisions, etc.).

Corroborating these findings, Wehmeyer, Agran, and Hughes, (2000a) surveyed teachers on self-determination to assess their utilization of student-directed learning strategies with adolescents with disabilities. Results of 1,219 surveys covering the 50 States of the United States showed 60 percent of respondents were familiar with the term and 90 percent to 98 percent stated that choice-making and goal-setting were important elements of self-determination instruction. However, beliefs about self-determination and actual implementation of strategies that promote the same were not paralleled. Only 22 percent of respondents indicated that "...all their students had IEP goals in this area" (p. 63). Moreover, Wehmeyer et al., (2000a) found that teachers of students with more severe disabilities rated self-determination instruction as less important compared to teachers of students with mild disabilities across all components, except for choice-making. This may be attributed to the abundance of research supporting the importance of choice-making for this population.

Research shows teachers are aware of self-determination and the importance of skill acquisition for children with disabilities. Empirical data also supports the importance of choice-making and goal-setting and their contribution toward strong (high) self-determination. Of all the research, however, questions yet to be answered are -- why isn't self-determination a standard part of the curriculum for both preservice teachers (in preparing them to be successful throughout their educational career, as well as prepare them to purposefully teach self-determination in their future classrooms) and why aren't teachers in the field purposefully teaching self-determination to their students?

Conclusion

A definitional framework for self-determination includes essential elements evidenced in people with high levels of self-determination. These elements include: decision- and choice-making, problem-solving, goal-setting and attainment, self-regulatory behaviors, and self-advocacy and leadership. Evidence of these elements are indicators of high levels of self-determination, substantiating high ratings of behavioral autonomy (e.g., actions of a person that are the result of their own preferences, interests and/or abilities) and self-regulation (e.g., self-regulating one's own behavior within their environment contributes to goal setting and attainment) (Wehmeyer, 1997a, p. 180). A person with self-determination is able to set and attain goals by making their own choices and decisions toward goal attainment. These choices and decisions are based on personal interests and abilities. Success is then afforded when consequences of their own actions are self-regulated thereby allowing for learning outcome adjustments.

To help determine whether an individual has self-determination, a self-report is an effective measure. Self-report measures showed that individuals with disabilities who had high self-determination scores were more successful than those with low scores. They maintained higher paying jobs and were more personally and financially independent than those with low scores. As such, positive adult outcomes were correlated with high levels of self-determination. In addition to individuals with low self-determination, among those considered to be unsuccessful were also individuals who chose to drop out of school.

Dropout rates among individuals with disabilities are alarmingly higher than those without disabilities. Contributing factors of individuals with AD/HD, SLD and or BD who dropped out of school included: lack of interest, poor attendance, social or cultural contributors, and self-confidence. This is important to consider when assessing self-determination in that those who drop out could be considered unsuccessful and having low self-determination skills. Because the rate of dropouts among individuals with disabilities is so high, it is important to consider characteristics of specific disabilities and how they hinder self-determination.

Considerable overlap between characteristics defining LD, AD/HD, and BD exists. Choice and self-regulation are important constructs of self-determination and indicate the ability to engage in goal-directed, self-regulated, autonomous behavior (Field et al., 1998). Among overlapping characteristics of individuals with AD/HD are difficulty in decision- and choice-making. Both of these elements are important indicators of successful problem-solving. However, among the research reviewed, there was no research that focused specifically on individuals with AD/HD. Future research is needed to help determine whether characteristics of individuals with AD/HD inhibit skill acquisition of problem-solving through decision- and choice-making is a result of a lack of opportunity, skill deficit or a hinderance due to challenges associated with their disability.

Further, children with AD/HD are more often rejected by peers and demonstrate more difficulties in social behavior than any other qualifying disability. Decision- and choice-making, and problem-solving contribute to social success (Wehmeyer et al., 1997b). Additional research is needed to help determine their lack of success in social interactions and how it was influenced by choices and decisions made during problem-solving interactions among peers, and to what extent rejection affects their self-determination.

Research shows self-regulation deficits exist among children with AD/HD and are affected by their choice- and decision-making, and problem-solving skills (Wehmeyer et al., 1997b). Future research is needed to help determine the effects of choice- and decision-making and problem-solving on self-regulation of behavior of children with AD/HD, as well effect of deficits on self-determination overall.

Finally, speaking in terms of preservice teacher preparation, because there is evidence that high self-determination results in positive adult outcomes, it is important to assess self-determination skills among preservice teachers early in their program. Given self-determination is an outcome that may only be achieved through adequate and sufficient opportunities to learn and practice it (Wehmeyer et al., 1997b), teacher educators need to be diligent to ensure the curriculum provides for purposeful teaching and practice opportunities among preservice teachers. While research shows teachers are familiar with self-determination and the skills associated with it, it is unclear why teachers do not include goals and objectives related to self-determination in students' IEP or within the general education curriculum. It is also unclear as to why self-determination is not a standard part of the curriculum from the outset. Future research is needed in the area of transition planning and self-determination curriculum for students with varying disabilities

among PreK-21+ programs, across environments. Curriculum development that includes transition and self-determination strategies for preservice teachers to learn about and practice self-determination skills themselves, throughout their educational program and training, so they are better equipped to offset their own deficits pre- and post-graduation. Early intervention is the key to success. Thus, improvement of the educational process to include goals and objectives is needed for more meaningful opportunities and experiences to practice self-determination skill acquisition without assumption the skills exist or can readily be applied across environments.

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Interpreting Twitter in Preservice Methods Courses:
Realizing the Social Dimensions

by

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Abstract

Twitter has become a social media platform for over 330 million users worldwide. It is described as a microblogging system that allows users to send and receive short multimedia messages known as tweets. Tweets can include up to 140 characters of text, as well as images, videos, live feeds, and hyperlinks. A common Twitter convention, the hashtag (key words preceded by the # symbol), engages users with common interests, ideas, and resources and the desire to engage in conversation with others (Carpenter & Krutka, 2014). Additionally, Twitter has become a touchstone for breaking news, current events, and societal trends (Lowe, 2016). Twitter users have the power to bypass the media and directly share information with their audience. Twitter (2020) is proud to be the home of “a concentrated group of leaders and influencers” who “come to Twitter to discover what’s happening and seek out new content.” Leaders in nearly every field learn, share, and personally engage with their followers using the platform.

Over the last several years, Twitter has become increasingly popular with educators, combating “the isolation that has often characterized the teaching profession” (Carpenter et al., 2017, p. 52). Educators are able to make connections with other educators, expand their influence, collaborate with others, and provide opportunities to increase teacher-student and student-student interactions. Ross et al. (2015) discovered that educators are “engaging in ongoing professional development through anytime-anywhere-learning opportunities and are participating frequently in asynchronous and synchronous learning opportunities” (p. 73). For example, educators can interact on Twitter by topic, or a specific hashtag, such as #edchat (a chat based on general education topics) or #sschat (a chat focused on a specific content area). Instead of only receiving information from those they follow, educators can reach anyone else using the same hashtag.

Twitter has become a center point for this type of engagement. Stevens (2014) explained, “Out of the 1/2 billion tweets that post every day, 4.2 million are related to education” (para. 1). The number of educators who engage on Twitter continues to rise as they discover more ways to use the platform to enrich teaching and learning. Although most K-12 educators predominantly use Twitter for their own professional development and learning (Carpenter & Krutka, 2015), it is also being employed to increase student engagement (Hunter & Caraway, 2014), and to connect students to experts in fields of study (Becker & Bishop, 2016).

Studies on the use of Twitter in higher education have shown that Twitter can contribute to university-level teaching and learning. Microblogging tools can be used to share ideas, insights, and resources instantly between learners and instructors. Instructors can provide feedback, make comments, and pose questions that coordinate with instruction (Kimmons & Veletsianos, 2016; Li & Greenhow, 2015). Students can be active learners, increasing the retention and application of knowledge (Kassens-Noor, 2012). They are more interconnected to the content (Luo et al., 2017), to other learners (Hsu & Ching, 2012), and to their instructors (McArthur

& Bostedo-Conway, 2012; Prestridge, 2014), thus, increasing their academic achievement.

In 2011, Junco et al. published one of the first quantitative studies on Twitter use and student engagement, conducting an experiment with 125 pre-health professional majors at an institute of higher education. Findings showed that using Twitter in the classroom increased student engagement and raised GPAs. Therefore, researchers implied benefits for the use of Twitter as a tool for the classroom. They argued that Twitter improved contact between instructor and student, promoted active learning, provided space for timely feedback, and improved on-task protocols.

Other researchers have described advantages of the integration of Twitter in higher education as a “safe space” (Dunlap & Lowenthal, 2009; Reid, 2011), where power relationships between teacher and learner can be transformed with the amenity of informal conversations and unlimited ideas. Ebner et al. (2010) state that informal learning will only occur if there is an opportunity to talk with each other without any constraints and that “the opportunity to be a part of someone else’s process by reading, commenting, discussing, or simply enhancing it” indicates engagement in the learning process (p. 99).

However, some studies do show that the use of Twitter for teaching and learning present some challenges. Tang and Hew (2017) examined empirical studies of using Twitter in teaching and learning over 10 years from 2006 to 2015, to understand how Twitter is being used and whether its implementation benefits students or not. While most of the studies they examined reported positive results regarding learner interactions and attitudes, the researchers advise scholars to be cautious. Attentiveness should be paid to the lack of rigorous comparison-based studies, the novelty of short-term studies, and self-reported data. Tang and Hew (2017) strongly suggest following specific guidelines for educational use of Twitter:

1. Provide information and technological training sessions, as well as interaction opportunities prior to class
2. Provide clear description of Twitter-related educational activities
3. Consider making Twitter mandatory.
4. Provide regular academic and personal support.
5. Provide access to broader learning communities. (Tang & Hew, 2017, pp. 111-112).

Recently, Twitter has been promoted as an approach for teacher educators to engage their students. It has been used to generate self-reflection among student teachers, as well as move beyond “passive consumption toward functioning as active creators of information” (Carpenter et al., 2017, p. 53). It also widens the development of a “community of practice” (Carpenter et al., 2017, p. 53) between in-service and preservice teachers, and promotes the creation of online professional learning networks that extend beyond the classroom. Preservice teachers are able to capitalize on creating an informal mentoring network that could potentially promote a smooth transition from student teacher to classroom teacher (Risser, 2013). Additionally, Twitter can be used as a tool to analyze the shaping of teacher identities (Prince, 2019), increase preservice teacher collaboration (Adcock & Bolick, 2011; Kim & Cavas, 2013), and create opportunities for field placements (Carpenter et al., 2013). Research studies examine what kinds of Twitter interactions are most productive to best enrich teacher education coursework by extending student learning, developing communities of practice, and promoting critical self-reflection.

As a pedagogical tool, teacher educators have been able to support and extend student learning in response to preservice teachers’ tweets (Prestridge, 2014). Students initiate interaction with the instructor through a question or idea

tweeted and subsequently, were then able to use paraphrasing as a way to restate content. "Twitter illuminated what content students were having trouble with, which could then inform future teaching practices" (Prestridge, 2014, p. 12). Furthermore, multiliteracies pedagogy (Cummins, 2009) and new literacies (Lankshear & Knobel, 2011) advocate for the expansion of literacy education to include digital technologies. Teacher educators are obligated to design courses with the intended use of the internet "for the multimodality, global connectivity, and the collaboration it affords" (Nagle, 2018, p. 87). Twitter, as a new literacy practice, is a platform for preservice teachers to develop critical social media literacy where they can initiate conversations around and question dominant ideologies to be discussed in the classroom with their students. "Discussions can extend beyond curriculum content, or professional learning networks created, and delve deeper into conversations regarding other types of experiences students encounter when they stray away from like-minded, convivial communities" (Nagle, 2018, p. 91).

Some teacher educators have utilized Twitter as a way for preservice teachers to organize their own professional learning networks (Semingson et al., 2019). They are asked to search for relevant Twitter hashtags, to "retweet" something related to disciplinary pedagogy, and learn to search for Twitter chats. In doing so, they connected with professional organizations that hosted educational chats and were able to see the kinds of disciplinary literacies professionals use in their work. The preservice teachers reflected on how educators use social media to engage in disciplinary conceptual knowledge and share resources and ideas for teaching and learning (p. 62). They initiated themselves into the teaching profession within their disciplinary fields. Not only were they able to widen their knowledge related to disciplinary literacy but were allowed the opportunity to begin building their own professional network. "Clear instructions, modeling, examples, and a risk-free opportunity to practice can help students successfully engage with other professionals on social media as productive experiences" (p. 64). Similarly, Luo et al. (2017) employed Twitter live chats as synchronous discussions to converse about educational issues. Preservice teachers engaged in conversation with education professionals on a global level and the majority of the students in the study maintained positive perceptions of the experience.

In one qualitative study, researchers (Mullins & Hicks, 2019) analyzed the participation of preservice teachers in a discipline specific Twitter chat known as #sschat. The goal of #sschat is for social studies educators to expand their knowledge and expertise through this weekly chat. The social studies preservice teachers were required to participate in three to five #sschat Twitter chats, choosing any topic they wanted, and document their experiences in online blog reflections. Most of the preservice teachers identified #sschat as a positive avenue for community building and networking. However, some students felt uncomfortable using the platform. The researchers suggest that instructors introduce and model the use of Twitter by spending time in class exploring the hashtag or chat intended for use. Preservice teachers may need more support in becoming a member of an informal space. However, the researchers assert that the experience was worthwhile, albeit "complex and murky" (p. 235). In other words, students might need more scaffolding than expected, due to lack of experience overall. Similarly, Krutka et al. (2017) reported a "Twitter learning curve". Many students who had not previously utilized Twitter, or at least not in the ways the researchers requested, confessed to facing a learning curve, including technical difficulties and platform limitations.

A number of teacher educators have taken advantage of Twitter to commit preservice teachers to critical self-reflection. Gao et al. (2012) reported that

microblogging services such as Twitter have the potential “to encourage participation, engagement, reflective thinking as well as collaborative learning under different learning settings” (p. 783). Benko et al. (2016) examined the benefits and limitations of using Twitter in methods courses to provide preservice teachers the opportunity to reflect on their own teaching, write for authentic audiences, and build communities of practice. Students were asked to reflect weekly via Twitter and to share those reflective tweets with their classmates. They found that preservice teachers needed support and scaffolding in both reflective thinking skills and writing for authentic audiences in communities of practice. Benko et al. (2016) suggest for teacher educators to tweet actively throughout the course to model long-term participation. The more active the instructors were, the more the preservice teachers engaged on Twitter (p. 16). To promote collaborative reflection, Kim and Cavas (2013) created an online community of practice, wherein preservice teachers and teacher educators shared the duties of reflecting on pedagogical content knowledge. Degrees of participation were found among preservice teachers and researchers designated these levels as contributors, advisors, audiences, and silent participants.

Methods

This research study interpreted the Twitter posts and responses of two sections of an elementary social studies methods course. The first half of the semester was conducted face to face and the second half of the semester transpired online. The course engaged students in activities and projects designed to prompt their development of social studies content knowledge and instructional strategies while encouraging their critical thinking about the subject and its teaching in elementary schools.

Participants consisted of students enrolled in an elementary social studies methods course at a large public teacher education institution in the Midwest during the spring of 2020. The total number of students was 34 and all students granted permission for analysis of their course work-products.

The purpose of the project was to use Twitter as a learning tool in which students would engage the community in dialogue about themes or topics of interest within the course. On four Fridays during the semester, students tweeted about “some aspect of the course learning (e.g., readings, activities, online discussions) that deeply resonated with you.” The night before their Twitter Fests (small group discussions), they were to bring their posts and any responses for sharing in small groups. The second author/instructor assigned students to different small groups with each iteration to provide for interaction with a variety of classmates.

Within the groups, they were instructed to perform the following tasks:

- Share their tweets with each other, discussing the reasons for selecting topics and emotions guiding the development of their tweets.
- Locate an example of an empowering and disempowering response tweets.
- Interpret patterns of bias evident within the response tweets received.
- Create a new tweet, based on group feedback, to provide a responsible rejoinder to response tweets.

After each of the class discussions, students posted guided individual reflections about their posts and discussions. The reflections contained six elements:

- (1) The original tweet,
- (2) The number of replies,
- (3) The number of retweets,
- (4) The number of likes,
- (5) A rejoinder tweet – based on the group discussion, and

(6) An explanation of how the student perceived the extent of success of the original tweet and what was learned from group feedback and tweet responses received.

Qualitative analysis was employed to review respondent tweets and determine the frequencies with which they posted about different course related topics. To determine the topics of student interest, frequency analysis was employed to determine the topics that participants mentioned and the number of times they were mentioned.

To interpret the strategies that students employed to generate media interest in their posts, The second author reviewed the posts, noting their structure, content, and features, recording the frequencies that each item appeared. Following this process, he interpreted student reflections about their perceptions of the tweets' successes for any comments that described any unobserved intentions in making the posts. He created separate observations for each posting opportunity and then studied the levels and trends of the features over the semester.

Findings

This section presents the outcomes of analysis employed to answer the two research questions. The first subsection describes findings that answer the question "What topics were of interest to the students?" The second subsection describes findings that answer the question "What strategies did students employ to generate responses?"

The timing of the study provided for an unusual pattern of topic interests. This situation occurred because of the outbreak of the current global COVID pandemic. The first half of the semester witnessed a conventional face-to-face approach to learning, which emphasized activity-based learning and discussion. After the spring break, the course transitioned to an online format, which employed synchronous and asynchronous activities and discussions. The four Twitter posts occurred in a balanced manner, with two posted during the face-to-face learning experiences and two during the online learning. Table 1 contains a summary of the topics mentioned. It distinguishes between tweets made before and after the onset of the pandemic.

Table 1. Frequencies of Topics in Tweets (N = 34)

	Most Frequent	Second	Third	Others
Week 1	Elementary Social Studies (8 or 23.54%)	Columbus (6 or 17.64%)	Social studies as literacy? (4 or 11.76%)	16 or 47.05%
Week 2	Religion (26 or 76.47%)	--		8 or 23.53%
COVID Outbreak				
Week 3	Two topics mentioned six (17.64%) times each: <ul style="list-style-type: none"> • COVID • Global Education 	Three topics mentioned three (8.24%) times each: <ul style="list-style-type: none"> • COVID • Cultures • Virtues 	Two topics mentioned two (5.88%) times each: <ul style="list-style-type: none"> • Current events • Elections 	(7 or 20.58%)
Week 4	Current Events (14 or 41.17%)	COVID (10 or 29.41%)	Technology (2 or 5.88%)	(8 or 23.53%)

The first set of Twitter posts conveyed a broad array of student topic interests. This pattern is consistent with the structure of the course, which intended to disrupt students' notions of social studies learning through a discussion of Loewen's (2007) study of the inaccuracies in history textbooks, followed by conversations about differences of opinion, and the history and nature of social studies.

