

THE TEXAS
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OF TEACHER EDUCATION

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Daniella G. Varela, Managing Editor

Editorial Board

Patsy Sosa Sanchez, Karen Dunlap, & Elda Martinez



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THE TEXAS FORUM OF TEACHER EDUCATION

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The Texas Forum of Teacher Education, a publication of the Texas Association of Teacher Educators (TxATE), is a referred journal published once annually. Articles in the journal are directed to both campus-based and field-based Texas teacher educators. TxATE members, including graduate students, are encouraged to submit manuscripts. Authors must be active members as a condition for publication.

The views expressed in the articles are not necessarily those of the Texas Association of Teacher Educators.

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EDITOR'S INTRODUCTION

Conversations surrounding the topic of education often focus on the word, *future*. Indeed, the idea that education is a non-negotiable prerequisite for empowered *future* populations begins with the notion that children ARE the *future*. Embedded within the educator collective is the responsibility to guard that *future* through meaningful validation of the consequential work they do.

The impact of the COVID-19 pandemic changed educators' stereotypically consistent identifiable handling of the *future* to an elusive and ever-changing process which has now caught the eye of countless researchers. The pandemic did not create student inequities: it exposed them, forced them to the forefront of research focus, and created multitude opportunities for reflection of practice, policy, planning, and invention. In short, Covid-19 forced the educational system to look beyond how things *have always been done* in order to plan better for *how things must be done*. Such institutional soul searching is necessary to ensure that the current public health crisis does not become a generational education crisis.

And so, they say it doesn't matter how hard you fall, but rather how high you bounce back. Although 2020 proved to be a challenging year, 2021 provided just as much of a test of educators' ability to persevere. That is perhaps the most encouraging common thread in this year's lineup of contributions to *The Texas Forum of Teacher Education*: perseverance. The articles within this issue offer a myriad of insightful opportunities for meaningful change to for the betterment of our work, to support and encourage effective educators who consistently strive to deliver high-quality learning experience rooted in research-based strategies in order to ensure that all students' needs are met.

- *Laura Shelton* brings the unique perspective of a first-year doctoral student transitioning into academic life as a preservice teacher educator after years of working in the K-12 setting, negotiating those experiences with the challenges of COVID-19 and connecting those themes to inform the future of teacher preparation.
- *Dr. Pauli Badenhorst* shares how chaos and complexity can be integrated as a vital component of teacher preparation contexts relative to the emergent development of teacherly dispositions.
- *Dr. Doug Monk* explores the causes of low confidence, negative attitudes, and reduced efficacy that many female pre-service elementary teachers have toward science and science instruction and discusses techniques to change those perspectives.
- *Dr. Cynthia Lima and Dr. Lucinda Sohn* present an action research approach to adapting the traditional face-to-face workshop to an online experience as a result of the pandemic; a shift that presented science methods faculty with opportunities to maximize support of teacher candidates.
- *Dr. Amy Ray and Dr. Julie Herron* explore the beliefs of pre-service teachers about math, revealing that most pre-service, and discuss how field experiences have the potential to shift pre-service teachers' perceptions and beliefs about mathematics teaching and learning.
- *Dr. April Sanders, Dr. Laura Isbell, and Dr. Kathryn Dixon* use qualitative research strategies to understand teacher candidates' focus and progress during lesson planning and discuss the value of early and authentic experiences with instructional design.
- *Dr. Olivia Modesto, Shauna Cooke, and Dr. Mike Desiderio* present the beneficial outcomes of a qualitative research project in an ELA pedagogical course and offer practical strategies for adoption.
- *Geronima Nale and Dr. Mary Petron* describe the experiences and encouraging outcomes of supplementing traditional field experiences with virtual field experiences in ESL preparation through a collaboration with a partnership school district.

- *Dr. Lorraine Killion and Dr. Daniella G. Varela* explore methods and strategies for preparing teacher candidates for a TExES content exam based on the qualitative feedback of a preservice teacher focus group, and offer practical, sustainable strategies proven to improve exam performance and pass rates.
- *Dr. Miriam Boesch, Dr. Alexandra Da Fonte, Anna Mohler, and Samantha K. Papp*, in response to reported low levels of knowledge and skills in augmentative and alternative communication, advocate for future pre- and in-service training to serve students with complex needs.
- *Dr. Benita Brooks, Dr. Burcu Ates, and Dr. Jannah Nerren* focus their research on ensuring that teachers are both classroom and community ready with a discussion based on the experiences of an after-school initiative at one educator preparation program.