The most frequent topic ($n = 8$) about which students posted concerned elementary social studies. Among these eight posts, six concerned social studies memories and two related to perceptions of its importance. Of the six memory posts, four were of an evaluative nature and two concerned remembrances. The four posts queried about whether readers appreciated their social studies experiences. For example, two students seeking appraisals posted "Like if you enjoyed social studies". The two other memory posts asked about whether remembrances occurred and what topics came to mind.

The second set of Twitter posts occurred a week before the students' spring break and one week after a class that focused on teaching about religion. This meeting began with a silent conversation concerning fears regarding teaching about religion. A presentation that featured a guest speaker followed this activity. The class closed with a writing activity described in Borg (2014) in which students wrote love letters to understand the concept of God. The class emphasized that social studies teachers' responsibilities were to teach about different religions given that religious beliefs provided the basis for many historical events, such as the crusades. It also pointed out that social studies teachers were not to advocate for any particular religion or to apostatize.

This meeting resonated with the classes, as more than three fourths of the students wrote about the religion and its teaching. Most of the posts raised the question about the appropriateness of religion's teaching. Example posts asked, "Should religion be taught" and "Should religion be included in social studies curriculum", "Is religion important to be taught in elementary social studies". Several posts took a more inquisitive approach, asking about experiences and perspectives. Examples consisted of "Is religion a topic you want your child to learn about?" "What are your experiences learning about different types of religion", and "How can we make religion comfortable to talk about." Finally, a couple posts addressed the process of teaching, asking how to teach about religion. The third set of posts occurred the third week after spring break. Course topics over those weeks were culturally responsive teaching, social justice, and global education. The students were also engaging in a semester-long post and response project about the 2020 presidential education.

Most posts concerned two topics: (1) the possible influence of COVID on the presidential election and (2) global education. Concerning the election, posts fell into three categories. These themes were (1) beliefs about whether there would be an effect, (2) whether elections would be delayed, and (3) whether a causal relationship existed between the onset of COVID and the elections. With regard to global education, several themes emerged in the posts as well. These themes were (1) approval and outcomes, (2) teaching processes, and (3) the definition of global education. Three (COVID, cultures, and virtues) other topics were the bases of three posts each.

After the third set of posts, the course turned to the social studies content areas, namely, economics, geography, and history as well as current events. The fourth set of posts conveyed much interest in current events. The session on current events occurred on Zoom and featured an activity in which students researched and reported current events in the form of a newscast.

Two topics occurred more frequently than did the others: (1) current events, and (2) COVID. The students made 14 posts about current events. Seven of these posts asked about whether classrooms should teach about current events rather than history. Five of the posts required readers to make judgements about teaching current events. For example, one post asked whether classrooms should center current events. Another post wondered if current events were beneficial to learn. The remaining two posts about current events concerned respondents' feelings about current events and classroom teaching about them. There were nine posts with regard to COVID. Five of the posts related to the teaching of COVID. Two of the posts concerned COVID's influence on education. The remaining two posts concerned questions and ideas about teaching about COVID. During all four posting opportunities, most of the students attempted to generate responses to their posts by asking questions, using the polling feature, and employing the hashtag feature.

Discussion

This study found that participants desired to communicate about a variety of topics, until experiencing social studies content that seemed controversial or events that dominated their patterns of life. Students predominately used polls to generate responses to their posts, although the use of hashtags and questions served as strategies to generate responses.

Although Krutka et al. (2017) describe the importance of structuring learning to oriented students to the Twitter processes, the results of the current study suggest that peer support represents also represents a valued vehicle for navigating the experience. The peer-support in this project developed through small group discussions with instructional direction. Additional studies are needed to interpret how proportions of scaffolded and socialized direction relate to patterns of student experiences to determine conditions for optimizing learning opportunities.

Further research also needs to consider patterns of topic interests among students and the influences on the content selected for tweets. The current study indicated that participants held varied interests in social studies content. Experiencing life-altering environments (such as the pandemic) or topics perceived as controversial prompted patterns of uniformity in posting content.

While some literature points to patterns of difference in perceptions of classroom management based on developmental experiences, these reflections may suggest that contexts that challenge or threaten community may provide for convergent patterns of thinking (Lucey & Lorsbach, 2021). These findings are consistent with those of Panksepp and Biven's (2012) work, which described mindful relationships with the animal kingdom.

Conclusion

Twitter's identity as an application and its purpose for both personal and professional use has value in the field of social studies teacher education. Teacher educators can use Twitter as a valuable educational resource for instructional strategies. When considering whether to use Twitter in the classroom, educators should be familiar with both the strengths and weaknesses of teaching and learning. Setting clear expectations, active usage of Twitter by the instructor, and training all students on how to use Twitter should be considered. The results of this study indicate that Twitter offers potential as a tool for peer-supported student communication. We encourage further research into this area that interprets influences of background experiences on patterns of usage.

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A Longitudinal Analysis of Teacher Professional Development
across TALIS 2013-2018

by
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Abstract

Professional development (PD) in K-12 schools has significant impacts on teaching. Since 2008, the Organization for Economic Cooperation and Development (OECD) developed the Teaching and Learning International Survey (TALIS) to evaluate teachers and school leaders in OECD countries and economies on their teaching and learning environments, as well as contextual information. Drawing on U.S. secondary teachers' data from TALIS 2013 and 2018, this longitudinal study compared U.S. teachers' perceptions of PD over the five years, including teachers' needs for PD, forms of PD, PD topics, and barriers to PD participation. This study provided evidence for the changes in PD between 2013 and 2018 and further discussed the policy that influenced the changes and a new policy for future PD.

Professional development (PD) in K-12 schools has significant impacts on teaching and has become crucial to new teachers' induction and continued teacher development. Studies showed that low-quality PD demotivated teachers' participation and career development while high-quality PD improved teachers' instructional practices and further positively impacted student learning (Cohen & Hill, 2001; Darling-Hammond et al., 2009).

Educational reform has shifted the landscape of initial teacher preparation and teacher education globally, and international organizations have launched various initiatives to support educational policy analysis and research. The Organization for Economic Cooperation and Development (OECD) developed the Teaching and Learning International Survey (TALIS) in 2008 and continued developing it in 2013 and 2018. The international large-scale survey provides "the perspectives of teachers and school leaders on their teaching and learning environments, as well as contextual information, for schools in participating OECD countries, partner countries, and economies" (Ainley & Carstens, 2018, p. 8). TALIS 2013 (OECD, 2014) and TALIS 2018 (OECD, 2019) surveys covered topics of initial teacher preparation, professional development, teacher motivation, and teacher self-efficacy to name a few.

Our study addressed several PD-related domains: teacher profiles, forms of PD, PD topics and needs, and barriers to PD participation. We reported the findings and discussed the implications for PD policies, which included ensuring the availability of and participation in PD for all teachers, and removing barriers to teachers' participation in PD.

Theoretical Framework and Empirical Bases

The conceptual framework for the evaluation of issues of professional development are seen in the following specific domains: needs for PD, support for PD, and barriers to PD participation (OECD, 2014; OECD, 2019). TALIS 2013 provided two themes: 1) teacher education from initial education through induction to in-service professional development and 2) teacher appraisal and feedback. TALIS 2018 combined the first component and teacher feedback as one construct and considered teacher appraisal to be a separate construct.

In our research, we compared the professional development without including the component of teacher feedback; however, feedback functions as a key

feature of effective PD (Ingvarson et al., 2005) and that feedback and PD are interrelated. The components of PD we examined included the profile of in-service professional development (including types of activities, participation rates, intensity of participation, mentoring and induction programs), forms of PD, the needs for PD, and barriers preventing participation in PD. Some content items of PD activities and teachers' needs for PD help researchers investigate different types of PD that have the most impact on teacher knowledge and behaviour. The key research questions in this research are built on the conceptual framework and results of TALIS 2013 and TALIS 2018. The same indicators of initial teacher education (ITE) were used in TALIS 2013 and 2018 (see Table 1).

Teacher preparation provide opportunities for preservice teachers to develop teacher knowledge through courses. Pre-service teachers develop their knowledge, such as the content knowledge, student discipline and management, teaching students with special needs, and use of technology in instruction (Darling-Hammond et al., 2009; Wei et al., 2010). Content knowledge and pedagogical content knowledge (Shulman, 1986) have been emphasized in teacher education programs. The content of these courses provides a foundation for teaching.

TALIS 2013 and 2018 followed empirical evidence and developed survey questions that focus on three components: instruction, classroom management, and student engagement. The introduction of the national/state curricula or standards including the Common Core State Standards in US K-12 schools required teachers to develop new professional knowledge, such as subject matter, pedagogy, students' learning, and technology to implement new standards and curricula (Youngs, 2013), but the implementation has challenged teachers (Orlando, 2014). It is important to evaluate whether teachers continue to have the similar challenges reported in previous surveys.

Of the 14 TALIS 2013 items that assess both preservice teachers' learning provided by teacher preparation programs and the degree to which professional development needs are being met, three items are not included in those of TALIS 2018: new technologies in the workplace, approaches to developing cross-occupational competencies for future work or future studies, and student career guidance and counseling. Of 14 TALIS 2018 items, three new items were added: analysis and use of student assessments, teacher-parent/guardian cooperation, and communicating with people from different cultures or countries. Thus, 11 items that were in TALIS 2013 and 2018 data were compared.

Teachers face barriers in accessing professional development opportunities. Research showed that time, financial considerations, travel time/distance, and family commitments are major obstacles for PD participation (Lind, 2007; Monahan, 1996). Abdal-Haqq (1998) pointed out that teachers in the US have less time for professional activities than teachers in other countries. Including time for collaborative teacher development was also a significant obstacle (Lind, 2007; Lucilio, 2009). Because new curricular and standards mandates required teachers to collaborate to plan lessons, assess students, and develop curriculum, time commitments continue to remain a barrier to PD.

Other factors also may prevent teachers from participating in PD activities. Personal and contextual factors influence teachers' participation in PD (Kwakman, 2003); some of these variables include professional attitudes, pressures related to the teacher tasks, and intentional learning support from schools. Additionally, the structure of a standard school schedule was not conducive to PD learning opportunities (Abdal-Haqq, 1998; Watts & Castle, 1993). TALIS 2013 and 2018 provided data to investigate these barriers using the same questions to evaluate barriers that prevent in-service teachers' participation in PD, which focused on

school schedules, time spent on teacher tasks, financial challenges, and incentives to PD. The questions are shown in Table 4.

Methods

The data used for this study were from the 2013 and 2018 TALIS administered by OECD. Questions asked teachers to indicate their backgrounds, work environments, professional development, beliefs and attitudes about teaching, and teaching practices. Another important goal of TALIS was to report changes over each five-year cycle. As the third cycle of the TALIS survey, TALIS 2018 ensured us to examine changes over the cycle since the US participated in TALIS 2013 and 2018. A total of 2,560 lower secondary teachers from 165 schools participated in the 2018 TALIS administration, while 1,926 teachers from 122 schools participated in the 2013 TALIS administration. The characteristics of teacher participants were presented in Table 1.

Table 1. Teacher Profiles in TALIS 2013 and TALIS 2018

		TALIS 2013	TALIS 2018
Age	50 years old +	30.3	31.1
	30-49 years old	54.0	56.6
	Under 30 years	15.7	12.3
	Mean	42.2	43.1
Gender	Female	64.4	65.8
	Male	35.6	34.2
Employment Status	FT	96.3	97.3
	PT	3.7	2.7
Complete a teacher training program	Yes	94.9	-
	No	5.1	-
Highest Education	ISCED Level 3	0.1	0.9
	ISCED Level 5	0.4	0.9
	ISCED Level 6	98.0	43.1
	ISCED Level 7		53.2
	ISCED Level 8	1.5	1.9
Work experience	At this school	8.7	8.1
	In total	13.8	14.3
	Other education role	3.0	3.2
	In other jobs	8.1	6.9

Note: “-” refers to the item as not administrated.

The TALIS teacher survey was used to generate comparisons of TALIS 2013 and 2018. We compared teacher professional development participation with specific focuses on four areas: the types of PD teachers have participated in, the topics included in PD activities, the areas that teachers think that they need PD, and the barriers teachers face in accessing PD opportunities. We also examined the time that teachers spend in work and teaching because it relates to PD participation: “Of this total, how many 60 minute hours did you spend on teaching at this school during your most recent complete calendar week”, and “Approximately how many 60 minute hours did you spend on the following tasks during your most recent complete calendar week in your job at this school.”

Data Analysis

The International Database (IDB) Analyzer, developed by the International Association for the Evaluation of Educational Achievement (IEA), was used to estimate means, percentages, and their respective standard errors. The IEA IDB

Analyzer generates SPSS syntax that correctly takes the sampling design into the account when computing statistics and estimating the parameters. The IDB Analyzer also allows selecting the weight based on the data file type. In this study, the teacher final weight was selected for data analysis. In order to examine the similarities and differences, we compared the percentages of teachers' responses to questions of PD in TALIS 2013 and 2018.

We recognize the limitations of this study. First, this study relies on the self-reported survey as the only data source. The results of this study may only reflect teachers' perceptions of PD. Second, because some modifications were made to the teacher questionnaires in TALIS 2013 and 2018, not all questions across the two cycles were the same and comparable across the two measurement points. To address the challenge of comparison over time, the TALIS data set includes the variable of "TALIS12POP" to ensure the observation comparable to the TALIS 2013 target population definition (OECD, 2019). An examination of TALIS12POP indicates that all observations are comparable to the TALIS 2013 target population definition. Therefore, we use all observations to analyze the comparable questions across the two cycles.

Findings and Discussion

Teacher demographic profiles included age, gender, education level, and work experience. Table 1 presents the changing profiles of teachers. The US teacher workforce was aged from 42.2 in 2013 to 43.1 years old in 2018. Examining the age distribution of teachers, there was a slightly higher proportion of teachers of 50 years old and above in 2018 (31.1%) than in 2013 (30.3%), while the proportion of teachers under 30 years old decreased from 15.7% to 12.3%. There was a higher proportion of the teacher workforce between 30 to 49 years old in 2018 (56.6%) than the teacher workforce in 2013 (54.0%).

Regarding the gender of teachers, the proportion of female teachers decreased. Female teachers account for 64.4% in 2018 vs. 65.8% of the teacher workforce in 2013, while 35.6% vs. 34.2% were male teachers. There was a slightly higher proportion of full-time teachers in 2018 than in 2013 (97.3% vs. 96.3%) but a lower proportion of part-time teachers in 2018 (2.7% vs. 3.7%).

Based on the 2011 International Standard Classification of Education (ISCED), teachers' highest education levels were presented in Table 1. TALIS 2013 used ISCED 1997, in which ISCED 2011 levels 6 and 7 were combined in one category - ISCED 5A. The education levels include the following: ISCED Level 3, upper secondary education, ISCED Level 5, short-cycle tertiary education, ISCED Level 6, bachelor or equivalent, ISCED Level 7, master or equivalent, and ISCED Level 8, doctoral or equivalent. Table 1 also summarizes the highest level of formal education completed by TALIS teachers. Although we observed slight differences between TALIS 2013 and 2018, the percentages of each level were similar (see Table 1).

In terms of teachers' years of work experience, teachers had about 14.3 years of experience teaching in total in 2018 vs. 13.8 years in 2013; 8.1 years of this teaching was at their current school in 2018 vs. 8.7 years in 2013. In addition, years of working in other education roles *not as a teacher* were 3.2 in 2018 vs. 3.0 in 2013, and years of working in other non-education roles were 6.9 in 2018 vs. 8.1 years in 2013. There was an evident decrease in years working in other non-education roles.

The comparison of teacher profiles brought attention to the different PD forms, topics, needs, and barriers. In comparison with TALIS 2013, there was a higher proportion of teachers 50 years old and above in TALIS 2018 (31.1%) and less teachers under 30 years old. This information is consistent with the increased number of teachers in ISCED Level 7, master or equivalent, and ISCED Level 8,

doctoral or equivalent. In the US, as the number of non-traditional teacher education programs (which is quite often connected to master's programs) is increasing; there is a need to consider teachers' different needs. In contrast to the teachers who come from traditional routes, teachers from alternative routes are exposed to different conditions and constraints (Thomas & Mockler, 2018). Alternative route licensure programs at the state and national levels produce teachers with different challenges. Blumenreich and Rogers (2016) discussed how Teach for America candidates with inadequate training are assigned to teach in the schools of high need; these teachers desperately need PD that will help them handle difficult classrooms and difficult neighborhoods. As another example, despite their positive perspectives of their professionalism and because charter schools provide teacher support, guidance, and orientation at the organizational level, teachers in charter schools have to deal with burnout and lack knowledge development in specialized areas like special education as the pedagogy training is more focused on student behavior management strategies (Torres & Weiner, 2018).

In TALIS, teachers were asked to indicate forms of training that they had at least attended in the 12 months prior to the survey. Overall, about 98% of the teachers reported they had participated in at least one PD activity in 2018, while it was 95% in 2013. Table 2 details the percentage of teacher participation in PD activities in 2013 and 2018.

Table 2. Forms of PD Training

	TALIS 2013	TALIS 2018	Change (2018-2013)
Courses/workshops	84.2		-
Courses/seminars attended in person	-	81.8	-
Online courses seminars	-	55.0	-
Education conferences where teachers and/or researchers present	48.9	55.2	6.3
Formal qualification program	16.4	17.4	1.0
Observation visits to other schools	13.3	19.2	5.9
Observation visits to business premises, public organizations, non-governmental organizations	7.0	10.4	3.4
Peer and/or self-observation and coaching as a part of a formal school arrangement	-	55.4	-
Participation in a network of teachers formed specifically for the professional development of teachers	47.4	51.0	3.6
Reading professional literature		71.1	71.1
Individual or collaborative research on a topic of interest to you professionally	41.1	-	-
In-service training courses in business premises, public organizations, non-governmental organizations.	15.4	-	-
Other	-	32.6	-

Note: “-” refers to the item as not administrated.

In 2018, attendance at courses and seminars was the most common type of PD activity (81.8%), which has been viewed as a traditional approach that views teachers as passive recipients (Avalos, 2011). Eight out of ten teachers reported they participated in this form of PD but the percentage of participation decreased from 84.2% in 2013 to 81.8% in 2018. More than half the teachers in 2018 reported that they participated in PD activities of “education conferences” and “a network of teachers formed specifically for the professional development of teachers”, while 48.9% and 47.4% of teachers reported so in 2013, respectively. In 2018, “reading professional literature” was a frequent form of professional development activities

(71.1%), followed by “peer and/or self-observation and coaching as a part of a formal school arrangement” (55.4%) and “online courses seminars” (55.0%). However, these three items were not administrated in 2013.

As suggested in Table 2, there was an increase in three types of PD activities in 2018 compared with 2013: “observation visits to other schools” (19.2% vs. 13.3% in 2013), “formal qualification program[s]” (17.4% vs. 16.6 % in 2013), and “observation visits to business premises, public organizations, non-governmental organizations” (10.4% vs. 7.0% in 2013). Teachers also reported having participated in other forms of PD activities in 2018 (32.6%). While the differences in participation rates for these forms of professional development were not generally large, the greatest differences were found in participating in education conferences where teachers and/or researchers present their research or discuss educational issues (55.2% vs. 48.9% in 2013) and observation visits to other schools (19.2% vs. 13.3% in 2013).

The comparison results reflected some changes in forms of PD. Since 2009, teacher evaluation systems were reformed in 46 states that involve student performance measures, standards-based classroom observations, and even parent and student feedback (Steinberg & Donaldson, 2016). The reforms have changed teachers’ practice such as spending more time setting goals, analyzing student performance assessment data, and expanded classroom observations (Donaldson, 2016). The results reported that more than fifty percent of teachers participated in three new forms of PD: “reading professional literature,” “peer and/or self-observation and coaching as a part of a formal school arrangement,” and “online courses seminars.” Researchers need to further evaluate the effectiveness of the new PD forms for more effective policies. Researchers and policy makers need to continue exploring more varied, multi-faceted, and specific objective-based PD while also helping remove the ineffective PD forms.

Traditional form of PDs such as courses and seminars seem to be dated. The PDs involving the collaboration of varied stakeholders and participants will be needed. When PD activities do not align with the teaching realities in the school and district, teachers reflect a continuum from compliance, accommodation, or compromise to resistance (Achinstein & Ogawa, 2006). Based on a principals’ report, Wieczorek (2017) found that teachers in the urban, low-SES, and high minority schools more likely report their PD participation and an increase in the alignment of PD with other aspects such as school and district goals, standards, student achievement outcomes, and resources. These external factors such as the school community’s location, socioeconomic status, and school demographics influence teachers’ PD. The collaborative efforts are needed beyond the existing integration among teachers. Rather, concerted efforts are required between teachers, principals, schools, communities and beyond. PD should use effective collaboration to allow teachers to work together and contribute to student learning (Darling-Hammond et al., 2017).

TALIS in 2013 and 2018 asked teachers to select the topics that were covered in their PD activities. The PD activities include the subject or content-oriented PD activities that focus on specific subject areas, pedagogy of the subject and general pedagogic topics, knowledge of curriculum, and teaching for diversity. In the 2013 teacher questionnaire, the question asked, “Did the professional development activities you participated in during the last 12 months cover the following topics?” In the 2018 teacher questionnaire, the question asked, “Were any of the topics listed below included in your professional development activities during the last 12 months?” Of the 15 TALIS 2013 items, three items are not administrated in TALIS 2018, which included “new technologies in the workplace,” “approaches to

developing cross-occupational competencies for future work or future studies,” and “student career guidance and counseling.” Of the 14 TALIS 2018 items, three new items were added, which were “analysis and use of student assessments,” “teacher-parent/guardian cooperation,” and “communicating with people from different cultures or countries.” A total of 11 items in TALIS 2013 and 2018 are comparable (see Table 3).

Table 3. Topics Covered in PD Activities and Needs for Them

	PD Topics			PD Needs		
	TALIS 2013	TALIS 2018	Change (2018-2013)	TALIS 2013	TALIS 2018	Change (2018-2013)
Knowledge and understanding of my subject field(s)	70.3	77.8	7.5	1.6	2.1	0.4
Pedagogical competencies in teaching my subject field(s)	60.8	67.6	6.9	2.2	2.8	0.6
Knowledge of the curriculum	65.7	75.1	9.4	3.3	3.1	-0.2
Student evaluation and assessment practice	72.2	72.3	0.1	4.2	4.6	0.4
Analysis and use of student assessments (Student evaluation and assessment)	- ^a	60.0	-		5.1	5.1
Student behavior and classroom management	38.1	55.6	17.5	5.1	5.3	0.2
ICT (information and communication technology) skills for teaching	49.5	60.1	10.6	8.1	10.2	2.1
Implementation of national/state curriculum standards or Common Core standards	75.4	- ^a	-	15.3	-	-
School management and administration	16.4	31.0	14.6	4.1	4.2	0.1
New technologies in the workplace	57.4	-	-	14.6	-	-
Approaches to individualized learning	57.8	64.4	6.5	5.1	7.3	2.2
Teaching students with special needs	38.6	55.9	17.3	8.2	9.2	1.0
Teacher parent/guardian cooperation	-	32.4	32.4		4.0	4.0
Teaching in a multicultural or multilingual setting	23.7	41.9	18.2	5.0	6.1	1.1
Communicating with people from different cultures or countries	-	29.3	-	-	4.7	-
Teaching cross-curricular skills (e.g. problem-solving, learning-to-learn)	49.5	58.7	9.2	4.7	6.2	1.4
Approaches to developing cross-occupational competencies for future work or future studies	17.4	-	-	7.0	-	-
Student career guidance and counseling	11.2	-	-	4.3	-	-

Note: “-” refers to the item as not administrated.

In comparison with 2013, a larger proportion of teachers reported that all the 11 topics were covered in PD activities in 2018. As shown in Table 3, the percentages ranging from the highest to the lowest are: “knowledge and understanding of my subject field (s)” (77.8% in 2018 vs. 70.3% in 2013), “knowledge of the curriculum” (75.1% vs. 65.7%), “student evaluation and assessment practice” (72.3% vs. 72.2%), and “student behavior and classroom

management” (55.6% vs. 38.1%). Regarding “the use of information and communication technologies (ICT) skills for teaching,” in 2018, there was an evident increased percentage of teachers who reported their PD included this topic (60.1%) relative to 49.5% in TALIS 2013. There was a significant increase in “school management and administration” (31.0%) relative to 16.4% in TALIS 2013.

Regarding teaching in a multicultural or multilingual setting, there were increased percentages of teachers who reported that their PD included the topics of “approaches to individualized learning” (64.4% in 2018 vs. 57.8% in 2013), “teaching cross-curricular skills” (e.g. problem-solving, learning-to-learn) (58.7% vs. 49.5%), “teaching students with special needs” (55.9% vs. 38.6%), and “teaching in a multicultural or multilingual setting” (41.9% vs. 23.7%).

For each of the topics relevant to PD activities, teachers were asked to indicate their level of need for training on a four-point scale: “no need at present,” “low level of need,” “moderate level of need,” and “high level of need.” The percentages of “high level of need” were reported and compared (see Table 3). The increased needs for PD included the following items: “approaches to individualized learning” (7.3% vs. 5.1%), ICT (information and communication technology) skills for teaching (10.2% vs. 8.1%), which continues to be the highest PD activity, “teaching cross-curricular skills” (e.g. problem-solving, learning-to-learn) (6.2% vs. 4.7 %), and “teaching students with special needs” (9.2% vs. 8.2%). Of the high-level needs for PD activities, there was an increased percentage of teachers in all the activities except “knowledge of the curriculum,” (3.3% vs. 3.1%).

The PD activities include the subject or content-focused PD activities in the realms of specific subject areas, pedagogy of the subject and general pedagogic topics, knowledge of curriculum, and teaching for diversity. The top items were “knowledge and understanding of my subject field(s),” “knowledge of the curriculum,” “student evaluation and assessment practice,” and “student behavior and classroom management.” This finding suggests that policy makers should continue to support content-focused and job-embedded PD that is situated in teachers’ classrooms with their students while paying attention to the context of teachers/school or school district context (Darling-Hammond et al., 2017).

With the increasing number of English language learners, there are increased language and literacy demands across the curriculum required by the CCSS. Whitenack and Swanson (2013) call attention to challenges in developing English learners’ content specific academic language, time conflicts with teachers’ teaching, insufficient budget, and developing academic language related to subjects. Johnson and Wells (2017) addressed the concerns of ill-equipped teachers for teaching English language learners and recommended that PD should be implemented with a connection to teaching practice and with a systematic evaluation process to measure ELL teacher effectiveness.

Additionally, TALIS 2018 included three new items: “analysis and use of student assessments,” “teacher-parent/guardian cooperation,” and “communicating with people from different cultures or countries.” These areas need to be further investigated in the future research. This line of research will help the OECD TALIS team improve the survey for the next round.

There was an increased participation in “the use of information and communication technologies (ICT) skills for teaching” and teaching in a multicultural or multilingual setting: “approaches to individualized learning,” “teaching cross-curricular skills,” “teaching students with special needs,” and “teaching in a multicultural or multilingual setting.” However, the results indicated that with the exception of “knowledge of the curriculum,” the increased needs for PD include: “approaches to individualized learning,” ICT (information and communication

technology) skills for teaching, which continues to be the highest level of need, “teaching cross-curricular skills” (e.g., problem-solving, learning-to-learn), and “teaching students with special needs.” Regarding technology, the study results support previous research (Darling-Hammond et al., 2009; Orlando, 2014) that teachers need to continue learning how to effectively integrate information and communication technology into their classrooms (Kay, 2006). While technology is one of the most critical needs, other needs should also be investigated. What remains unanswered is how these needs are put together to ensure interrelatedness. The understanding of the interrelationships among these needs will trigger professional development program designers to see the needs holistically for a sound PD program.

Teachers were asked their barriers in accessing professional development opportunities. TALIS 2013 and TALIS 2018 examined teachers’ main barriers to accessing training and they were asked to what extent they agreed that these issues represented a barrier to participation at the time of the survey (“strongly disagree,” “disagree,” “agree,” or “strongly agree”). As the items in the two surveys are the same, it is possible to see the changes in the barriers over five years. Table 4 illustrates the changes between TALIS 2013 and 2018 and the average percentage of “agree” and “strongly agree.”

Table 4. Types of Barriers to PD Participation

	TALIS 2013	TALIS 2018	Change (2018 - 2013)
Professional development conflicts with the teacher’s work schedule	45.6	48.5	2.9
There are no incentives for participating in professional development	44.0	46.9	3.0
Do not have time because of family responsibilities	38.7	42.3	3.6
Professional development is too expensive	30.7	38.2	7.5
There is no relevant professional development offered	27.6	27.3	-0.3
There is a lack of employer support	20.7	18.8	-1.9
Do not have prerequisites	5.3	8.3	2.9

In comparison with TALIS 2013, in TALIS 2018 there was an increased percentage of teachers who reported their barriers in five items. An interpretation of Table 4 is that the items of barriers are “professional development conflicts with the teacher’s work schedule” (48.5% vs. 45.6%), “there are no incentives for participating in professional development” (46.9% vs. 44%), “do not have time because of family responsibilities” (42.3% vs. 38.7%), “professional development is too expensive” (38.2% vs. 30.7%), and “do not have prerequisites” (8.3% vs. 5.3%). However, there was a decrease in the proportion of teachers who reported their barriers in the following items, which were “there is no relevant professional development offered” (27.3% vs. 27.6%) and “there is a lack of employer support” (18.8% vs. 20.7%). However, both teachers in 2013 and 2018 perceived “work schedule conflicts,” “no incentives,” “family responsibilities,” and “affordability” as the top barriers to PD participation.

Evidently, teachers of TALIS 2018 spent more hours on tasks related to the job, and spent more hours on teaching at school. They also spent more time counseling students. Abdal-Haqq (1998) highlights that teachers in the US teach more classes than teachers in other countries and have less time for professional activities that are essential for teachers’ teaching and professional learning. Because US teachers spent more time in school and teaching, PD outside their contract time

may add more burden or stress to them. Researchers reported that time, financial considerations, travel time/distance, and family commitment are major obstacles for PD participation (Lind, 2007; Monahan, 1996). Competing time commitments spent mostly on the routine tasks of a teacher leave little time for new curricular mandates that required teachers to collaborate to plan lessons, assess students, and develop curriculum. As students' study time at school and home is increased, policy makers should consider dramatic changes to the structure of a standard school schedule and teaching time.

Teachers still perceived “work schedule conflicts,” “no incentives,” “family responsibilities,” and “affordability” as the top barriers to PD participation. An increased percentage of teachers reported their barriers as “professional development conflicts with the teacher’s work schedule,” “there are no incentives for participating in professional development,” “do not have time because of family responsibilities,” “professional development is too expensive,” and “do not have prerequisites.” However, a decreased number of teachers reported their barriers as the following: “there is no relevant professional development offered,” and “there is a lack of employer support.”

The results showed that the professional development activities or programs are more connected with teaching and supported by the administrators. However, several barriers continued to exist. PD activities outside of their contract time such as courses or workshops during the summer or weekends or on school days may not be practical for teachers who have family responsibilities or other work. PD in schools, which is also referred to as job-embedded professional learning, may better accommodate teachers' time and schedules may be more practical and welcome. Although in-school professional development is within teachers' contract time, teachers should be granted monetary and non-monetary incentives so that they are more motivated to engage in their PD. Well-designed technology-based PD programs should be considered to create an environment where teachers work actively, collaboratively, and reflectively (Darling-Hammond et al., 2017).

Fullan et al. (2015) pointed out that U.S. policy makers should “make a major shift from a heavy reliance on external accountability and superficial structural solutions (e.g., professional standards of practice) to investing in and building the professional capital of all teachers and leaders throughout the system” (p. 1). They proposed a new professional accountability model that ensures the development and circulation of professional capital as “a collective commitment and responsibility to improve student learning and strengthen the teaching profession” (p. 4).

Conclusion

Using TALIS 2013 and 2018 data provided by OECD, this longitudinal study addressed several PD issues and provided the findings of comparisons: teacher profiles, forms of PD, PD topics and needs, and barriers to PD participation. The comparison of profiles of teachers showed an increased number of teachers from non-traditional licensure programs or master’s programs. As a result, professional development programs may consider the different needs for teachers who recently graduate from traditional programs and from alternative routes to licensure programs (Blumenreich & Rogers, 2016; Torres & Weiner, 2018).

The comparison results of forms of PD showed the changes over the five-year cycle (2013-2018). The reforms have changed teachers' practices such as spending more time setting goals, analyzing student performance assessment data, and expanded classroom observations (Donaldson, 2016). Three new forms of PD were reported to be attended by teachers: “reading professional literature,” “peer and/or self-observation and coaching as a part of a formal school arrangement,” and

“online courses seminars.” Researchers are encouraged to evaluate the effectiveness of these PD in the future research. Meanwhile, courses and seminars as a traditional PD form were less provided. This finding indicated another change in 2013-2018. As teachers’ PD needs are diversified, policy makers and researchers should consider factors such as the school community’s location, socioeconomic status, and school demographics and concerted efforts between teachers, principals, schools, communities and beyond (Darling-Hammond et al., 2017) in creating policies and conducting research.

Specifically, we call for PD design that integrates ELLs into the content-focused and job-embedded PD (Johnson & Wells, 2017; Whitenack & Swanson, 2013). Additionally, the three new PD items, “analysis and use of student assessments,” “teacher-parent/guardian cooperation,” and “communicating with people from different cultures or countries” were reported; research in these areas is a recommendation for future studies based on the current findings from this study. Unsurprisingly, ICT (information and communication technology) skills for teaching continues to be the highest level of need (Darling-Hammond et al., 2009; Kay, 2006; Orlando, 2014).

The examination of barriers to PD participation supports previous findings indicating that time, financial considerations, travel time/distance, and family commitment are major obstacles for PD participation (Lind, 2007; Monahan, 1996). Policy makers should consider dramatic changes to the structure of a standard school schedule and teaching time.

Teachers still perceived “work schedule conflicts,” “no incentives,” “family responsibilities,” and “affordability” as the top barriers to PD participation. An increased percentage of teachers reported their barriers as “professional development conflicts with the teacher’s work schedule,” “there are no incentives for participating in professional development,” “do not have time because of family responsibilities,” “professional development is too expensive,” and “do not have prerequisites.” However, a decreased number of teachers reported their barriers as the following: “there is no relevant professional development offered” and “there is a lack of employer support.” US policy makers should build the professional capital of all teachers and leaders throughout the system and propose new professional accountability models to improve student learning and strengthen the teaching profession (Fullan et al., 2015).

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Zoom for Literacy: A Cross Country Collaboration
Active and Experiential Learning
by
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Abstract

The process of learning to teach is one that is best facilitated through active learning experiences. In this study, teacher candidates from a university in California interacted with freshman composition students from a university in Texas. This experience allowed teacher candidates to give feedback to composition students on their literacy narratives, to gain insights into the influential impact of teachers as well as to participate in collaboration via Zoom. This experiential study demonstrated the profound learning potential for teacher candidates provided through experiential learning opportunities as well as highlights the need for expansion of the use of technology in education programs across the nation.

The quality of teaching is recognized as one of, if not the most, important factor that contributes to student learning (Darling-Hammond, 2009). This recognized importance of teacher preparation has led to an increased scrutiny of educator preparation programs across the country (Boyd et al., 2008). These inquiries have resulted in studies that show that effective teacher preparation is directly linked to practice (Boyd et al., 2008). These findings were also echoed by teacher candidates. In fact, a 2008 study reported that 65% of nearly 2,300 potential teachers surveyed said that real classroom experience was an important aspect of a teacher preparation program (Hart, 2008).

Despite the importance placed on experience by both researchers and teacher candidates, there are various and unique challenges for teacher candidates to gain real classroom experiences. In response to these challenges, two professors at state institutions in different states, working in different departments, formed a partnership and facilitated collaboration among graduate teacher candidates and freshman composition students utilizing technology as a mode of interaction.

This study was defined by a constructed relationship between freshman composition students and teacher candidates within a graduate program. This relationship, orchestrated by the two professors, allowed a reciprocal learning opportunity for all involved. The freshman composition students were assigned a literacy narrative as part of the normal course work within the required course. The literacy narrative detailed a time in their life when writing had a significant impact on them. However, apart from this normal assignment, students were then tasked with sharing their literacy narrative drafts with the teacher candidates, who, in turn, provided feedback regarding the freshman composition students' writing. The feedback was provided both through writing and by meeting via Zoom. During the Zoom meeting, teacher candidates also interviewed freshman students regarding their experience with teachers during their high school years. Teacher candidates were able to hear both the positive as well as negative potential that teachers possess when working with secondary students. After the conclusion of these activities, teacher candidates reflected, in writing, about their experiences working with recent high school graduates in an effort to support these students' written literacy capabilities along with learning about their perceptions of effective teachers.

Transformative experiences like these are important as students often experience isolation and alienation leading to disengagement from their work and

their learning (Brooks et al. 2008; Macdonald and Shirley 2009; Zielinski and Hoy 1983). Our collaboration facilitated a transformative opportunity early in a teacher preparation program through the utilization of technology.

Literature Review

While literature is available regarding experiential learning and the role it has played in education, much of that research has been conducted at international sites, has been situated outside of the teacher preparation programs, or occurs in programs that are not training secondary level teachers. For example, a 2018 study was published regarding teacher candidates in Hong Kong who participated in a community-based project aimed at “expanding their capacity to integrate theory and practice” outside of the physical classroom (Harfitt and Chow, 2018). Other studies utilizing experiential learning have been conducted in Australia (Legge and Smith, 2014) and in academic areas such as law education (Lee, 2015). In 2016 Girvan, Conneely, and Tangney published research that detailed the influence that experiential learning can have on early teacher professional development. Furthermore, studies like Yu and Hunt's 2016 reviewed the impact of elementary teacher candidates who assisted in an after-school program. While all investigations contributing to this topic are important, there is a noted need for research that specifically examines the role of experiential learning in the training for secondary teacher candidates in the United States.