As TxATE prepares for the next edition, the call for papers to be submitted to the *Texas Forum for Teacher Education* will go out in spring 2022 with the deadline for manuscripts set for **July 1, 2022**. Authors are asked to direct submissions to the 2022 Managing Editor, Dr. Daniella G. Varela (daniella.varela@tamuk.edu).

Respectfully submitted,
Daniella G. Varela
Managing Editor, *Forum* 2021

ENVISIONING CRITICAL TEACHER EDUCATION IN A POST-PANDEMIC WORLD: A DOCTORAL STUDENT'S TAKE ON CRITICAL PEDAGOGY AND SOCIAL JUSTICE IN TEACHER EDUCATION

Laura Shelton

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Abstract

This conceptual reflective essay highlights the perspective of a first-year doctoral student transitioning into academic life as a preservice teacher educator after working in K-12 teaching. I unpack challenges I see facing teacher education and highlight three major themes as they appear in literature and make connections to my personal experiences in the classroom. The three themes I address are: developing critical self-reflection practices, connecting theory to practice, and leveraging technology.

Keywords: Critical pedagogy; teacher education; theory to practice

The social movements after pandemics have often led to periods of creativity and innovation (Wright, 2020). Critical pedagogues remind us that education holds the opportunity for social transformation (Giroux, 2011; Kincheloe, 2008; Freire, 1972). As the world comes out of a year-long quarantine that changed the structure of modern schooling, coupled with nearly a year of protests for racial justice; it is imperative that teacher educators pause to think about what the future of teacher preparation programs will look like moving forward.

The Council for the Accreditation of Educator Preparation recently released its revised standards for teacher preparation in 2022 (n.d.). These standards require teacher preparation programs to prepare preservice teachers to address the needs of diverse students and teachers as well as integrate technology throughout their instruction. Teacher educators are required to be responsive to the shifting nature of schooling in a post-pandemic world, so now is the time to seize the opportunity to plan for this change before we act. Being on the brink of change bears wondering: What do teacher educators need to do differently in order to make justice-oriented, critical teacher education a reality in the midst of shifts in P-16 schooling, such as increased attention to systemic racism; addressing the diverse needs of preservice teachers; and imagining remote learning in teacher preparation programs?

Positionality and Purpose

I identify as a white queer woman from Southern Appalachia. I come to this topic not as a seasoned expert in teacher education, but as a doctoral student finishing her first year. The perspectives I have to offer in this article are not from a long-storied career filled with anecdotes from working with misguided preservice teachers, but rather as a veteran teacher transitioning into teacher education as a way of examining a system that I have witnessed and participated in first-hand recently and walked away from wondering how to prepare preservice teachers to do things differently.

Prior to starting my doctoral journey, I was an upper elementary school teacher for four years. I held onto and sometimes fought for with the help of mentors and colleagues, the identity of a critical social justice educator (Nix-

Stevenson et al., 2020; Shelton & Alarcón, 2020). Additionally, I was teaching fifth and sixth grade when the pandemic began and started my doctoral degree full time the following fall, so I have the unique perspective of teaching in K-12 before and during the pandemic, as well as being a student and burgeoning teacher educator during the pandemic. Making the move into teacher education during this time has framed how I view training pre- and in-service teachers moving forward.

As I have embarked on the journey towards becoming a teacher educator, I have noticed that justice-oriented teaching doesn't happen on its own. Teachers need to develop critical consciousness first to have insight into their identities as well as an understanding of power, privilege, and oppression. As such, I have been wondering how preservice teachers develop an orientation for justice-teaching, and therefore how they develop critical consciousness. With this article, I attempt to understand how critical pedagogy informs the training of future educators. I will begin by drawing upon the work of practiced scholars in the field to define critical pedagogy. Then, I will draw connections between social justice and critical pedagogy as they are defined in the literature, and I will finish by describing themes I notice in contemporary theories and research to consider what critical teacher education looks like in the current socio-political context.