Since many researchers are calling for transformative experiences for pre-service teachers through experiential learning it is important to examine the effectiveness and impact of such practice, and the feasibility in which such opportunities can be implemented in a university setting. Our study was designed to answer the following questions:

1. Do pre-service teachers have new insights to the teaching profession as a result of this project?
2. What were the pre-service teachers' responses to electronically facilitated experiential learning experiences?

Experiential learning is “the process whereby knowledge is created through the transformation of experience” (Kolb, 2015). Dewey (1938) first called for developing learning opportunities through experiences and reflection, arguing his belief that learning does not occur through passive acts. Instead, Dewey called for an education system that offered students exposure to real-life situations, a system that facilitated active learning opportunities. Kemp (2010) describes experiential learning as active learning events that occur external to traditional academic settings.

Teacher preparation programs across the world are examining how experiential learning opportunities impact their teacher candidates. In 2015, education faculty members from the University of Hong Kong reported that through implementing an experiential learning initiative their teacher candidates gained valuable teaching experiences. The teacher candidates at the University of Hong Kong were enrolled in a “credit-bearing elective” in which they identified educational needs of a community or social group and worked to implement proposed solutions within those settings (Gao, 2015: 436). The purpose of this initiative was to “nurture pre-service teachers into critically minded reflective professionals capable of teaching in local and international educational contexts” (Gao, 2015: 435). The pre-service teachers reported that they “all believed that experiences [have] greatly enriched their understanding and vision as teachers” (Gao, 2015: 436).

Another study, conducted at the University of Western Sydney in Australia, detailed faculty efforts to assist generalist primary teachers' confidence and ability to

teach music classes; something required of generalist educators at many Australian state primary schools (Russell-Bowie, 2013). This study of 197 pre-service teachers indicated that the “majority of students started the unit with very little confidence in music education” but at the end of the semester, 84% indicated they were confident in their music teaching abilities (Russell-Bowie, 2013).

In her study of exemplary teacher education programs in the United States, Darling-Hammond (2009) concluded that “the most powerful [teacher education] programs require students to spend extensive time in the field throughout the entire program” (84). These are programs in which pre-service teachers are afforded the opportunity to practice the theoretical tools they have learned in the university classroom (Darling-Hammond, 2009). Darling-Hammond argues that “it is impractical to expect to prepare teachers for schools as they should be if teachers are constrained to learn in settings that typify the problems of schools as they have been—where isolated teachers provide examples of idiosyncratic, usually a theoretical practice that rarely exhibits a diagnostic approach and infrequently offers access to carefully selected strategies designed to teach a wide range of learners well” (p. 42).

Despite the positive implications that many studies present, there are factors that impede and negatively impact experiential learning opportunities. Darling-Hammond (2009) noted that implementation of programs with mainly experienced based requirements would mean “hard work with institutions to secure support from administrators and to reshape faculty and coursework” (p. 43). Labaree (2006) noted the tenure-track faculty often found resources and support were lacking when they attempted to coordinate field-based experiences. Zimpher & Howey (2013) called for innovative intervention in teacher preparation programs across the United States to provide “firsthand interaction with real students” (p. 412). Innovative intervention is both important and necessary to ensure that traditional students have multiple opportunities to practice and implement the knowledge obtained in their teacher education course work in a field-based setting. Perhaps most important is that when “content [is] learned in an experiential context, through self-discovery and practical application, [content] is retained for far longer, and can be accessed and transferred far more readily than content learned from traditional lecture styles.”

Experiential learning opportunities that are facilitated through technology are important to consider as many teacher candidates report a lack of “authentic experiences using technology in their own professional education” (Sutton, 2011). A 2006 study based at Dublin Institute of Technology in Ireland revealed that students enrolled in a postgraduate teacher education course enjoyed embedding technological elements as they were able to “experiment and take risks with technology that previously may not have been familiar to them” (100). Murphrey’s 2010 revealed that students enrolled in her undergraduate Instructional Design and Technology Course” found the use of technologies like Camtasia and Snagit important to their future careers and enabled them to become comfortable with the technologies.

Additionally, technology can alleviate some of the challenges that arise when educational programs, including teacher preparation programs, are attempting to facilitate quality field experiences. Several studies demonstrate the role that technology plays in developing experiential learning activities across academia. A 2015 study of preservice elementary teachers explored how participating in a digital book club with third grade students impacted their knowledge and pedagogical understanding. The research revealed that the teacher candidates responded in an overwhelmingly positive manner. In fact, they found the “book club project to be a way to apply skills learned in their literacy methods course in an authentic way” (8).

Furthermore, the preservice teachers indicated that this experience enabled them to feel more confident about their abilities to lead literacy activities in a classroom.

Lee (2015) argues that many law schools have attempted to link educational practices to employment through internships, but that in the legal world “a high level of coordination with the government by such apprenticeship system” limits the number of students who can comply with such requirements (455-456). As a response, Lee, along with Professor Zhu Wei, developed and instituted a “computerized simulation of international trade transaction” which enables students to have first-hand experiences of the “demands placed upon lawyers in various contexts” and to determine methods to meet those demands (460). The use of the stimulation removed the barrier that many law students faced when considering methods for acquiring apprenticeships. Similar programs can be developed to meet the needs of pre-service teachers, as our study demonstrates.

Theoretical Framework

This idea of learning through experiences is found in both Constructivism Theory and Kolb's concept/model of experience, both of which informed our study. Constructivism Theory was the framework for this study, as it argues that knowledge is not achieved through a set of standard truths, instead, it is gained through “emergent, developmental, nonobjective, viable constructed explanations by humans engaged in meaning-making in cultural and social communities of discourse” (Fosnot, 2005). Constructivism is a theory that seeks to “describe both what knowing is and how one comes to know” (Fosnot, 2005). Through the constructivist paradigm, learning is active, and the learner constructs their own knowledge through experiences and reflections. The idea that experiences and reflections illuminate how one understands and gains knowledge was a key element of this study.

Furthermore, the researchers utilized Kolb's Experiential Learning Theory (ELT) to develop the activities the teacher candidates took part in. According to Kolb (2015), knowledge and understanding is created as a result of the interaction between theory and experience. Essentially, Kolb asserted that “learning is the process whereby knowledge is created through the transformation of experience” (Kolb, 2015). Kolb's theory is a four-stage model of experiential learning in which the learner is given a concrete learning experience, is allowed to make observations and reflections, then forms generalizations, and applies these ideas/concepts to new situations (Kolb, 2015). According to Kolb, learners who partake in these stages experience active engagement with content; thus, enabling learners to participate in a “more effective learning process” (Kolb, 2015). The authors utilized these stages as a framework to choose and sequence the learning activities for their courses.

Research Methods

Two groups of participants were essential to this study. Graduate students enrolled in the Single Subject Credential Program at a rural state university on the west coast comprised one group. These students were all enrolled in a credential course titled Teaching Literacy in the Content Area. The class had 15 students studying to be teachers in all secondary content areas such as English, math, science, social science, music, and physical education. Eight of the participants were female and seven were male. All the students, with the exception of two, were in their early twenties. The remaining two students were studying education as a means to a second career and were in their late forties. The purpose of this class is to establish the need for each teacher to contribute to the literacy skills of the students in their classes by focusing on strategies that enhance the reading, writing, listening, and speaking abilities of secondary students.

The second group of students were from a rural university in the south and were enrolled in a freshman composition class. There was a total of twenty-two students enrolled in the course. Of those twenty-two students, fifteen were female and seven were male. All students were traditional college freshmen who graduated from Texas high schools. Prior to the onset of the study, IRB approval had been obtained by both universities involved and the study was given exempt status due to the minimal risk of participation. In the course of the study, all graduate students participated in the project as the assignment was part of the normal routines and structure of the class they were enrolled in. Additionally, the freshman composition students wrote their literacy narrative and participated in the feedback session as an element of their writing course.

For this study, a qualitative approach was utilized to uncover the impact of experiential learning on secondary teacher candidates. As part of course assignments, the graduate students were grouped in twos or threes to work with two to three freshman composition students. To meet course requirements, the two groups of students from geographically diverse areas had to learn to utilize Google documents as well as Zoom, a video conferencing software, in order to communicate effectively and engage in face-to-face communication. To facilitate schedules and time differences, Google documents were created and shared with both groups of students in order for them to sign up for times that worked in their schedule.

Prior to the Zoom meeting that students participated in, the freshman composition students shared their literacy narrative drafts with the teacher candidates. The teacher candidates then prepared feedback to share with the students regarding their writing in the Zoom session. Additionally, each teacher candidate prepared interview questions to ask the college freshman regarding their relational experiences with teachers as secondary students. Interview questions included the following:

1. Who was your favorite teacher in high school?
2. What did your favorite teacher do that made them your favorite?
3. Did your favorite teacher and your favorite subject coincide with each other?
4. Is your major influenced by a teacher from high school?
5. Who was the teacher you absolutely hated?
6. What were some things this teacher did that you disliked?
7. What are some things you wished your teacher did for you in high school?
8. Any advice for us as future teachers?
9. Did any of your teachers instill a passion for learning in you? If so, how did they do it?
10. How many teachers have you had that made you feel like they cared about your well-being? How did they do so?
11. Did any of your teachers share information about their personal life with you? If so, do you think it made it easier to relate with them?
12. Were there any teachers of yours that you felt were extremely organized?
13. Did you have any teachers that were really chaotic?
14. Did any of your teachers ever tell you why you were learning what you were learning?
15. If you could ask one of your former teachers one question they would have to answer truthfully, what would it be?

The Zoom sessions focused on these two elements: feedback on written narratives and discussions on the impact of teacher-student relationships. The graduate students' final step in this assignment was to reflect in writing on four areas of this interaction:

1. The experience of assisting students with their writing and how this ties into your role as a literacy teacher in your content area
2. Your new understandings of the impact of a teacher on a student's level of motivation, work ethic, behavior, and overall attitude toward school
3. How these new understandings will impact you as a new teacher
4. The experience of collaborating via technology

Data collected included literacy narratives from the freshman composition students, recorded Zoom sessions, and reflections from CSUS students, as well as informal conversations between one professor and her students. The literacy narratives were assigned by the Freshman Composition instructor early in the semester. Students were given due dates and instructions on sharing their narratives with the credential candidate students. The literacy narratives were a natural assignment within the course and an embedded component of the required coursework. Students then made appointments to Zoom with one another to discuss their literacy narratives as well as the impact of teachers on students. The credential candidate students recorded their Zoom sessions and shared these with their instructor. Finally, the credential candidates wrote reflections regarding their experience working with the Freshman Composition students.

Informal data analysis occurred throughout the semester as data was collected; however, formal data analysis did not begin until the conclusion of the Spring 2018 semester. Data analysis revealed three emerging themes: the importance of building teacher-student relationships, the need to teach literacy skills as educators, and the role of technology in education.

Findings

Remarkably, one hundred percent of the teacher candidates reflected on the positive impact a teacher can have on their students based on their discussions with the college freshman. An English candidate reflected, "In speaking with the student, I learned just how much students notice the level of energy teachers put into teaching and how much students want to be taught, not just given content. Further, it's not just about a fun factor, but about creating lessons and activities that enable students to engage with the content." A Science candidate wrote, "The overall ideas talked about in our meeting seemed to always come back to listening to your students, having trust and honesty, and having compassion over lesson planning." Finally, a Physical Education teacher candidate reflected, "The more I interact with students I've realized what a difference we can make as teachers. Making relationships with students is extremely important because you build trust. Once you have trust with your student their work ethic changes tremendously...If a teacher does not show any kind of interest in the students, then the students will respond the same. Teachers underestimate the power they have to influence students' attitudes."

Through the Zoom discussion, teacher candidates were also exposed to the negative impact teachers can have on their students as well. A Physical Education candidate wrote, "Every kid needs a chance to obtain wisdom and encouragement from you. One bad instance she [the student] had was a teacher not keeping their composure and lashing out at a student. This teacher singled out a student and their family, humiliating them in front of the whole class. As a student, I can understand how this would make her feel very uncomfortable and not like her teachers." An English candidate also learned the importance of being a teacher that not only cares for the individual student but also their academic needs. She writes, "She [the student] spoke of a teacher who was nice and fun but who did not teach her anything and due to this she did not like the teacher and would not wish to have her again...I knew that what a teacher does in a classroom has an effect on their students, but

actually seeing what that was and hearing someone else's experiences gave me a new understanding that I appreciate and will consider more carefully as I go on to become a teacher."

Even though both student groups are digital natives, this experience stretched many of them by having them utilize the Google Suite and Zoom. Teacher candidates concluded this assignment with mixed feelings regarding the use of technology. A science candidate reflected, "After going through the whole experience, I feel that I am all the better for it, as I learned a few new tricks. I didn't know that Zoom was even a thing, and interacting with the student, face to face, enhanced the whole correspondence experience. Now, I have another resource that I can keep in my back pocket to use if the opportunity ever presents itself. Also, I had never used google documents in that capacity. Using the comments feature, as well as sharing the document between my class partner and the composition student led me to realize the power and potential google documents have in the classroom."

Another student did not appreciate the utilization of technology in this assignment. She wrote, "This was my first experience collaborating via technology and I didn't like it. I am not too fond of technology because I think it takes away social aspects. In today's society everyone is on some type of device and because of this people are becoming less and less social."

Another physical education candidate shared, "the overall experience of meeting via technology was smooth. My class partner and I first logged on about five minutes before our appointment just to be prepared for technical difficulties. However, both of us plus our student did not have any technical problems. I did not like that you could see into someone's personal room as I did not notice behind me the entire time sat my dad's deer head. Thankfully, our composition student laughed at it and agreed her family was country people as well."

Several students noted that the ability to see one another allowed for deeper communication and learning to occur. "With the addition of Zoom, we were able to discuss the work in person and see each other via camera so we could also communicate with inflections and facial expressions. This is very important, as non-verbal communication is often key to conveying meaning, particularly when delivering criticism." Technology afforded collaboration that would not have been feasible otherwise and allowed for rich learning experiences despite the occasional technological difficulties.

Discussion

The active and engaging learning cycle that occurred across the country, between the two different groups of students, created an experiential learning opportunity that allowed for theory to be put into practice. This is intrinsically important for those at the end of their professional education. The ability to engage in social interaction strengthens learning and enhances the professional dispositions of those entering the field of education as well as many other careers.

Research continues to support what effective teachers have known all along; positive relationships are the foundation that allows for curriculum to be taught. Jensen (2016) explains that neuroscience proves that "we are hardwired to connect." He goes on further to state that effective student-teacher relationships have a significant effect size. Additionally, these relationships empower students from poverty to perform at equal levels to their advantaged peers (28). We know that when a student makes an emotional connection with an adult, this connection fosters positive development that includes increased motivation and engagement, and improved academic performances (National Research Council, 2004; Sabol & Pianta, 2012).

In this study, all fifteen teacher candidates, via discussions with college freshmen, were able to gain insight into the necessity for building meaningful relationships with their students. As these graduate students enter their own classroom, the social interaction that occurred within this assignment with beginning college students will empower and remind them to consider the individuals in their class. Technology is expanding at a phenomenal rate and instructors, in both higher education and in K-12 settings, are striving to integrate the use of technology in both engaging and meaningful ways. Recent times have proved that technology will become more and more infused into daily educational practices amid the COVID-19 pandemic. In her study on students and information technology Caruso (2004) writes, “students noted their preference for technology in the classroom, with the highest number of students (41.2%) preferring to take classes that use a moderate amount of technology” (4). Both sets of students in the current study were stretched to some extent with the use of the Google Suite and Zoom; however, once students had been walked through the process of utilizing these applications, most students embraced and enjoyed the use of technology for communication across a distance. Technology allowed for communication and growth that could not be fostered otherwise and was a means for active and social learning.

Conclusion

Although this study was limited in its scope, it is obvious that students in higher education benefit from active learning experiences. The ability to engage in experiential learning bridged theory and practice, allowing teacher candidates to reflect in meaningful ways that will enhance their pedagogy as they move into their profession. Despite these clear advantages that experiential learning opportunities can create in teacher preparation programs, many faculty and administration are reluctant or unsure how to implement them with ease. Our study demonstrated the potential that the use of technology can have when preparing preservice teachers.

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Preparing Teachers for Effective Use of MTSS:
Students with ASD who Experience Anxiety
by
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Abstract

Mental health issues are on the rise and it is paramount that teachers be prepared to recognize and support students with mental health needs. Students with disabilities and co-occurring mental health issues in particular often go unrecognized and untreated. Specifically, students with autism spectrum disorder (ASD) experience anxiety at higher rates than their neurotypical peers which can negatively impact their school performance. Symptoms of anxiety can be difficult for teachers and school staff to identify because of their tendency to mimic ASD's diagnostic characteristics. Multi-tiered Systems of Support (MTSS) is a comprehensive, collaborative framework for educators and mental health partners to personalize support for students with ASD and anxiety; however, teachers often view their role as limited in this process. The purpose of this article is to better prepare teachers to collaborate with the school-based intervention team to identify and support students with ASD who experience anxiety.

Case Study

Mary is a first-year teacher whose 6th grade classroom includes Alex, a student who was diagnosed with autism spectrum disorder at age 8. He is a general education student who maintains good grades and is not normally a disciplinary concern. When Alex transitioned to middle school his behavior changed drastically. He began to aggressively protest against group work with his peers, avoided talking to others in the hallways, and ate alone during lunch. His teachers noticed Alex picked the skin on his arms during class, sometimes causing bleeding. The school nurse realized Alex was coming in weekly, complaining of head and stomach aches. His parents noted an increase in Alex wanting to stay home from school, claiming he "hates it there" because "no one likes me". They reported he would text them multiple times per day, asking if he could be picked up from school. As the school year continued, Alex's grades dropped while his absences increased. Mary wants to collaborate to support Alex's needs.

The purpose of this article is to discuss how the school intervention team collaborates and steps to implement effective practices to support the needs of students at each level. While this article focuses on students with ASD who exhibit anxiety, it is likely that it may be applied to any student demonstrating anxiety or other mental health needs. In order for the school's intervention team to be in the best position to support Alex's school performance and emotional well-being, several critical questions must be answered:

1. Is Alex's behavior part of the symptoms of his autism diagnosis or something else?
2. How will the team be made aware of the concerns?
3. What are the best interventions to put in place for Alex?
4. What is the role of the teacher in each step of the intervention process?

To answer these questions, this article will apply the Multi-Tiered System of Support (MTSS) model as a framework for educators to identify and manage symptoms of anxiety in students with autism. While the focus of this manuscript is specific to supporting the unique needs of individuals with ASD and anxiety, it is likely that the process and strategies can be used for all students to support other mental health needs.