Critical Pedagogy, Social Justice, and Teacher Education

Critical Pedagogy

Critical pedagogy prepares students to participate in a democratic society where they are able to plan and engage in social transformation (Freire, 1972; Giroux, 2011). Positivistic culture has decontextualized content knowledge and presents it as objective, when in reality it has been used as a tool for domination and forced assimilation (Giroux, 2011; Paris & Alim, 2014). Critical pedagogues recognize that teaching and learning are never neutral acts (Freire, 1972; Giroux, 2011; Kincheloe, 2008; Valenzuela, 2016).

Traditional methods of schooling position teachers as the knowers, and students as empty vessels waiting to learn, in what Freire (1972) calls the banking model of education. In this traditional model, teachers are rewarded for how well they impart knowledge to their students; and students are rewarded for how passively they receive the information (Freire, 1972). As a result, Freire (1972) offers a problem posing education as a solution to the passive banking model. In problem-posing education, students identify and solve problems relevant to their world, thus positioning education as a vehicle of social change (Freire, 1972).

Disrupting long-held systems and beliefs and challenging oppressive structures make institutions uncomfortable because it calls into question the very foundation of positivistic, individualistic, and hegemonic norms that the institution has a vested interest in upholding (Giroux, 2011; Kincheloe, 2008). For this reason, critical research can be contentious in higher education (Kincheloe, 2008). Raising the critical consciousness of preservice teachers can help them see these problematic norms and become aware of their own identities and the acculturation process that has allowed them to develop biases and deficit ideals about historically marginalized students that will impact their role in the school community (Aguilar, 2020; Nieto, 2000; Valenzuela, 2016).

According to Liston and Zeichner (1988), for teacher education to have a critical approach, it must help teachers examine their role in the political and moral aspects of schools and the pedagogy that supports them. Liston and Zeichner (1988) also posit that positioning preservice teachers as researchers in their field placements by using ethnographic observations and action research will help them grapple with the culture of schooling and devise plans to address the problems they see within their own practices; thus, providing an example of what problem-posing teaching can look like in teacher education (Freire, 1972). Further, Bartolomé (2004) outlines recommendations for teacher educators in her study of four critical high school teachers. She recommends an "explicit study of ideology" so that "educators can see what's currently in place in a society, where one actually stands and why, and what can be done to contest existing social injustices that are part and parcel of mainstream socio-cultural practices" (Bartolomé, 2004, p. 115-116). The study of

ideology helps preservice teachers learn to counter-hegemonic norms within the school culture and develop cultural awareness to advocate for historically marginalized students (Bartolomé, 2004). Howard (2003) describes critical reflection as an ongoing process throughout teacher development and practice. According to Howard (2003), teacher educators must provide preservice teachers with opportunities to reflect on their ideas and experiences with people of cultures, identities, and backgrounds other than their own to work with racially, linguistically, and culturally diverse students.

Social Justice

Social justice is an ambiguous term with multiple meanings to scholars and teacher educators depending on their context. As such, Hytten and Bettez (2011) attempt to tease out the ways social justice has been discussed and used across various disciplines in educational research and philosophy. Social justice is entwined within the roots of critical pedagogy because critical pedagogues are keenly interested in the ways schooling and knowledge have been used as tools for oppression, and therefore necessitates calls for liberatory and emancipatory education practices (Hytten & Bettez, 2011; Freire, 1972).

Nieto (2000) addresses ways to embed equity and social justice in teacher education. She calls for teacher education programs to “(a) take a stand on social justice and diversity, (b) make social justice ubiquitous in teacher education, and (c) promote teaching as a life-long journey of transformation” (Nieto, 2000; p. 181-182). According to Nieto, “[a] concern for social justice means looking critically at [...] school policies and practices—the curriculum, textbooks and materials, instructional strategies, tracking, recruitment and hiring of staff, and parent involvement strategies—that devalue the identities of some students while overvaluing others” (p. 182).

Acknowledging the ubiquitous nature of social justice, Roegman et al. (2021) define social justice within teacher education as developing “teachers who create learning spaces that serve minoritized students who are marginalized and underserved, and enact inclusive practices that challenge societal inequities [...] we collectively define teaching for social justice as practices that include: curriculum making and the design of curricula for heterogeneous classrooms in which all learners have access to core content; reflective practice and critically questioning one’s own beliefs, instructional skills and strategies; and advocacy that involves working against societal inequities that manifest in schools” (p. 146). Understanding and reflecting on beliefs is also a core principle behind developing critical teachers.