Autism and Anxiety

Mental health issues in school age children have been demonstrated to lead to reduced attendance, lower academic achievement, poor peer relationships and vocational achievement as well as a higher risk of alcohol and drug use, susceptibility to disease and reduced life expectancy (Maclean & Law, 2021; August, Piehler, & Miller, 2017; Reinke, et al., 2011). The World Health Organization (2012) reported that approximately 20% of adolescents are likely to experience some form of mental health issue. After the COVID-19 pandemic, however, more recently a survey from Centers for Disease Control indicated 37% of highschoolers, or 1 in 3, report consistent mental health struggles (CDC, 2021).

Individuals with ASD appear to suffer even higher rates of anxiety, stress, depression, and suicide than the general population (Ratcliffe et al., 2015) yet these conditions go undiagnosed and untreated (Magyar & Padolfi, 2012). Approximately 42-79% of individuals with ASD have a co-occurring mental health disorder in addition to ASD (Kent & Simonoff, 2017; Ratcliffe et al., 2015) including both internalizing (e.g., anxiety, depression, inattention, and irritability) and externalizing (e.g., hyperactivity, impulsivity, aggression, defiance, and tantrums) emotional behavior disorders (EBD; van Steensel & Heeman, 2017; Magyar & Pandolfi, 2012). It is estimated that 30-84% of people with ASD exhibit some form of anxiety, in fact, anxiety is becoming one of the most commonly co-occurring diagnoses for individuals with ASD (Adams & Emerson, 2021).

Although anxiety can intensify academic and behavioral challenges that impact school performance, typically only the externalized behaviors are identified by teachers because they are more observable and disruptive to the classroom routine. Furthermore, characteristics of ASD such as cognitive impairments, the inability to articulate and regulate emotions, and the overlap with ASD may mask symptoms of anxiety, making it difficult to recognize in students (Beaumont, Rotolone, & Sofronoff, 2017). Usually, teachers will focus more on the academic and behavioral components rather than the social emotional or mental health needs of students, however, left untreated, anxiety can lead to the poor outcomes previously mentioned.

Teachers must be in a position to address the mental health needs of the students they serve, including those with ASD, so that learning can take place. Awareness and application of the Multi-tiered System of Support (MTSS) system by the school intervention team (i.e., teachers, school mental health professionals, and community agencies) can be used to identify and address anxiety in students with ASD. In fact, schools are ideal locations for such support due to regular contact with students. Multi-tiered Systems of Support is the framework for aligning school resources so that intervention teams can systematically support all students, including those with ASD. Current literature addresses both MTSS (von der Embse, 2018) and the unique mental health needs of students with ASD in schools (South, Rodgers, & Hecke, 2017). What is missing is a discussion of how teachers can practically apply the MTSS framework to identify and support students with ASD and anxiety. Classroom teachers play a key role in this process as they are the "front line workers" who will identify, assess, intervene with Tier 1 and 2 practices, and

make referrals and reinforce implementation for Tier 2 and 3 interventions. The purpose of this article is to identify the teacher's role on the school-based intervention team to implement practical strategies at each level of MTSS so that they are able to collaboratively support students with ASD who experience anxiety.

Teachers can also increase their awareness of how anxiety symptoms manifest in students with ASD. Characteristics of ASD such as poor social skills and the inability to articulate and regulate emotions may mimic symptoms of anxiety, making it difficult to recognize (Beaumont et.al., 2017; den Houtin et al., 2020). It is unclear whether anxiety is caused by the ASD or if some of the ASD symptoms may be a reaction to stress (Syriopoulou-Delli, et al., 2019). For example, intolerance for uncertainty, insistence on sameness, restricted and repetitive behaviors (American Psychiatric Association, 2013) and poor emotional regulation skills (Berkovits, Eisenhower, & Blacher, 2017) are all central characteristics of ASD however they may be experienced at higher rates if students are using them as a coping mechanism for anxiety (Joyce, et al.). For example, an increase in repetitive sensorimotor behaviors such as rocking or skin picking, insisting on sameness or being inflexible with changes to the school routine, or an increase in physical complaints such as headaches, fatigue, and stomach aches can all be the result of increased anxiety. Likewise, teachers may notice an uncharacteristic decline in academic performance such as missing or incomplete assignments, a lack of participation, and/or increased tardiness and absences. Finally, students with ASD who are struggling with anxiety may engage in emotional outbursts such as tantrums, crying, withdrawal or refusal to engage, or oppositional behaviors.

Multi-tiered Systems of Support (MTSS) is the framework for aligning school resources and initiatives that is based on the Response to Intervention (RTI; [RTI Action Network](#)) and Positive Behavioral Interventions and Supports (PBIS; [Center on PBIS](#)) programs as a way to systematically support all students. Traditionally, PBIS focused on social-emotional interventions and behavioral support and RTI focused on academic interventions, however, MTSS is intended to support the whole child by merging the two systems into one interdisciplinary, systematic approach to intervention. Since mental health challenges, particularly anxiety, have been shown to impact behavior, school attendance and academic achievement (Maclean & Law, 2021; August, et al., 2017) teachers are the professionals that will most likely be able to impact the student on a daily basis. However, teachers indicate that they feel ill prepared and lack the skill or knowledge to intervene (Reinke, et al., 2011). While teachers do have knowledge and skills to address this issue, it's important to know that they are not alone but part of an interdisciplinary team of professionals that can collaboratively support the student. This article will discuss the steps involved in the MTSS process and the teacher's role in each step.

MTSS uses universal screening, data-based decision making, problem-solving, collaborative teams, evidence-based interventions, and wrap-around services. It is important that teachers know how to collaborate within the system of MTSS as well as how to implement Tier 1 and Tier 2 interventions, and reinforce Tier 2 and 3 interventions that address these concerns. The process begins with a systematic universal screening process to identify students with mental health concerns, including those with concerning levels of anxiety. Results inform teachers and guide the implementation of Tier 1 classroom interventions which include education and preventative coping skills for all students. Students who are identified at higher risk can receive Tier 2 interventions such as small group or individual, targeted instruction implemented by the classroom teacher or a school mental health practitioner. If anxiety levels begin to impact daily functioning and/or school

performance, Tier 3 interventions such as wrap-around services with community service providers can be an additional means of support.

Universal Screening

A critical first step in MTSS is screening all students. Universal screening is a preventative measure that can help identify students who may struggle with learning and adapting to the school environment. A comprehensive assessment strategy that includes screening will help educators support students that could encounter challenges in meeting learning and social development expectations. Developmentally appropriate universal screening measures can be administered at all grade levels and can target academic, behavioral, and mental health concerns, including anxiety.

In today's classroom environment there is a greater level of responsibility for teachers to promote positive mental health as well as provide early detection of behavior changes and emotional distress, however, approximately 70% of 5–16-year old's who have experienced a mental health challenge have not been provided an appropriate intervention (Maclean & Law, 2021). Maclean & Law (2021) found that while 93% of teachers surveyed believe schools should play a role in identifying and improving mental health issues, over half (65%) had received minimal to no training. Most teachers surveyed felt it was the responsibility of other school professionals (e.g., school psychologists, school counselors) to screen, conduct assessments and provide social emotional support, not the teacher (Reinke et al., 2011).

While teachers are well prepared to screen students for academic and behavioral challenges as a part of normal classroom practice, screening for mental health concerns is not as common. However, due to the extensive amount of time teachers spend with students, they are in the unique position to observe variation in mood or behavior. Since MTSS is focused on a holistic view of how to serve students social-emotional, behavioral, and academic needs, and these needs impact learning, performance and positive life outcomes, screening for mental health concerns must be part of the process.

During the screening phase of MTSS, intervention teams will prioritize desired targeted outcomes such as an increase in student instructional engagement or a decrease in disciplinary referrals within school districts or individual schools. The team then reviews and selects an appropriate universal screening tool to use for the target population of students. Specific screening tools for mental health concerns can be recommended by the school counselor. Proctor eligibility is determined by the training and expertise needed to administer the screening. Collaboratively, the team can decide who is best to administer the screening. Details such as standardized directions for students, format specific instructions (online, paper and pencil), and an implementation schedule should be discussed and shared by the team. If the screening tool collects personal information from students such as would be the case with anxiety assessments, confidentiality and informed consent should be explained, and parental notification provided in advance of the screening. An identification and referral system should be in place for students whose scores indicate a potential safety issue, such as harm to self or others. After results are obtained, the team should plan to review and determine trends, patterns, areas of needed support, and resources to meet the desired outcomes. It is important to note that screening tools are not appropriate to diagnose ASD. Rather, universal screening tools may help isolate anxiety as a separate and distinct concern for students with an ASD diagnosis. Figure 1 describes universal screening resources that can inform discussion around the selection, implementation, and interpretation of mental health related screening tools.

Figure 1. Universal Screening Resources

Name	Description	Website
Substance Abuse and Mental Health Services Administration (SAMHSA): Ready, Set, Go, Review: Screening for Behavioral Health Risk in Schools	Information on how to prepare schools to implement universal screening including clarifying screening goals, selection, implementation funding, and follow up.	Ready, Set, Go, Review: Screening for Behavioral Health Risk in Schools (samhsa.gov)
National Center on Safe, Supportive Learning Environments: Mental Health Screening Tools for Grades K-12	Guidelines including examples of mental health screening tools and additional resources.	Mental Health Screening Tools for Grades K–12 (ed.gov)
School Health and Performance and Evaluation System (SHAPE): School Mental Health Quality Guide: School Mental Health Screening	Tips for implementing mental health screening including the role of the intervention team, creating school and community partnerships, determining assent and consent, and follow up procedures.	Screening-1.27.20.pdf (schoolmentalhealth.org)
Mental Health America (MHA): Mental Health Screening in Schools	Discussion of implementation strategies including what happens after screening. Tools for online mental health screening are offered	Mental Health Screening in Schools - MHA Screening (mhanational.org)

Mary noted that there have been several student absences and visits to the nurse as well as signs of withdrawn behavior such as lack of interest and engagement in classroom activities. Alex is one of several students exhibiting this behavior. Mary was able to share her observations and concerns with the intervention team to determine if these are possible behavioral and social emotional signs that indicate anxiety. The intervention team selected academic, behavioral, and mental health screenings for administration to all students as a means to understand what supports would be most helpful for struggling students. When the results of a mental health screening were reviewed, the team noticed several students had concerning high scores on anxiety related items, including Alex. They began discussing what interventions were needed for these students.

Tier 1 Supports: Classroom Climate

Teachers are in a prime position to identify signs of anxiety in students with ASD since they are already aware of the student’s disability, IEP goals and how the ASD symptoms normally present in the classroom. Teachers are prepared to make the academic and behavioral accommodations needed to provide their students support; however, they may not be as familiar with how to help in reducing anxiety. Since many of the symptoms of anxiety can be masked by the characteristics of ASD, teachers will be most sensitive to increases and decreases in energy levels, repetitive, stereotypic movements, engagement, flexibility, sensory sensitivity, and mood changes. Teachers can use the results of universal screening to monitor students in need of additional support and to improve classroom interventions

(Center on MTSS, mtss4success.org; American Institutes for Research, www.air.org).

Once symptoms have been recognized either through universal screening or teacher observation, specific techniques can be implemented in the classroom to reduce anxiety and increase student participation in instruction. The strategies described can be used as a preventative technique, as whole class instruction, or small group instruction once anxiety has been identified within the classroom. While these strategies are specific to helping students with ASD reduce anxiety, they will undoubtedly assist other students with anxiety.

One strategy is to foster a classroom climate that uses mindfulness and relaxation techniques regularly to teach students to recognize their unique signs and levels of anxiety (Stockall & Blackwell, 2020). Teachers can encourage whole class deep breathing or read a guided meditation appropriate for school to students before perceived stressful events such as an exam. For students who have been identified with anxiety, teachers can work with a small group to help them recognize how anxiety manifests in their bodies and guide them in the mindfulness and relaxation techniques. This is particularly helpful for students with ASD who lack emotional regulation skills and may not recognize how anxiety impacts them physically and emotionally. Teachers can also create a sensory space that allows students to calm and de-escalate when anxious and overwhelmed. Since anxiety is often associated with increased movement, agitation, and tension, creating a safe space to de-escalate and reduce sensory input is helpful. For students with ASD, stereotypical repetitive movements are common and often exacerbated when they are anxious. Providing low lighting, noise canceling headphones, and inexpensive fidgets such as Silly Putty or Pop-It's can give students appropriate outlets to reduce sensory input and in turn, reduce the level of anxiety (Amos, Byrne, Chouinard, & Godber, 2019; Robertson & Simmons, 2012). It would be important for the teacher to introduce the corner and establish guidelines on how and when it should be utilized.

Additionally, applying the principles of Universal Design for Learning (UDL) breaks down the barriers to learning while allowing for learner variability and can help reduce anxiety. Universal Design promotes providing students with multiple means of engagement, representation, and action and expression to learn and show what they know (CAST 2018. Universal Design for Learning Guidelines version 2.2. Retrieved from <http://udlguidelines.cast.org>). By following the principles of UDL teachers can build on student's strengths and preferences to reduce sensory stimuli and social anxiety. Providing options for the students allows them to successfully engage in learning in a way that best meets their needs. For students with social anxiety or poor social skills, teachers can allow students to use computers or other multimedia to complete tasks. For example, students can be allowed to text peers or use chat rooms rather than face to face group assignments or students can record an oral presentation rather than presenting in front of the class.

When Mary became aware that Alex's high levels of anxiety had impacted his grades and his ability to remain in class, she decided to implement several techniques in the classroom to address his symptoms. First, Alex was given a small amount of PlayDoh to manipulate during instruction. Mary explained to Alex privately how the tool was to be and not to be used. Alex was reminded not to disrupt others when using the PlayDoh and to put it in his desk when it was not in use. Mary also created a "quiet corner" where students could provide her a signal and then go to the quiet corner, set the timer for two minutes and refocus or calm down. On days Mary noticed Alex was anxious she allowed him to use noise canceling headphones to complete his independent work in the back of the room. Finally, Alex's group was allowed to meet via Zoom to complete a group assignment,

using texting between classes to collaborate. This was also an option for other groups of students who felt it necessary.

Tier 2 Interventions: Individual and Small Group Techniques

Intensified anxiety can present in various forms in students with ASD during the school day. Research has shown that poor emotion regulation skills (Berkovits et al., 2017) and an intolerance for uncertainty (Keefer et al., 2017; Ying Cai et al., 2018) are common anxiety manifestations experienced by students with ASD. For example, on days where there is a change to the typical schedule such as an assembly or a reading fair, students can act out through tantrums or refusal. If these behaviors become routine, students with ASD can benefit from Tier 2 interventions to cope with the anxiety faced during a schedule alteration or transition. Tier 2 interventions are targeted interventions for students who have been identified as academically and/or behaviorally at-risk (Ebersole, 2021). These supports are provided to individual or smaller groups of students by a qualified mental health professional when it is determined that intervention is needed in addition to Tier 1 supports. Availability of mental health professionals varies between school districts but can include school counselors, school psychologists, school social workers, and school-based therapists.

After receiving a referral, school based mental health practitioners may apply cognitive behavioral therapy (CBT) techniques because of their demonstrated effectiveness in alleviating anxiety in students with ASD (Hillman et al., 2020; Simpson, Maffini, & Schuck, 2017; South et al., 2017). CBT strategies can include psychoeducation, cognitive restructuring, and gradual exposure to anxiety causing events. Psychoeducation allows school based mental health practitioners to explain to students what anxiety is, how it is experienced, and what coping skills can be applied. It is an opportunity for students to learn about the unique impact their anxiety has on their school performance and general well-being. Cognitive restructuring involves teaching individuals how to identify, evaluate, and change unhelpful thoughts into ones that are more productive (Burns & Beck, 1978). When students experience frustration or self-doubt about an expectation, they can learn how their negative thinking is preventing them from successfully completing a task. Exposure therapy is used to help people control their fears by gradually exposing them to activities or situations they avoid in a safe and supported environment (APA, 2022; <https://www.apa.org/ptsd-guideline/patients-and-families/exposure-therapy>). School based mental health practitioners can use a modified version of exposure therapy to fit the needs of students with ASD who experience anxiety. Once an anxiety provoking situation is identified, practitioners can work with students to create specific goals to gradually increase their tolerance for a particular event such as a noisy lunchroom or unfamiliar classroom.

Although Tier 2 interventions may take place outside of the classroom, there is much teachers can do to reinforce and generalize the techniques to different contexts within the school setting. Collaboration with the school based mental health practitioner is an important first step. With the student's permission, talking with the school counselor or social worker can help the teacher understand the specific anxiety triggers and intervention goals. They can learn strategies and language to use with the students to remind them of the techniques. For example, if a teacher knows a student becomes anxious before taking a test, they can ask the student how and where they feel their anxiety. Calming interventions such as deep breathing or time in a quiet corner can then follow. The teacher can also remind the student about the impact of negative thoughts. For example, if the student is convinced, they will fail the test, the teacher can assist the student with replacing the self-sabotaging

thought with a more adaptive one such that they can always do their best. Finally, if the student experiences extreme anxiety over a specific event such as a fire drill, the teacher can work with the mental health practitioner to provide support for the student. For example, the teacher may prepare the student for the scheduled drill and initially offer noise canceling headphones. The school counselor or social worker then may join the class during the drill to walk with the student. As the student becomes more comfortable, the headphones and extra assistance can gradually be removed.

In addition to classroom support, Alex began working with his school counselor on a weekly basis. After building a strong rapport based on trust, the focus of sessions was on recognizing patterns of his specific anxiety symptoms and applying relevant coping skills. For example, Alex learned that the period before lunch was very anxiety producing for him because of the large amount of sensory input. After collaborating with Mary, the school counselor helped him become more accustomed to this environment by having him eat at a quieter table with a trusted friend for shorter periods of time, then allowing him to finish his lunch in a designated classroom. The amount of time spent in the cafeteria increased over time as Alex became more comfortable. Mary also ensured that the transition from lunch to class went smoothly for all students by reducing the sensory stimuli. She played soft music and used a “bell ringer” activity for the first five minutes of class before beginning the lesson. To address Alex’s negative thinking patterns, the school counselor used cognitive restructuring to challenge Alex’s belief that no one liked him. When asked if he had any evidence that his classmates disliked him, Alex was unable to name any specific instances. When prompted, Alex was able to identify at least one supportive person in each class. Alex was encouraged to evaluate the truth of negative thoughts and to reframe them into more realistic and helpful cognitions. Mary did a short whole group activity on cognitive restructuring with her class. Mary then was able to utilize this strategy with Alex and other students throughout the year to address negative thoughts.

Tier 3: Community-Based Supports

At times, students might need more intensive support, which may include referrals to community mental health practitioners (Magyar & Pandolfi, 2012; Conroy et al., 2022). Teachers can collaborate with school counselors to locate local mental health practitioners who are skilled in working with individuals who have been dually diagnosed with anxiety and ASD. Many school counselors develop resource databases of community practitioners and their specialties. In tandem with caregivers, teachers and school counselors can refer students to qualified mental health practitioners. These practitioners can reinforce strategies that have been introduced to students in the school setting and provide support to caregivers in obtaining necessary services. For example, mental health practitioners can aid students in determining which emotional regulation strategies have been most effective and how those techniques can be modified at home and in the community. Further, mental health practitioners can refer caregivers for individual or family counseling, support groups, or respite care as needed.