Current Landscape

Darling-Hammond and Hyler (2020) recently outlined future possibilities for policy shifts within teacher education post-pandemic. These shifts require teacher preparation programs to develop educators that are culturally responsive, tech savvy, collaborative, and practice inquiry-based learning (Darling-Hammond & Hyler, 2020). These policy recommendations connect to the work of critical teacher educators because critical teacher education in a post-pandemic world requires the themes outlined by Darling-Hammond and Hyler, while also: 1) providing opportunities for preservice teachers to develop critical consciousness; 2) making explicit connections between critical pedagogical theories and teaching practice; and 3) leveraging technology for collaborative knowledge construction.

Critical Self-Reflection

Critical self-reflection is key to developing justice-oriented teachers. This process of developing critical self-reflection practices requires developing racial literacy as well as an understanding of deeply held beliefs about gender, class, religion, language, sexual orientations, and other historically marginalized identities as well as the ways they intersect with one another. Sealey-Ruiz (2020) explains a process for developing critical self-reflection that she calls Archeology of the Self, where preservice teachers “excavate” their identities, beliefs, and culture to become more aware of how they will interact with future students, families, and colleagues in a school environment. Shim (2020) supported three white male preservice teachers on their journey towards critical consciousness and racial awareness. In her

findings, Shim describes shifting away from an intervention approach when working to help white teachers develop racial literacy and critical self-reflection due to emotionality that is inherent within challenging one's beliefs. Valenzuela (2016) describes that teaching and teacher education is always political and therefore “[e]ven teachers of color must continually check their belief systems” and assumptions and ways they may unknowingly and unintentionally be reproducing the status quo (p. 40). Further, Boler (2014) describes developing critical consciousness as not only emotional, but devastating for some students at first, in a process she calls “shattering worldviews.” To counter the devastation and resulting hostility, Boler posits that providing historical and contemporary examples of resistance and new ways of being more inclusive provide critical hope for learners on the path towards seeking justice (Boler, 2014).

While I am still coming to understand what this process looks like in the teaching methods classroom, I can pinpoint moments in my own teaching when my critical consciousness shifted and I developed a deeper understanding of my identity as a white woman, and the ways it affects my teaching. The vignette below outlines one of these shifts.

In my first year, I worked at a high-performing district in an affluent area. In this district, student rankings included not one, but two levels of ‘gifted’ – academically gifted and/or highly gifted, and those without either gifted label were not given as many opportunities. I saw pushout firsthand. That year my class had one African American boy out of eighteen students, and he received so many discipline referrals the year prior that his previous teacher made sure to warn me about Shawn.

Later in the year, a white parent in the school with a lot of social capital began to pick on this child. She blamed him for several things in the span of three weeks, the final being that he had smeared feces on a urinal boys’ bathroom. That entire day the student wasn’t himself, he did not participate in class activities and instead kept his head down on his desk. When we would do a collaborative activity, Shawn would turn around and face the wall to avoid talking with anyone. I checked in with him in the hallway, and he broke down crying saying that he didn’t understand why he kept getting accused of everything. The weight of the situation hit me, and we hugged and cried together for a moment in the hallway. I had the TA cover my class while I marched to the principal’s office. I knocked on her door and before she even let me in I exclaimed, “Mrs. Hawkins is a racist and she is targeting Shawn.” The principal laughed and said “We all know Mrs. Hawkins is racist. That’s why no one listens to her.” “Shawn keeps getting called to the office and questioned every time she accuses him of something.” I retorted. “He’s not in trouble, we just have to question him to make sure,” responded the assistant principal who was listening to the conversation. “All he sees is that he’s getting called to the office,” I told them, “And it’s really starting to get to him. I think he deserves an apology.” The principals exchanged looks. “Okay, we’ll take care of it,” the assistant replied. I walked back to my classroom and shortly after Shawn was called to the office. Again. Weeks later it was revealed that a third grader had been the person smearing feces on the urinal.

There are systems of whiteness embedded within schooling. These systems of whiteness are sometimes interpersonal, as with the parent from my classroom targeting Shawn, and they are perpetuated by discipline systems and other ways that schools send coded messages to students about who belongs and who doesn’t in the school; who can be trusted and who can’t; who is smart and who isn’t. This is further deepened by the ways white teachers choose to engage, or don’t, in discussing race and racism in their classrooms and with their colleagues. In the vignette above, it is clear I knew that Mrs. Hawkins was bullying Shawn, but the impact it was having on Shawn did not occur to me until I saw how upset he was. I let it get that bad because I was trusting parents and administrators to follow proper decorum. In terms of traditional schooling, they were. If the purpose was to make Shawn feel uncomfortable and like he didn’t belong there, the system ultimately did what it was designed to do.

If I had done the appropriate critical self-reflection to understand my role in the system of schooling as a white teacher; how my gender made me less likely to want to upset anyone; how my queerness made me want to not stand out; and, how my own success in school meant that I knew how to navigate the system and looked for opportunities to be doted on as an exemplar teacher; Shawn may not have cried in the hall that afternoon. Critical self-reflection allows well-

intentioned novice white teachers like me the opportunity to understand the socialization process and the ways their intersectional identities impact teaching and relationships with students and families within the school community. As Valenzuela (2016) points out, critical self-reflection helps preservice teachers of color reflect on their experiences in schooling to heal and envision a new paradigm for historically marginalized students.

Theory and Practice Connections

Beyer (2001) describes the role of helping preservice teachers make connections between theory and practice during their preparation programs. According to Beyer, preparation programs must be “grounded in intellectual studies and theoretical pursuits” as they help preservice teachers develop agency and learn to challenge the status quo (Beyer, 2001, p. 152). Beyer further describes the role of critical theories to help contextualize the socio-political context of schooling and critically question curricular content and the agendas it serves (Beyer, 2001). Valenzuela (2016) describes the ways theory helps preservice teachers develop critical consciousness. She calls for preservice teachers to learn “critical race theory, critical pedagogy, and sociocultural teaching/learning theory” to be agents for change within their communities (p. 42). Further, Love (2019) requests that teacher preparation programs utilize theory because “theory consistently explains patterns of injustice” and provides “language to fight, knowledge to stand on, and a humbling reality of what intersectional social justice is up against” (p. 132). The vignette below is an example of how I taught a series of lessons that connect these theories to pedagogy and practice.

I spent the last two years of my time in K-12 education teaching fifth and sixth grade at a new grassroots charter school focused on experiential education, social justice education, and arts integration. Our teaching team decided to participate in Black Lives Matter Week of Action in Schools (n.d.). At the end of the week, we co-planned a lesson to analyze Jay-Z’s song “Minority Report” from Watson’s (2015) lesson as it connected our grade level’s work on climate justice in science to the Black Lives Matter Week of Action (n.d.). The students and I wrote poems based on our learning from the week, and we shared them with each other. As we each performed our poem, we worked as a class to choose the most impactful line from every poem. We then worked together to group the lifted lines into stanzas, deciding how to use each line to create an overall message. The final product read:

“Tomorrow Your Nation will be What You Want it to Be”

*You think we are the same,
But we are not.
We have different emotions.
You take us for blame,
Then think it’s a game.
The government doesn’t give a dime.*

*They wanted us to fall,
But that wasn’t the case at all.
Most of the people who get shot by police
Are Black teenagers.
Trayvon Martin walking home
Killed at no cost.*

*More people want you to stop,
But you say no with a cherry on top.
This problem has gone on long enough,
Taking, not giving.
Let’s stop this now, if we only knew how.*

*Tomorrow your nation will fight with you.
Lying to get someone hurt
Is unacceptable.
When the people that are supposed
To keep you safe
Are the ones taking innocent lives
It can feel like safety is hard to find.*

After we read the final product aloud together, the room echoed with the power of our words. I looked at the class and said “What do you want to do now? What do we do with this thing we created?” Students chimed in with various ideas, all related to performing the poem for a group, but we couldn’t reach a consensus on where or who our audience should be. With family night coming later in the week, we decided to get suggestions from families in our school community. The afternoon before family night, we displayed our class poem on the door, and students laid out notecards at tables and wrote a note on the board to ask for suggestions for where we should perform our poetry. The next day, we sifted through the suggestions and voted on where we would perform; ultimately, we decided on a locally owned bookstore close to school. I shared the results with a colleague that had her class do a similar lesson. We arranged an evening performance with the bookstore and invited families and community members to our reading. Students performed the poems they wrote as well as the class poem for friends, family, and community members as a protest in solidarity with the Black Lives Matter movement.