Collaboration between teachers, school counselors, families, and community based mental health practitioners is essential in supporting mental health of students across settings (Beames et al., 2022; Conroy et al., 2022). Consultation can “harness the unique expertise of school-based professionals, families, and external providers and specialists” (Conroy et al., 2022, p. 384). Certain communities have agencies which serve as conduits for families receiving services. These agencies employ a wraparound approach to ensure that children with

behavioral and social-emotional health needs have a network to support them at home, at school, and in the community. A variety of resources are available to programs that want to employ this comprehensive, collaborative approach to care (<https://www.nwic.org/>; <https://nwi.pdx.edu/wraparound-implementation-guide/>). In some cases, the sponsoring agency has dedicated a staff person to serve as facilitator. The facilitator works with the student and family, to build a team, which can include mental health practitioners as well as other community supports (<https://nwi.pdx.edu/Wraparound-basics/>). Teachers can assist caregivers in getting connected to wraparound services and participate as members of the wraparound team.

When checking in with Alex's parents at parent- teacher conferences, Mary learned that while Alex's behavior in school had improved markedly, he was still having difficulty managing his anxiety at home. According to Alex's mother, her daughter, Karen, recently returned to the family home after separating from her husband. Karen has two younger children, ages 4 and 6, who are also residing with them. By his mother's report, Alex has been having difficulty adjusting to his niece and nephew's presence. As the youngest, Alex has never had to vie for his parents' attention, share his room, or manage the disruptions of younger children. Alex's mother requested additional support for the family as they navigate the transition. Mary shared the information with the school counselor who provided Alex's mom with the names of various mental health providers in the community. Alex's mother contacted a local mental health agency and set up an appointment for an intake. The intake therapist recommended individual counseling for Alex and family counseling. After obtaining a release of information, Alex's therapist collaborated with Mary and the school counselor to determine what strategies were in place at school. The therapist then asked Alex to practice some of the skills he had learned from his school in session. Simultaneously, the family therapist worked with Alex's parents to mediate the concerns of their children and grandchildren. The family decided to remodel their basement to accommodate Karen and her children.

Conclusion

Anxiety presents unique challenges for students with ASD because symptoms are easy to confuse with diagnostic characteristics. Left unmanaged, anxiety can negatively impact school performance including grades and social adjustment. MTSS is a framework that involves identification, intervention, and collaboration among the intervention team as a means to personalize support for students with ASD who struggle with anxiety. Teachers as "first responders" play a major role and must be prepared to collaborate at every level of MTSS intervention. Teachers will be the first to recognize changes in a student's social emotional behaviors and mood so they must be empowered to play an active role in identifying and screening for mental health concerns as well as work collaboratively to implement Tier 1, 2, and 3 level supports. School-based mental health practitioners can lead Tier 2 but they must collaborate with the teachers so that support strategies can be reinforced in the classroom. Community health providers can enact wraparound services in Tier 3 such as mental health treatment and support to caregivers as a way to supplement school level interventions. By working together to apply the MTSS framework, intervention teams can be more certain students with ASD who experience anxiety are able to thrive academically and behaviorally in school.

At the end of the third marking period the intervention team met to discuss Alex's progress. Mary reported that Alex was using the calm down corner at least three times a week without prompting. Using an online meeting forum, Alex was

more consistent with his contributions to class projects and was recently invited by peers to join a group for an upcoming assignment. His grades showed a significant increase from the previous marking period. Alex's school counselor stated they saw Alex weekly and focused on identifying and reframing negative thoughts and increasing engagement in anxiety producing activities. Mary reported reinforcing this in the classroom. The school counselor reported that Alex has been eating in the cafeteria most days of the week. After obtaining signed releases, Mary and the school counselor talked to the mental health and family therapists who noted Alex's positive progress in treatment. Specifically, Alex has learned to articulate his anxious feelings to his mother and ask for time alone in his room to regulate his emotions through guided imagery and deep breathing. The team determines the interventions at all tiers are working and will continue to monitor Alex's progress.

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Arming Teachers: Voices of the Faculty
by
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Abstract

Since the Sandy Hook Elementary School shooting in 2012, there has been a call to arm teachers to protect children and prevent the loss of lives in the event of school shootings. Those calls have come from the National Rifle Association (NRA), legislators, parents, and others outside the scope of the educational setting – meaning they are not educators. There is little research on how the educators themselves feel about this idea. This article used a survey to solicit responses from educators across the United States in K-12 classrooms regarding school violence. One question from the survey was used for this manuscript: How do educators feel about the idea of arming faculty in a school building? The qualitative results were overwhelmingly negative and are outlined in this manuscript.

The massacre at Columbine High School in 1999 is seen as marking a distinct change in school safety policies. The increased incidence of violence on school campuses since, has led to increased legislative interest to prevent recurrence. Since 2018, the possibility of arming teachers and other school personnel has been given more support from organizations such as the National Rifle Association and former President Trump's Federal Commission on School Safety (Weiler et al., 2021). With every school shooting, the topic is once again brought to the forefront as a way to prevent future events.

Data exists showing violence in schools has declined by more than 80% since the mid-1990's (Irwin et al., 2022). Between 2009 and 2020, nonfatal criminal victimization for students aged 12-18 decreased from 51 to 11 incidents per 1000 students (Irwin et al., 2022). However, incidents of school violence involving the use of a gun or explosive device have been on the increase (Weiler et al., 2021). In the 2020-2021 school year, 93 school shootings occurred which was the highest number since the 2000-2001 academic year (Irwin et al., 2022). School violence involving guns or explosives has increased so much that law enforcement created its own category of crime to describe it – targeted school shootings (Warnick et al., 2010). While school shootings become the featured news story when they occur, other types of violence occur in schools which rarely get media attention. Approximately 234,000 teachers become victims of violence at schools in the United States each year (Duffy & Mooney, 2014). These acts include homicides, rapes, and assaults (Duffy & Mooney, 2014) but are not the focus of this manuscript.

An Education Week article written in 2021, which has been updated through the event in Uvalde, Texas on May 24, 2022, states that between 2018 and 2022, 199 incidents in schools occurred in which at least one person was killed or injured. Overall, in that time, 88 people have been killed and 213 people have been injured in school shootings (Sawchuk, 2021). In a school shooting incident, it is estimated that one student will die every 17 seconds (Carno & Klehr, 2017) and that most shootings are over in less than 15 minutes (Lee, 2013). Law enforcement response to school shootings varies. If it takes 10 minutes for first responders and law enforcement to arrive on scene, having armed personnel on campus could begin an immediate intervention.

As of 2020, there were a total of 130,903 K-12 schools in the United States (Bouchrika, 2022). Enrollment in these schools is more than 49 million from PK

through 12th grade (<https://nces.ed.gov/fastfacts/display.asp?id=372>). The probability of a school shooting at any one school is relatively small, yet schools spend millions of dollars on safety measures (Kennedy, 2017). DeMitchell and Rath (2019) reported an FBI study done in 2014 showing that of the 160 active shooter incidents occurring that year, only 27 occurred in K-12 schools. Measures to make schools safer have been underway since the 1950s. These include armed school resource officers (SROs), metal detectors, cameras, school redesign, dress code policies, limiting entry points, changing school architecture, and active shooter drills (DeMitchell & Rath, 2019; Warnick & Kapa, 2019; Weiler et al., 2021).

School shootings become headline news when they occur. The fact that mass shooter incidents have occurred with increasing regularity has led to increases in active shooter training and development of crisis management and emergency response policies for such events (Briggs & Kennedy, 2016; Kennedy, 2016). Most school shootings are resolved through actions by administrators, educators, and students, or the shooters either gave themselves up, committed suicide, or ran away (Briggs & Kennedy, 2016; Lee, 2013). Advocates for arming teachers state that response to school shootings are limited to either running or hiding because without a weapon, the only other response would be to confront an armed person, most likely leading to self-sacrifice to protect others (RAND, 2022). For this reason, it is argued that schools need to have some sort of armed force to act in the face of such violence and stop shooters before there can be a massive loss of life (DeMitchell & Rath, 2019; Klein & Blad, 2019; RAND, 2022).

In 1990, the federal government passed the Gun-Free School Zones Act (GFSZA) as a measure to protect schools from gun violence. This act makes it a “federal criminal offense for any individual to knowingly possess a firearm at a place that the individual knows or has reasonable cause to believe is a school zone”. A school zone is defined as “within a distance of 1000 feet from the grounds of a public, parochial, or private school.” A firearm means “any weapon which will or is designed to or may readily be converted to expel a projectile by the action of an explosive” (Vessels, 2019, p. 298). This law pertains only to K-12 schools. Even with the GFSZA, many states do not prohibit those who carry valid conceal and carry licenses from bringing a firearm onto school property. Exceptions to the law allow guns to be brought onto school campuses as long as they are unloaded and locked in a vehicle, used for a school program, or for persons who are contracted by a school for security purposes (Eckes & Mueller, 2019).

While most states prohibit firearms on K-12 campuses, almost all states do have some exceptions. The National Conference of State Legislatures website (<https://www.ncsl.org/research/education/school-safety-guns-in-schools.aspx>) lists states with existing statutes allowing or prohibiting firearms on K-12 campuses. Nine states specifically list school employees as being exempt to prohibition of carrying weapons on school grounds as long as they have completed training programs: Idaho, Kansas, Missouri, Oklahoma, Tennessee, Texas, and Wyoming (<https://www.ncsl.org/research/education/school-safety-guns-in-schools.aspx>). On May 21, 2019, the 86th Texas Legislature sent House Bill 1387 to the governor’s desk that would allow changing the ratio of allowing one gun per 200 students’ enrollment to allowing one gun per 100 students’ enrollment on a public-school campus. The bill would not force districts to comply but would allow them to do so if they wished (Samuels, 2019).

There is public support for arming teachers, especially in the wake of a mass school shooting, among the general public (Baranauskas, 2020; Mancini et al., 2020; RAND, 2022). After the 2012 Sandy Hook shooting, the National Rifle Association (NRA) began advocating for arming teachers (Weiler et al., 2018);

Zgonjanin, 2014). Following the 2018 shooting at Marjory Stoneman Douglas High School, President Trump established a Federal Commission on School Safety (DeMitchell & Rath, 2019). The charge of this commission was to review school safety procedures and make meaningful recommendations for best practices to keep students safe. One of the recommendations of this commission was to consider arming school personnel beyond the school resource officer (SRO) or police officer assigned to a school (DeMitchell & Rath, 2019; Eckes & Mueller, 2019; Klein & Blad 2019; Warnick & Kapa, 2019). President Trump himself supported arming 10-20% of teachers on a campus and felt that those who do so should be compensated (DeMitchell & Rath, 2019). It is this recommendation that is concerning to educators.

School safety policies are inconsistent and varied across the United States (Hara, 2020; Jonson et al., 2020; Weiler et al., 2021). Even in policies allowing for arming teachers, policies are varied. One consistent element in district policies allowing for arming teachers is that only school personnel employed by the district are eligible to carry weapons and they must meet designated certification requirements (Weiler et al., 2021). Few districts, however, address in those policies when deadly force could be used. Some policies require consideration of the situation prior to the use of deadly force but would also hold the employee accountable for collateral damage (Weiler et al., 2021).

There is little scholarly research related to the effectiveness of arming teachers (Mancini et al., 2020; Weiler et al., 2021). This is primarily because the federal government will not fund such research. This lack of funding is related to the Dickey Amendment, added to a government spending bill in 1996 (Lee, 2013). This amendment prohibits the use of federal funds by the Centers for Disease Control and Prevention (CDC) to advocate or promote gun control. In 2011, the Dickey Amendment was extended to include the National Institute of Health (NIH) (Lee, 2013). Because of the lack of research and restrictions placed on agencies that develop such research, pro-gun lobbyists and legislators do not have the justification needed to be able to refute the need for stricter controlling measures on guns (Lee, 2013; Rogers et al., 2018; Warnick et al., 2010). This lack of research makes it difficult to ascertain what policies might work to reduce school violence, indicating that policy decisions regarding school safety are being made without a clear research base (Kent & Curran, 2021).

Another area with little research is related to the unintended consequences of arming teachers (Mancini et al., 2020). While there is evidence that having armed individuals on a campus would significantly reduce response time, evidence exists that doing so negatively affects the physical and emotional well-being of students and staff (Weiler et al., 2021). Students perceive such measures as searching their bags and walking through metal detectors to gain entry to school as being punitive (Hara, 2020). There is also the possibility of an accidental weapon discharge injuring or killing someone, although there have been no such reported incidents. There are also no reports of an attempted shooting at schools that have enacted such policies, however the possibility of a shooting at any one particular school is very small so little credence can be put on this evidence (Weiler et al., 2021). Even when there is a policy in place, the presence of armed personnel on a campus has not reduced the number of casualties (Kent & Curran, 2021).

Finally, research from the perspective of the teacher is missing. While organizations such as the PTA and NEA have come out against guns in schools (Kennedy 2018), most of the available research comes from surveying the public, not teachers. Teachers are not well represented in decision-making in districts, however they are the primary enforcers of such policies (Hara, 2020). Due to legislative

changes in many states allowing for armed faculty, this article is an attempt to listen to the missing voices of teachers regarding their feelings.

Research Methodology

Using a phenomenological approach, a Google survey was created and used to gain the perspectives of school personnel regarding the overall effect of school violence on school climate. The original survey asked 11 open-ended, qualitative questions related to perspectives of faculty. Three questions were demographic questions asking the size of the school or district, grade level of the participant, and approximately how many faculty were on the campus/district. One specific question in this survey directly addressed the idea of school personnel being allowed to carry a weapon on school property as a deterrent to school shooting events.

The authors work in a small, religiously affiliated, liberal arts institution that trains educators for K-12 classrooms, principals, and school counselors. Invitations to complete the survey were sent to the university's graduates, placed on electronic message boards, Twitter, and Facebook. In some cases, the survey was shared by followers on Twitter and Facebook. Survey responses were completely anonymous with no tracking of emails or other identifying information.

The survey was completed by 76 participants from across the US shortly after the Santa Fe, Texas school shooting in 2018. No specific identifying data was collected for confidentiality purposes. One international respondent (based on answers to questions) did complete the survey. While this response rate seems small, the results are similar to other studies of teachers and the general public in terms of sentiment, with more respondents being opposed than supporting the arming of teachers (Baranauskas, 2020). This qualitative paper reveals the "why" specific to teacher opposition to carrying weapons which is lacking in the research. This question was asked in the survey which served as the research question for this paper: Do you agree/disagree with the suggestions that trained teachers with conceal-carry permits be allowed to carry their weapons on campus for school safety? Why/Why not?

The researchers individually analyzed the responses to the specific question about carrying weapons. After individually analyzing and coding the responses, the researchers met and discussed their analyses and compared notes on emergent themes. Of the 76 responses to this question, four responses were simply yes or no, four responses were non-specific (didn't say agree or disagree), 13 responses were yes, with the remaining 55 responses being emphatic no responses. The open-ended responses were coded, looking for patterns to suggest emerging themes (Moustakas, 1994). The themes that emerged from responses include mixed feelings, accidental discharge/loss of weapon, training and liability, weapon storage/access, worry about colleagues' mental stability, changing the environment, and potential for wounding/killing innocents.

Findings

Teachers have a lot of responsibility for the education, development, and well-being of students in their charge. Classroom teachers are also responsible for carrying out any policies the district puts into place. On a daily basis, educators react to issues related to bullying, crime, medical emergencies, natural disasters, racism, and suicidal behavior (Lee, 2013). One respondent echoed this sentiment that teachers have a lot of responsibility saying, "Teachers already have a lot on their plate and are loving, caring, giving, and nurturing individuals and to ask them to carry

a gun, to me, is out of the question. I understand the why, (I am retired military) but not all teachers can, if not most."

A March 2018 survey by the National Education Association (NEA) found that 74% of members overwhelmingly oppose arming of teachers with 82% stating they would not carry a gun in school (NEA, 2018) However, even those who may not endorse the idea of educators arming themselves do recognize that in some situations it makes sense to have armed faculty on a campus (Carno & Klehr, 2017). Due to the rapidity with which school shootings are over, rural schools often have a longer response time from law enforcement personnel. In this situation, it might make sense to arm teachers. Currently, no schools have a requirement for teachers to step up and arm themselves on campus. Those who choose to arm themselves for school safety, have done so voluntarily (Carno & Klehr, 2017). One respondent stated that while they disagree with the idea of arming faculty acknowledged, "it is already happening on my campus." Another respondent who agreed with arming of teachers stated, "A teacher with a weapon is in a position to stop the threat quickly. The sooner the threat is eliminated the less injuries will occur."

Accidental Discharge/Loss of Weapon

Accidental discharge or loss of a weapon is a concern when arming a campus. Even educators who might be in favor of arming school personnel, may be reluctant to do so due to fears of being overpowered by larger students, leaving a gun where students might gain access, have concern over having a large number of guns in school, and the potential for an increase of accidental shootings (Lee, 2013). A respondent echoed some of these fears, "I don't see how this will help with safety. I think it is more dangerous with accidental discharges, students gaining access to these guns, or teachers possibly using the guns after a breakdown." The potential for accidental discharge was a primary concern of many who responded to the survey. One teacher stated, "Teaching kindergarten, my students are extremely affectionate and hug me when they feel like it, no matter what I am doing. I would be extremely upset if my kids got ahold of my gun by accident." Yet another teacher expressed this concern, "I don't trust them [other teachers] to keep a weapon concealed from the kids. I know how many remote controls and pieces of devices they mislay during the day because of all the interruptions and distractions to their work." In March 2018, in a California school, a teacher, who is also a reserve police officer, accidentally discharged his weapon while teaching a class on gun safety (DeMitchell & Rath, 2019). The Giffords Law Center to Prevent Gun Violence maintains a website reporting incidents of mishandled guns in K-12 schools (<https://giffords.org/lawcenter/report/every-incident-of-mishandled-guns-in-schools/>) illustrating that mishandled weapons are a real concern.

Before arming can occur, training issues must be addressed. In addition to state requirements for conceal and carry permits, there are organizations actively providing firearms training specifically for educators. These organizations include FasterColorado.com, the Coach Aaron Feis Guardian Program, Giffords, and the Buckeye Firearms Foundation (Carno & Klehr, 2017; DeMitchell & Rath, 2019). One respondent expressed this concern about the caliber of training, "Disagree with concealed weapons. The definition of "trained" varies from state to state. Are trained teachers going to go through psychological exams to be certain they are not unstable???" Another respondent stated, "Staff are not trained for tense situations involving weapons, like police officers are, and could panic and cause injury to innocent people."

It is estimated that there are approximately 20,000 SROs nationwide (Flounnory, 2019) in schools with a cost of greater than \$12 billion annually whereas arming teachers is seen as cost neutral (Weiler et al., 2021). While it may seem

inexpensive to arm teachers, guns in schools not only requires ongoing training for those who are armed, but also increases the liability and costs to schools and school boards for ongoing training and results of improperly stored or handled weapons (Carno & Klehr, 2017; Lee, 2013; Rajan & Branas, 2018; Rogers et al., 2018). It is known that insurance rates for schools that have armed teachers have increased (Carno & Klehr, 2017; Jonson et al., 2020; Weiler et al., 2021). Ongoing training would be necessary to maintain readiness of armed faculty (Weiler et al., 2018). This respondent summed up the need for ongoing training as well as the potential cost of arming educators, "I am not trained in firearms. The school cannot afford to train me, 100 rounds a day to keep me in good form; that isn't realistic." Those educators who have taken on the responsibility of arming themselves could face personal liability making them more responsible for lives lost because of their inaction (Weiler et al., 2021; Zgonjanin, 2014), as this respondent stated, "There are a number of staff, probably in most districts, that hold a concealed carry license. None of these would want to be responsible looking for a live shooter and potentially hit an innocent child - that would be devastating."

One issue regarding an armed teacher workforce is storage of weapons during the school day. Would educators be allowed to carry the weapon on their person, or would it be locked in a closet or vehicle? The GFSZA does allow for educators to carry a weapon on a school campus as long as it is locked in their vehicle in the school parking lot (Eckes & Mueller, 2019). Several respondents, while opposed to arming educators, felt that access to weapons might be hindered if guns are kept in a locked cabinet somewhere in the building or classroom. This teacher, who supports the idea of arming teachers, stated,

I would hate to be caught in a situation hiding with thirty young people behind me knowing I had the skill, but my weapon is unavailable. Once in the past, I waited in dark supply closet over an hour with large group terrified teenagers during an 'intruder with a gun' actual lockdown event. The football players grabbed the metal support poles used in physics lab and posted beside the door frame and waited, tense, ready to fight. I would have preferred to have my handgun than a kid with a pole to defend my students.

Another respondent expressed it this way, "How could I ever hope to get to the gun in an emergency?"

Trusting colleagues is important. There is currently no designated way to effectively identify and choose educators who may carry on a K-12 campus (Rajan & Branas, 2018). In cases where campuses are armed, administrators ask for volunteers (Carno & Klehr, 2017). From the NEA survey of teachers, 64% of respondents to that survey said they would feel less safe if teachers and other educators are allowed to carry guns. Several respondents expressed concern about faculty that might be chosen to become armed. This teacher expressed some concern stating, "I also think there are some poor teachers out there that would excel in that type of training and then be intimidating or scary to students." This teacher went on to say s/he did not trust every teacher in their building or the administration to choose the candidates to be armed, "I don't think I trust the 'Powers That Be' to determine who is safe to carry and that they get regular practice and understanding." Another respondent stated, "Who is to determine the mental stability of that staff member?" This respondent stated,

If a teacher wants to carry a weapon, perhaps it should be allowed. That being said, I have become more and more concerned with the 'what ifs'. What if the teacher is the one who

becomes disgruntled, or a student uses that very teacher's gun to commit violence. It is a confusing topic full of what ifs!

Teacher-student relationships play a role in the perception of a safe classroom and school environment. This respondent commented, "Kids need to feel we teacher [sic] are never, ever, ever a threat to them or their well-being." Metal detectors and backpack searches has already been noted to change the school environment (Hara, 2020).

The issue of whether or not law enforcement response would be able to distinguish between an armed assailant and a weapon-carrying educator (DeMitchell & Rath, 2019; Weiler et al., 2021) was a concern. Another question was whether or not educators who do not undergo the equivalent training of a law enforcement officer would be truly effective (Rogers et al., 2018). Putting students and staff in more danger when law enforcement responds to an incident is a real fear for both law enforcement personnel and teachers (Jonson et al., 2020). School shootings are often chaotic situations and not knowing who is armed in defense of the school and who is perpetrating the crime may be difficult to ascertain. This respondent stated, "Teachers who happen to be armed will be in more danger when police visit schools."

In studies involving officer-involved shootings, police officers, who are highly trained to use weapons in a live shooter situation, are accurate less than 50% of the time (DeMitchell & Rath, 2019; Eckes & Mueller, 2019). Given this statistic, how will responding to an active shooter situation affect the educator and the school? One respondent put it this way, "I would not want to have the responsibility of deciding to shoot or not to shoot a kid. Officers are trained for those situations." An echoing of this sentiment is felt by this respondent,

We do not practice with guns and live ammo under stress to prepare for such a thing like soldiers would do daily. Even well-trained soldiers freeze up and forget what to do in battle. An active shooter is a serious threat to the emotional and physical well-being of highly trained officers and soldiers. If it is that difficult for highly trained people, what makes anyone think teachers have time for that kind of training?

Having armed personnel on campus may increase the risk of assessing who is a threat and who is not once law enforcement arrives on the scene (Weiler et al., 2021). This concern was echoed by many respondents. This respondent said,

How would I know who is the shooter and who is the staff member? Or what if the shooter is staff? What if the shooter is our student? What if the shooter/student is shot and killed by a teacher? What would the fallout be from that for the teacher and the district? What directions would we give staff for when it would be okay to shoot a student of ours? Could we shoot a student who is pulling out a phone if we think it's a gun? Good grief! This is nonsense thinking.

Respondents who were supportive of arming teachers, could see the need to have armed teachers who are already trained, but acknowledged that teachers did not get into the profession to carry a weapon in school for safety purposes. One respondent stated,

There are a number of staff, probably in most districts, that hold a concealed carry license. None of these would want to be responsible looking for a live shooter and potentially hit an innocent child - that would be devastating. But without a doubt, if I had my gun on me and was barricaded in a room, I would

be grateful to have a way to defend the students behind me if someone were trying to break through my door to harm them. So, yes, I agree.

Another positive response stated they were in support because, “Criminals will always have guns and schools cannot afford a bunch of security officers.” Another supporting view admitted that his/her viewpoint may be skewed, “I live in an open-carry state so, I carry on a daily basis, but not at school because it is not allowed. I also have 20 years of military experience, 10 of which were as a weapons instructor.”

Discussion

Respondents were overwhelmingly against arming teachers stating they had too many other responsibilities in the classroom such as creating relationships and ensuring students feel safe in school. This finding is in line with the NEA (2018) survey of teachers. For the most part, schools are very safe places. With more than 130,000 K-12 public and private schools enrolling nearly more than 50 million students in the United States (NCES, 2020; Bouchrika, 2022), episodes of school violence are small in comparison to the number of schools and school children across the nation (Carno & Klehr, 2017; Riser-Kositsky, 2022; Shamserad et al., 2021).

The themes emerging from our study specify reasons for teachers to be opposed to arming themselves. In our survey, feelings are mixed. Even in teachers who are trained to handle weapons, feelings are mixed which is in alignment with the NEA (2018) survey. Reasons include concerns about training, storage and access of weapons, and mental stability of those who are armed. Other concerns of respondents are related to accidents involving weapons and changing the environment of the school. Findings from our study do closely align with the NEA (2018) study in that the majority of respondents to both our survey and the NEA survey were primarily against arming teachers.

Carrying a weapon and using it at a moment’s notice changes how people see their environment. As an educator, will the willingness to carry a weapon to protect students change the way the job is seen? Will students now be seen as potential threats instead of people needing to be educated and protected from the world (DeMitchell & Rath, 2019; Kent & Curran, 2021). Since 1999, school safety has been brought to the forefront of school reform. Every time there is a school shooting, there are greater calls for changing gun legislation, including arming teachers. Proponents for arming teachers state that no schools who have armed teachers have been attacked in a school shooting. However, evidence does show that at least some of the schools where mass shootings occurred had armed officers on campus (Yorio, 2022), yet the attacks were still carried out.

It should be noted that much of the support for arming teachers comes from outside the profession. Our own survey was overwhelmingly negative regarding how teachers feel about being armed. Even those who might support arming teachers do so with reservations. While most people think gun-free school zones makes schoolchildren sitting ducks to anyone wishing to commit violence on a large scale, due to the lack of research on the subject, we know very little about the effectiveness of arming teachers in deterring gun violence in schools. Any legislation or development of school/district policies related to arming teachers must allow for the teacher voice to be heard.

Implications for Educator Preparation

As faculty members who prepare preservice teachers, school counselors, and principals to enter the field, it is our job to ensure candidates are prepared for everything that might happen in the classroom. This includes episodes of violence. How do educator preparation programs prepare pre-service teachers, counselors, and administrators to look for signs of violence and be prepared to handle such events as we prepare them to use pedagogically sound, engaging teaching practices and create relationships with their future students?

The authors would like to recognize some limitations to the study. A response rate of 76 teachers does not seem like a large response rate. Our method of getting responses and timing of the survey was most likely at issue. The survey was sent in the final weeks of the school year as teachers were preparing to close classrooms. Even though we did use several methods of calling for participation, we were very limited in how far-reaching these sources were. However, given the studies reported by the NEA and PTA (Kennedy, 2018) which did survey educators rather than the general public, the results of our survey seems to coincide with the results of those organizations. Teachers are largely against arming themselves with a small number who do see some potential benefit.

State laws require schools to have school safety and security plans in place, as well as training faculty and staff in the implementation of such procedures (Rinaldi, 2017), but that doesn't change the fact that school violence episodes still occur. There are large gaps in the research related to school violence and its effects on school climate, teacher relationships, and how educators feel about the current and proposed safety measures (Mancini et al., 2020). Areas of potential future research include How the arming of teachers will change the school climate and relationships of teachers and students, the perspective of students and their perceptions of safety, the effect of school violence on teacher burnout, and the effectiveness of arming teachers with regards to reduction of violence. Finally, because there are no uniform policies across states or school districts regarding who can be armed, amount of training required, or even liability, research into effective policies is necessary. Teachers did not go into the profession to become first responders, but more and more, that is exactly what they have become (Rinaldi, 2017).

Conclusion

For the most part, schools are very safe places. Episodes of school violence are small in comparison to the number of schools and school children across the nation (Carno & Klehr, 2017). However, it is that victims of such violence are seen as helpless to do anything against the violence that makes such occurrences abhorrent. Because schools are often seen as "soft targets" – a place where large numbers of casualties can be obtained with little resistance (Arnold, 2015) – attempts to harden schools to reduce such violence have been underway since the 1950s. Measures undertaken include SROs, metal detectors, bag searches, locking doors, dress code policies, implementing student codes of conduct, video surveillance, profiling, curriculum changes, and changing school architecture and layout (Weiler et al., 2021). It is estimated there are between 14,000 and 20,000 school resource officers (SROs) nationwide (Flounnory, 2019). These SROs have been hired from the local police forces or hired specifically by the schools for security purposes. Many districts have established their own police departments. The reason districts choose to employ these groups is the desire to be able to respond immediately to any potential threat either during or outside school hours (Flounnory, 2019). Other measures to harden schools include installation of metal detectors, cameras, limiting entry points to buildings, lock-down drills,

partnerships with local first responders, creating threat assessment protocols, and training teachers and staff in safety procedures (Warnick & Kapa, 2019).

Since 1999, school safety has been brought to the forefront of school reform. Every time there is a school shooting, there are renewed calls for changing gun legislation, including arming teachers. President Trump endorsed the idea that 10-20% of educators on every campus should be armed (DeMitchell & Rath, 2019; Eckes & Mueller, 2019; Klein & Blad, 2019; Warnick & Kapa, 2019). Organizations such as the NRA also advocate for arming teachers (Weiler et al., 2018; Zgonjanin)

It should be noted that much of the support for arming teachers comes, primarily, from outside the profession. Our own survey was overwhelmingly negative regarding how teachers feel about being armed. Even those who might support arming of teachers do so with reservations. While most people think gun-free school zones make schoolchildren sitting ducks to anyone wishing to commit violence on a large scale, due to the lack of research on the subject, we know very little about the effectiveness of arming teachers in deterring gun violence in schools. Any future legislation related to arming teachers must allow for the teacher voice to be heard.

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Using Assessments to Improve Student Learning and Instruction
in the Social Studies Classroom

by

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Abstract

The present article is anchored in the empirical understanding that classroom assessments are the critical element to achieving meaningful improvement in student learning. Literature across different disciplines and contexts indicates that the alignment of classroom assessments and instruction improves student achievement (Breakstone et al., 2013; Conley & Darling-Hammond, 2013; DeLuca & Bellara, 2013; McMillan, 2013, Smith, 2016). The area of focus in this article is the exploration of how classroom assessments can be used in alignment with instruction. The analysis of the lived experiences of four Social Studies educators portrays the importance of several educational components and elements that educators may need to support student learning with classroom assessments.

Assessment literature in Social Studies reflects the importance of using assessment to improve student learning and instruction (e.g., Smith, 2017; Torrez & Claunch-Lebsack, 2014). However, despite the ubiquitous references to this understanding, it is not uncommon to hear that the educational practices of educators are not optimal for student learning. Educators should always examine the effectiveness of educational approaches to meet the educational needs of their diverse students (NBPTS, 2022). Literature on assessment practices of Social Studies suggests educators can benefit from implementing improved assessment practices to support instruction (Smith, 2017; Torrez & Claunch-Lebsack, 2014). Although many educators are innovative with their teaching, others can still reflect assessment practices that disagree with current educational standards. For instance, most states in the USA have adopted Common Core State Standards (CCSS), which focus significantly on developing literacy skills and critical and historical thinking. Smith (2017) found that most social studies educators still prefer to use multiple-choice tests to assess student learning. Multiple choice assessments are most adept at promoting rote memorization rather than critical and historical thinking skills. Thus, there is a need to assist educators in improving their educational assessment practices.

To assist Social Studies educators in meeting the educational needs of their students in an educational context that continues to evolve, this article aims to share educational experiences as explored in the research focus on how Social Studies teachers conceptualize and use assessments to improve student learning in an era of standardized high stakes assessments. This article explores the experiences of accomplished social studies educators as they develop their educator-made classroom assessments into an assessment system to improve student learning. To do this, this article reports on suggested findings based on information collected by personal interviews, focus groups, and document analysis of the educational practices of these educators. In doing so, this study is expected to address the lack of existing studies portraying how classroom assessments can evolve from outdated to meaningful assessment practices for student learning.

Conceptual Framework

This study uses McMillan's (2013) framework for classroom assessments. McMillan presents this conceptual assessment framework as an alternative to traditional approaches based on psychometric theory, as they have little applicability to the realities of classroom learning. This framework encompasses this study due to the emphasis of this research in the Social Studies classroom. The following elements are theorized to impact the understanding, design, and implementation of assessments in the classroom: (1) advances in measurement theory, (2) advancements in learning and motivation, (3) advancements in high-stakes large-scale testing, (4) advancements in formative assessments, (5) advancements in technology, and (6) advancements in standards-based education.

Advancements in measurement theory indicate the importance of formative assessment for student learning. This supports the evolution of concepts such as the validity and fairness of assessments. As such, new conceptualizations of validity emphasize five aspects of assessments: "(1) alignment with instruction, (2) minimal bias, (3) an emphasis on substantive processes of learning, (4) the effects of assessment-based interpretations, and (5) the importance of validity evidence from multiple stakeholders" (McMillan, 2013, p. 6). New conceptualizations of fairness also include the need to use assessment transparency in terms of expectation, equitability for all students, and evaluation of student work (Tierney, 2013).

Learning theory indicates that learning necessitates self-regulation. This involves the establishment of clear goals, the monitoring of progress, the provision of feedback, and the adjustment of actions directed toward the achievement of the goals (Andrade, 2010). Classroom assessments are a central element in achieving self-regulated learning, monitoring learning, and providing feedback.

Large-scale testing influences the type of classroom assessments educators use (Brookhart, 2003). Standard testing exerts pressure on students and teachers to succeed in these tests. If students fail, educators are often blamed. Thus, the high-stakes testing and the pressure of accountability undoubtedly impact classroom assessments and curriculum.

Formative assessments are central in the process of monitoring students and informing instruction. These are needed components of assessment and instruction (Andrade & Cizek, 2010; McMillan, 2007). Formative assessments promote student motivation, self-engagement, and effective feedback (Brookhart, 2011). These developments in formative assessments should direct the use of classroom assessments to impact student learning, instruction, and student motivation.

The expansion of education applications that include built-in assessments has become popular (McMillan, 2013). TI-navigator, for instance, incorporates assessment systems that promote mathematical problem-solving. Simultaneously math educators obtain instantaneous reports on students' strengths and weaknesses (McGrath & Bush, 2013). Technology can be used to provide well-timed feedback for student learning and teacher instruction.

Standards encompass the skills and knowledge that are deemed desirable for the students. With Common Core State Standards, critical literacy and college readiness skills are the desirable educational aims (Ateh & Wyngowski, 2015). This is a radical departure from policies that promote rote learning and memorization. In the field of assessments, the high regard placed on new standards must be reflected in how educators employ assessment practices. Within this framework, all these components directly influence how assessments are conceptualized, designed, implemented, and analyzed.

Literature Review

Current Educational standards emphasize developing skills such as critical thinking and analyzing information rather than memorizing content (Ateh & Wyngowski, 2015; Breakstone et al., 2013; Gerwin, 2014). In such a context, the use of school assessment practices from traditional paradigms can only create a misalignment with the educational outlook established for students in Social Studies. Assessments are critical in examining student learning and improving instructional strategies (Buyukkarci, 2014; Fulcher, 2012; Hobeck et al., 2014; Rahman, 2018; Reeves & Honig, 2015). Educators' assessment tools must reflect the educational goals most prized for student learning (Fulcher, 2012). These educational goals align with academic standards; they simultaneously impact student learning instruction and assessment processes. Educators must be adept and efficient in modifying their assessment practices effectively to these educational policies.

Educators must be assessment literate to employ effective assessment practices properly. In this area, one of the principal factors to understand is the use of formative assessments in the classroom (Buyukkarci, 2014; DeLuca et al., 2016; Dunn et al., 2013; Fulcher, 2012; Hobeck et al., 2014; Lysath et al., 2017; Yao, 2015). Formative assessment is one of the critical elements to understanding student learning and the effectiveness of instruction. For instance, Yan et al. (2021) found a strong correlation between formative assessment and instruction adjustment for student learning. Similarly, the researchers found that formative assessments support a growth mindset in the students. Additionally, a meta-analysis of formative assessment studies suggests that formative assessment practices among several disciplines could positively impact student learning if educators capitalized on the use of feedback and student self-evaluation (Lee et al., 2020). These studies suggest that educators need to be literate in the pertinent use of assessments to inform instruction and student learning.

In addition to commanding a solid use of formative assessments, assessment literature highlights the need for educators to be data literate. Specifically, educators are called to be effective in the use of statistical principles, software, and packages to determine and monitor student learning in their classes (DeLuca & Bellara, 2013; Dunn et al., 2013; Fulcher, 2012; McGee & Colby, 2014; Reeves, & Honig, 2015). Dunn et al. (2013) suggest that in looking at data, educators must identify patterns of performance that reveal areas where students may need support and areas where they excel in learning. This information must be included in instructional interventions targeted to improve students' weaknesses and capitalize on students' strengths. The analysis of these student data perpetuates a feedback loop in which educators constantly evaluate their teaching and implement alternate instructional strategies when their teaching practices are not as effective in meeting students' needs.