The vignette above illustrates critical pedagogy and social justice education, as it connects theory to practice. In this example, students learned about a problem relevant to their world, they planned and created performance art, and reached a consensus as a learning community about the structure and message of the poem. As a community, we also participated in art as activism by sharing our work with the larger community. Additionally, students learned key literacy skills from this experience – they learned about the structure and form of poetry as well as how to craft a message for an audience using verse. I was fortunate to work at a school that valued this kind of instruction and provided students the freedom to use their voices and make a difference in their community. Having worked in more traditional settings as well, I recognize that I would not have had the flexibility to encourage this kind of learning within the confines of district-mandated scripted curricula and testing.

Transitioning out of elementary teaching and into academia has been confusing at times. Now that I am learning to be a researcher and teacher educator with a strong theoretical framework, it seems that my experiential knowledge of daily life as a K-12 teacher is inconsequential compared to the literature I read and synthesize for my own studies. I experienced the same feeling, but in reverse during my first year of teaching, where suddenly no one wanted to hear about techniques from my methods coursework because it was deemed idealistic and impractical in our school setting. Perhaps this is where the trope about academics in the ivory tower being disconnected from daily life in a K-12 school.

As I think about my own identity as a preservice teacher educator, I wonder how I can help preservice teachers draw connections to the theories they learn in methods classes to their experiences in the field. How do new teachers realize their agency in the face of stringent district mandates?

Leveraging Technology

At the start of the pandemic, the American Association of Colleges for Teacher Preparation prepared a bank of resources for teaching in the pandemic. These resources include tools for online instruction; Mursion simulation technology; and strategies for navigating the inequities that are magnified from the pandemic (AACTE, 2021). Critical technology practices is a newer field of study within education; however, Baroud and Dharamshi (2020) describe the necessity of teacher educators developing capacity for critical engagement with technology and digital literacy. In their self-study, the novice teacher educators found that due to the lack of professional familiarity and comfort, as the teacher

candidates resisted participating in critical technological practices, the teacher educators were hesitant to continue with it as well (Baroud and Dharamshi, 2020). While their study focuses on experiences in a literacy methods course, the authors call for future research in teacher education to include ways teacher educators have tried to utilize critical digital technology in preservice methods courses in all content areas (Baroud & Dharamshi, 2020).

Working, teaching, and learning from home has called for building opportunities for connection and community while continuing to practice critical self-reflection and make practical connections to theories learned in methods coursework. Adams and Wilson (2020) describe their use of the collaborative annotation tool Perusall to help build class community in asynchronous environments. Use of the Perusall increased student interaction by 40% and allowed students in their course to co-construct the meaning of the reading content together beyond the typical discussion board (Adams & Wilson, 2020). Tools like Perusall can be utilized for critical pedagogy as learners co-construct meaning together in a learning community.

Mixed reality simulations, like Mursion allow preservice teachers to practice teaching skills before trying them out on live students. These kinds of experiences allow preservice teachers to practice professional behaviors before having the pressure of being in a live classroom, which can increase self-efficacy as preservice teachers develop reflection practices and make practical connections to theories learned in the classroom (Piro & O’Callaghan, 2019; Gundel et al., 2019). In Cohen et al.’s (2020) study using Mursion mixed-reality simulation, preservice teachers were able to practice redirection techniques and classroom management while receiving coaching from their teacher educator. Findings from this experimental design study suggest that pairing mixed-simulation experiences with coaching and self-reflection help preservice teachers improve their management skills over those with self-reflection or coaching alone (Cohen et al., 2020). The authors further posit that “reflection is not just neutral; it can be associated with negative shifts in candidates’ assessments of student behavior and their perceptions of how to respond to such behavior,” thus pairing reflection with theory to practice connections *and* technology can help preservice teachers develop critical practices (Cohen et al., 2020, p. 226).

The weeks before schools shut down were disorienting and uncertain at best. The vignette below outlines how my teaching team approached the shifting landscape at the beginning of the pandemic.

The spread of COVID-19 in the U.S. shuttered schools in a matter of weeks. Before schools closed, my class and I would watch the student news source CNN10 (2017) every day before dismissal. We watched as the concern grew, and once it was clear the virus was in our state, things became even more unpredictable. Our cleaning routines adjusted to wiping down tables during each transition and having long lines to wash hands at lunch instead of the usual hand sanitizer. We changed our morning meeting games to avoid touching and spaced out more. During that time, we also talked about keeping ourselves and the classroom clean to keep each other safe, and students happily jumped in to help. Once the announcement was made that we were going to be closing for at least three weeks (including spring break) to practice social distancing, students were frenzied with nervousness and excitement.

“We will be closing to students temporarily after spring break,” announced one of the principals in an emergency faculty meeting after an early dismissal. I looked around at the rest of the faculty, some of whom had laptops open, but everyone had looked up to hear the announcement and the room became tense. “Each grade level will distribute their content to students and families using Google Sites. After the break, you will have one week of trial remote learning to see how things go before students are required to complete the online instruction. Take the time you need today and tomorrow to experiment with Google Sites and any other online tool your team wishes to use” she finished. As the meeting adjourned, some teaching teams stayed behind as we worked to figure out how to reconfigure our instruction for online. Our team of four fifth and sixth grade teachers and one teaching assistant stayed behind as well. We discussed how we would schedule biweekly conferences, help students read, practice math, engage in science, and continue our focus on social justice topics all while working from home.

Once our day and a half of planning and spring break had ended and the Google Site went live, all we could do

was wait. Wait for the barrage of emails of worried families who now found themselves in the role of part-time teacher, wait for student work to roll in, and wait for conferences to begin so we can actually see our students via Zoom.

As conferences began and I met with families and students, we each checked in on each other to see how we were feeling during the lockdown. Focusing on student progress on schoolwork and assignments seemed counterintuitive to the stress of suddenly being in isolation. My primary questions for students were always “Have you continued to talk with your friends?” and “What have you done away from the computer today?” Our administrators began mandating daily office hours for each teacher, and mine were scheduled in the doldrums after lunch. Very few people showed up, but some would come and stay on Zoom for the entire time. Some students who weren’t even in my homeroom would show up, and we would talk about assignments and check in with one another. Someone suggested we play games, so I developed a schedule to have themed thirty-minute meetings three days a week: Talent Tuesday, Joke and Fun Fact Wednesday, and Game Friday. We were finally able to laugh together again. It was clear that students were longing for the connection and feeling part of the school community.

With the pandemic restrictions lifting, and the guidelines continuing to feel unpredictable, it is unlikely remote learning will go away entirely. Going forward, it is imperative that teacher educators help pre-service teachers learn to leverage technology not just for instruction, but also for community building. As with the vignette above, it is clear that one of the most important elements of schooling is helping students feel part of a learning community, even when engaging in school from home. Teacher educators can model this kind of community building so that preservice teachers feel confident applying it to their own instruction.

Conclusion

My first year as a doctoral student has been challenging to say the least. With moving across the country in the midst of the pandemic; changing careers during an economic crisis; ongoing police brutality and murdering of Black and Brown Americans at the hands of police; the contentious election and civil unrest following; the 2020-2021 school year was jam-packed with anxiety, fear, and now I feel accomplished and relieved to have completed my first year as a PhD student. As I continue developing as a teacher educator, I am left wondering how critical self-reflection will continue to inform my practice with preservice teachers. Milner (2003) calls for teachers to engage in race reflections, and I am curious to know what this looks like for teacher educators. I have read more empirical research and theory this year than I ever have, and as my students would say, my brain feels very full. I am curious to know why theory and current research aren’t commonly included in teacher preparation as well as professional development. As Dr. Bettina Love (2019) says, theory can provide a “north star” to guide instruction and making sense of life in the classroom (p. 12). How can I utilize in my future research and work with preservice teachers to help them connect theory to practice? This year has been isolating for everyone, especially those of us learning and working from home. I am left wondering how technology will impact my time as a student going forward, and later how this will change my interactions with pre- and in-service teachers. How can we leverage technology not just for rote content learning, but also community building and the co-construction of knowledge? As Love (2020) points out, we cannot go back to the way things were, and because the system was broken, and we now have the chance to imagine and build something better.