Accomplished educators should be able to have assessment practices that can fulfill accountability purposes. These accountability demands can arise from parents, educators, and other stakeholders. Therefore, educators must articulate how their educational assessments support and justify their academic interventions (Neal, 2013; Reeves & Honig, 2015; Rothman & Marion, 2016). In this area of accountability, Fulcher (2012) reiterates that to meet accountability demands, educators must understand the design and implementation of teacher-made and standardized assessments. Along with these kinds of assessments, educators must be able to understand and convey information about the validity and reliability of tests and assessment tools and demonstrate how their assessment practices support student learning (Dunn et al., 2013; Fulcher, 2012).

A systematic approach to assessment may not only be necessary to carefully look at student data, but also to implement formative approaches to assessment and accountability purposes. Rather than simply having dispersed assessments during an academic term, an assessment system encompasses a wide range of assessment tools carefully designed to be in alignment with each other and serve as a monitoring system for student learning (Conley & Darling-Hammond, 2013; Dunn et al., 2013; Neal, 2013; Rothman & Marion, 2016).

In their study, Rothman and Marion (2016) suggested that assessment systems are a promising approach to improving student learning while meeting accountability standards for educators. A locally developed system of assessments offers the advantage of having an effective alignment of classroom assessment at the classroom, school, district, and, likely, state level.

In addition to the utility of assessment systems for accountability and student learning, Conley and Darling-Hammond (2013) suggest that assessment systems have several other critical issues in an educational context. For instance, information on the accountability of educational practices can be used in the evaluation of local educational programs. So, the use of an assessment system is equally important for the classroom, school district, and beyond. Neal (2013) argues that schools are constantly trying to appease several stakeholders. In this process, schools must be equipped to meet several objectives at once. Hence, the use of assessment systems can be a critical element in meeting the needs of students and the educational community.

The Study

This qualitative study explored the experiences of four in-service Social Studies school teachers and their use of educational classroom assessments to promote student learning in the Social Studies classroom. The study used a social constructivist paradigm in which meaning-making is negotiated by individuals and their places and interactions (Patton, 2002). The social constructivism paradigm was deemed appropriate for this study because it fostered an in-depth and complete description of the context where participants share their perspectives and experiences.

A qualitative paradigm incorporates diverse research traditions or approaches for research topics (Patton, 2002; Thomas, 2011). This study's approach is a case study which brings together several research tools to explore the topic of interest. In conjunction with a social constructivist worldview, the case study allows researchers and participants to provide a contextual analysis of a research topic of interest.

The participants in this study were four Social Studies in-service teachers who graduated from a university in a mid-west state of the United States of America. All these educators had a close association with the same university. They underwent graduate education and collaboration with teacher educators from the university. Additionally, all educators participating in this study had more than three years of teaching experience. These participants were selected using purposive sampling. This recruitment approach allows the recruitment of participants with specific characteristics for a research study (Creswell & Creswell, 2018). Thus, to ensure this study's participants were leaders in their classrooms, information was solicited from educators at the university to identify these educators.

The data analysis consisted of in-vivo coding rounds. The first coding round resulted in a large number of codes. The second round established connections between the codewords to create categories. Then, the third round explored the themes that emerged to address the research question. In the first coding round, the

codewords were actual words or phrases participants shared in their interviews. In clustering the codewords, the researcher used professional judgment to combine codes that belong to the same category. Later, the researcher wrote the narrative to answer the research questions from these themes.

Results

In exploring the factors that resulted in social studies educators using assessment practices that are responsive to student learning, educators listed several lived experiences ranging from their time in middle and high school as students in the Social Studies classroom to the new professional development and opportunities they have obtained in their role as Social Studies educators.

In their time in the history classroom, educators reflected that their experience with assessments and instruction was very traditional and lacked student engagement. Classes were characterized by the history teacher using the lecture as the primary form to transmit knowledge to the students. They reported that students would sit and listen during the entire class. Little interaction happened between students, and only one version of history reigned unchallenged. Students were not allowed to engage in critical thinking because the version of history that educators taught could not be a challenge. Ms. S, one of the participants in this study, explained, "I wasn't really a fan of history in high school. It was taught dry and boring and had that stereotypical idea of what history is." Similarly, Ms. H explained, "I became a history teacher because I had horrible history teachers. I mean, names and dates and memorization. I love history, but you're making me hate it. If you can't think critically, it just won't work well for the students."

Social studies educators in this study reflected on their experiences as students and wanted a more meaningful approach to teaching history and Social Studies. This disposition was active during their teacher preparation program, as they were critical of the pedagogical approaches to history and Social Studies. In the following quote, Ms. L explained why she thinks teaching in Social Studies should be responsive to current educational contexts:

I think education is ever-changing, just like our everyday world is. If I were to teach like I did in 2007, we still had flip phones, everything was extremely basic, and everything that I learned in my undergrad education was to teach in 2007 or before. It would be a disservice. So, as the world changes, my teaching has, too.

Assessment Promotes Learning

Paramount to the justification of their assessment practices, Social Studies educators in this study adopted the view that assessment and instruction are intricately connected. Thus, failing to make assessments a central element of student learning is a missed opportunity to impact students positively. Ms. L explains:

I weigh assessments and instruction as equally important elements within my learning theories. Likewise, the curricular materials that I use with my students are as important as assessments and instruction. You can't modify instruction without modifying assessments and your curricular materials.

For these educators, implementing assessments has much to do with student learning and teaching. They do not conduct assessments for accountability or to assign grades at the end of a given academic term. Instead, they expect to learn how to meet students' needs by examining students' work. Ms. L further explains, "Any assessments I use help develop an image of whether they understand the skill that I'm trying to have them learn. So, assessments have changed

in what I've thought of them because traditionally, I would do a test, multiple-choice. And now I feel like a true assessment is showing me what they truly learned in terms of the skills that we now promote.

Consequently, rather than looking at assessment as a different process to instruction, they place assessment at the heart of responsive instruction and student learning.

The Importance of Formative Assessments

Reflecting on the nature of assessments, Ms. H states that "assessments must be meaningful and have a rationale behind their implementation. Otherwise, [educators would be] assessing for the sake of assessing." Other educators share the same view on using assessments in this study. This is why their reflective thinking on assessment has led them to conclude that formative assessments are crucial in being responsive to student learning. Ms. S indicates:

Any assessments I use help develop an image of whether they understand the skill that I'm trying to have them learn [...] I feel like a true assessment is showing me what they truly learned in terms of the skills that we now promote.

Assessments assist educators in understanding their students and what they know; educators determine these assessments to be formative. This is because if assessments are not formative, they cannot provide timely-relevant information to direct learning processes. Ms. T explained, "Assessment tools need to be contextualized within a meaningful pattern; random assessments, here and there, don't inform anything."

Consistent with Social Studies educators' view that history and Social Studies can be more than rote memorization, educators in this study have put aside textbooks as the primary curricular source in their classrooms. Ms. T further explains, "History has changed how you teach it. It's not names, dates, and memorization. It's more about teaching those life skills to be a productive citizen but using history content to do it." Educators in this study believe that to foster the development and acquisition of critical and historical thinking skills, as well as readiness for college and beyond, they need to be exposed to several primary sources on which students can evaluate and examine the validity and reliability of these sources so that they can create their personal conclusions about historical facts and their relation to current events. This way, students are not passive recipients of knowledge but critical history examiners. Literacy skills are desperately needed in the context of the students, educators believe, because a significant portion of the community is not literate enough to discern and analyze biased information that permeates the media. Ms. S explains, "False information is constantly being shared by multiple social media outlets, and people do not know to distinguish reliable from unreliable sources of information." Hence, it is necessary for assessments to expose students to analyzing multiple primary sources of information so that students can apply literacy and critical thinking skills.

According to Social Studies educators in this study, multiple academic opportunities may become available to educators at several stages of their profession. These opportunities must be embraced with a positive mindset to improve the assessment practices that educators implement in their classes. Some of the opportunities that these educators have embraced include participating in research studies with university professors, enrolling in Master programs, actively participating and directing professional development, collaborating with colleagues from their school district and beyond, embracing technology, and taking advantage of existing educational resources hosted by organizations such as the Library of

Congress. By taking advantage of these opportunities, educators can tremendously improve the quality of their assessments. For instance, embracing the assessment of skills presents an opportunity to redesign assessments. Ms. S explains, "I am moving towards skills more than content knowledge and memorization because I feel like anything that you could google isn't necessarily something you need to assess." Another opportunity presented to these educators was to modify their assessments beyond those suggested by the textbook. Ms. T elaborated, "We started looking at it differently. Everything changed. The textbook was gone. I never passed out a textbook again, and my assessments are skill-based."

Another factor that influences educators' assessment practices is professional development; Ms. L stated, "You can make connections between what you already know about assessments and the newest strategies and approaches." These connections serve as validation of educators' assessment practices or the incorporation of new practices in the assessment toolbox of these educators. So, opportunities for professional development should be cherished as an opportunity to reflect on the effectiveness of educators' assessment practices considering new research and best practices.

Implications

This study suggests that establishing effective educational assessment practices requires the availability of opportunities for educators and the necessary dispositions to take advantage of these opportunities. Here are the suggested implications of this study.

Social Studies educators in this study reflected on how much of the inspiration to adopt assessment, and educational practices came from outstanding faculty at the university. Ms. H explains:

Mr. R was one of the exceptional educators. This was one of the reasons why a lot of us, Social Studies teachers, were so influenced by him. He did all sorts of assessments, you know, not just read and write an essay. It was a variety of types of assessments. And I think that's such a differentiation between college versus high school.

Hence role models such as faculty members are impactful educators who want to engage their students in meaningful learning with classroom assessments.

Educators in this study were positively motivated to improve their assessment practices to further their professional careers. They meaningfully took part in projects involving the analysis and implications of educational standards for their assessment practices, creating classroom assessments in alignment with CCSS, and participating in research projects. These approaches suggest that educators should embrace the disposition to go beyond simply taking assessment courses superficially and moving towards implementing the principle of assessments in their classrooms. Ms. H explains that working with a faculty member from her local university prompted her to reflect on questions such as "what are students' weaknesses in terms of skills? I know Sally is struggling with this standard. Now, what do I do?" These questions have prompted her to continue improving the classroom assessments' effectiveness. Additionally, this study suggests that opportunities to collaborate with professionals from other school districts and educational institutions must be available for educators. These experiences have been transcendental in establishing solid assessment practices and helping students become experts in their school districts.

Social Studies educators in this study departed from using textbooks as the primary source of curricular material for their classes. Instead, by understanding the expectations of CCSS, they started using primary sources to develop materials,

deliver instruction, and improve their assessment practices. These changes in the approach to teaching history and Social Studies not only embraced literacy skills and critical and historical thinking but also examined what assessment practices are most effective in promoting student learning of these desired skills. This is why this research suggests that educators become active agents of their assessment practices and curricular materials as they aim to improve instruction and student learning.

In existing educational literature, a great emphasis is placed on how teachers should approach instruction considering contemporary factors impacting education, such as Covid-19. This study suggests a focus on ensuring students acquire the established instructional targets or objectives. That is, emphasis on educational assessments. Social Studies educators recognize the need to revamp educational practices and curricular development by focusing on the effectiveness of assessment practices. Since assessment and instruction are understood by educators in this study as interrelated components of the learning process, this study suggests there is great benefit in reflecting and evaluating assessment practices to improve student learning.

Conclusion

This study explored four Social Studies educators' understandings of the diversity of factors influencing classroom assessment practices to inform and improve student learning. Results indicate that skill-based education impacts classroom assessments, the elevation of literacy and critical thinking skills, professional opportunities, the selection of primary sources, and dispositions that improve student learning. Therefore, the availability of professional development and support is critical for educators to evaluate their assessment practices. Additionally, this study suggests that outstanding teacher educators make a positive source of inspiration for educators to create and develop their assessment practices. Finally, this study suggests that educational programs and school districts should allow educators to engage in professional development and educational programs in order to grow as professionals and leaders in their schools and beyond.

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Review of Programming Fanuc Robots for Industry Applications,
by James W. Gruenke, 2021.
Orland Park, IL: American Technical Publishers, paper, 240 pages.
Review by Lyle Gross

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FANUC Robotics is a leading provider of industrial robotics systems in the United States. Their Certified Education Robot Training (CERT) program provides educational discounts on equipment and certification paths for students and educators (Sergeyev et al., 2015). American Technical Publishers (ATP) recently published a new book, *Programming FANUC Robots for Industry Applications*, which is focused on training robotics technicians by providing a textbook and workbook combination that may pair well with the FANUC CERT program equipment or other FANUC robot. The 2021 book, authored by James W. Gruenke, is uniquely geared more toward robot programming than other textbooks widely used by schools.

Gruenke's textbook covers the topic of robot programming in nine chapters. Each chapter includes full-color robot images and programming pendant screen shots. The chapters are specifically focused toward programming topics, unlike more commonly used textbooks which are more broadly focused on robotics with only a chapter or two dedicated to programming. For example, Textbooks commonly utilized by colleges and universities are typically not focused on any specific robot manufacturer. Dinwiddie's (2019) book, published by Cengage Learning, on robotics specifically states the popular textbook does not cover the programming specifics of any particular robotic system (p. 124). Goodheart-Wilcox publishes a widely used textbook related to industrial robotics as well that does not focus heavily on programming (Ross, Fardo, & Walach, 2018). It does not focus heavily on the programming of projects but provides some background on the programming languages (p. 80-81). These textbooks are widely used in college and university settings due to their comprehensive nature. However, Gruenke's book differs by focusing primarily on programming with specific emphasis on FANUC robots.

It is not common to see lab activities included in robotics textbooks. This is expected given that robotics textbooks are typically more focused on theory and overall application than programming. By comparison, Gruenke includes a lab activity at the end of each of his nine textbook chapters. The lab activities are relatively short in length and rely upon the programming procedures included in each of the chapters. Some of the lab activities ask the students to build upon previous programs created while completing previous labs. Instructors may find the labs helpful. However, it is expected that instructors may wish to create their own lab activity sheets based upon the particular equipment and end effectors available on their own equipment. In this case, instructors can feel comfortable that students would be able to complete their labs given the well-documented step-by-step programming procedures included in the chapters.

Chapter one addresses robot safety and provides a good twenty-page introduction to robotic cells. A highlight of the chapter is its inclusion of maintenance related topics such as axis alignment and changing batteries. Chapter two covers powering on and jogging the robot which allows students to become immediately familiar with robot movement and capability. Chapter 3 follows up with robot reference frames which can be confusing for new programmers. Much of the chapter deals with how to create the programming frames without providing a sufficient number of applications to help students understand why this topic is important.

Chapter four covers program file types and other topics needed for starting new programs. Students learn how to set payload weights for end effectors and learn how to edit command lines while programming. The timing for these topics is good considering student interactions with data entry issues. Chapter five covers additional movement types such as circles and arcs which can lead to more creativity when assigning lab activities. The chapter also includes information on remastering the robot position in the event of a crash or loss of communication. Again, it is beneficial to students to include these maintenance related topics. Chapter six focuses on programming instructions like timers, waiting instructions, and looping sections of a program. The topics covered in the middle chapters provide students with specific programming procedures that can drive more complex lab activities.

The final three chapters cover registers, offsets, and communication. Chapter seven addresses the use of registers which allow students to create programs that can store numbers for counting cycles and modifying positions numerically. This topic leads well into chapter eight which provides students with the knowledge to use these numbers to program offsets in programs. Offsets are what allow programmers to teach robots to stack boxes onto pallets and interface with sheet stacks that are systematically becoming shorter or taller. Finally, chapter nine covers program communication and end effectors. Programming of input and output communication is what allows robots to be interfaced with other equipment for automated control.

The publisher provides additional online resources for students to help supplement the soft cover printed textbook. Each of the nine chapters include a quick response code (QR code) with an access code that can be used to access additional tools such as flash cards and videos. The videos are well labelled and short enough to be easily viewed on a computer or smartphone.

The textbook includes multiple-choice and short answer review questions at the end of each chapter. The questions are conveniently broken out into sections from each chapter to help students focus on the specific area of the chapter that covers the topic. None of the answers to the review questions are included in the back of book.

Instructor resources are available for purchase or can be obtained at no charge with a qualifying order quantity from a school bookstore. The resources include Powerpoint presentations, answer keys for all textbook questions, stand-alone lab sheets, as well as test banks capable of being imported into the most popular learning management systems. The publisher provides instructions for importing question sets into the various online systems.

The book is described by the publisher as a 214-page textbook/workbook. By comparison, it may be considered relatively thin for a textbook. Its page count is significantly less than more traditional theory-based textbooks utilized by universities. Each chapter contains approximately twenty pages which also include a significant number of images, some of which are quite large. The book might appear light in content when compared to traditional textbooks that are much larger with fewer images. However, Gruenke's focus is on programming which has traditionally been limited to only one chapter in more traditional textbooks.

The workbook element of Gruenke's book comes from the end of chapter questions and lab activity sheets. Six of the nine chapters are followed by a minimum of twenty-five review questions. Chapter four has the most review questions with thirty. The significant number of questions, the chapter programming procedures, lab activities, and the soft cover binding appear to give the book its well-deserved textbook/workbook label.

The book is structured in a logical progression introducing topics such as safety and jogging in the early chapters before covering more complex programming topics. The programming procedures are well highlighted and numbered in a step-by-step format. The programming procedures feature a blue background making them easy to find and reference when completing lab activities. However, the lab procedures could have benefited from follow up questions to reinforce learning that occurred while completing the lab activity.

Gruenke's book should be easily applied to accelerated hands-on courses that specialize in programming FANUC robots for industrial use. It would be an asset for programmers to keep after completing the hands-on course. However, it may be more challenging for instructors to utilize the book for a full three-credit hour college course without supplementing with additional theory content or additional lab assignments. The book's nine chapters may seem insufficient when spread across a traditional fifteen-week course without the addition of the supplemental material from the instructor. However, the quality of the programming procedures within the book may make this worthwhile for instructors given how challenging it is to find instructional resources dedicated specifically to industrial robotic programming.

James Gruenke's *Programming FANUC Robots for Industry Applications* may present challenges for college and university instructors due to its page count when compared to traditional theory-based textbooks. However, it may be well-suited for trade school, community college, and university courses that are heavily weighted toward lab experience. The book is a unique resource for providing hands-on learning opportunities for students in a structured step-by-step format. The learning experience can be enhanced by supplementing the existing lab activities with others created by the instructor that make full use of the equipment provided in their lab. The textbook provides a strong knowledge base for completing a wide variety of lab activities including handling various faults and simple maintenance activities. It is a strong alternative for schools and colleges wishing to get the most out of their lab robots by providing hands-on learning experiences rather than traditional theory-based lecture.

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