References

- 2022 CAEP Standards. Council for the Accreditation of Educator Preparation. (n.d.). <http://caepnet.org/standards/2022/introduction>.
- Aguilar, E. (2020). *Coaching for equity: Conversations that change practice*. Jossey-Bass.
- Adams, B. & Wilson, N. S. (2020). Building Community in Asynchronous Online Higher Education Courses Through Collaborative Annotation. *Journal of Educational Technology Systems*, 49(2). <https://10.1177/0047239520946422>
- Bartolome, L. (2004). Critical pedagogy and teacher education: Radicalizing prospective teachers. *Teacher Education Quarterly*, 31, 97-122. Retrieved from <https://www.jstor.org/stable/23478420>
- Baroud, J. & Dharamshi, P. (2020). A collaborative self study of critical digital pedagogies in teacher education. *Studying Teacher Education*. 16. 1-19. <http://doi.org/10.1080/17425964.2020.1739639>.
- Beyer, L. E. (2001). The value of critical perspectives in teacher education. *Journal of Teacher Education*, 52(2), 151–163. <https://doi.org/10.1177/0022487101052002006>
- Black Lives Matter At School. BLM AT SCHOOL. (n.d.). <https://www.blacklivesmatteratschool.com/>.
- Boler, M. (2014). Teaching for hope: The ethics of shattering worldviews. In *Discerning critical hope in educational practices* (pp. 26–39). Routledge.
- Cohen, J., Wong, V., Krishnamachari, A., & Berlin, R. (2020). Teacher Coaching in a Simulated Environment. *Educational Evaluation and Policy Analysis*, 42(2), 208–231. <https://doi.org/10.3102/0162373720906217>
- Cable News Network. (2017, February 14). *CNN 10*. CNN. <https://www.cnn.com/cnn10>.
- COVID-19 Resources. American Association of Colleges for Teacher Education (AACTE). (2021, April 24). <https://aacte.org/resources/covid19-resources/>.
- Darling-Hammond, L. & Hyler, M.E. (2020) Preparing educators for the time of COVID... and beyond. *European Journal of Teacher Education*, 43(4), 457-46. <https://doi.org/10.1080/02619768.2020.1816961>
- Freiere, P. (1972). In *Pedagogy of the oppressed* (pp. 71–86). Herder and Herder.
- Giroux, H. A. (2011). Schooling and the culture of positivism notes on the death of history. In *On critical pedagogy*. Bloomsbury Academic, an imprint of Bloomsbury Publishing Plc.
- Gundel, E., Piro, J., Straub, C. & Smith, K. (2019). Self-efficacy in mixed reality simulations: Implications for preservice teacher education. *The Teacher Educator*, 54(3), 244-269. <https://doi.org/10.1080/08878730.2016.1591560>
- Howard, T. (2003). Culturally relevant pedagogy: Ingredients for critical teacher reflection. *Theory Into Practice* 42, 195-202. https://doi.org/10.1207/s15430421tip4203_5.
- Hytten, K., & Bettez, S. (2011). Understanding education for social justice. *Educational Foundations*, 25, 7–24. Retrieved from <https://eric.ed.gov/?id=EJ925898>
- Kincheloe, J. L. (2008). *Critical pedagogy primer*. P. Lang.
- Ladson-Billings, G. (2009). *The dreamkeepers: Successful teachers of African American children*. Jossey Bass.
- Liston, D. & Zeichner, K. (1988, April). Critical pedagogy and teacher education [Paper presentation]. American Educational Research Association, New Orleans, LA, United States.
- Love, B. (2019). *We want to do more than survive: Abolitionist teaching and the pursuit of educational freedom*. Beacon Press.

- Love, B. L. (2020, December 3). *Teachers, We Cannot Go Back to the Way Things Were (Opinion)*. Education Week. <https://www.edweek.org/leadership/opinion-teachers-we-cannot-go-back-to-the-way-things-were/2020/04>.
- Milner, R.H. (2003) Teacher reflection and race in cultural contexts: History, meanings, and methods in teaching. *Theory Into Practice*, 42(3), 173-180. https://doi.org/10.1207/s15430421tip4203_2
- Nieto, S. (2000). Placing Equity Front and Center: Some Thoughts on Transforming Teacher Education for a New Century. *Journal of Teacher Education*, 51(3), 180-187. <https://doi.org/10.1177/0022487100051003004>
- Nix-Stevenson, D., Shelton, L., Smith, J. (2020) Fighting back against anti-Asian xenophobia: Addressing global Issues in a distance learning classroom. *Middle Grades Review*. Retrieved from <https://scholarworks.uvm.edu/mgreview/vol6/iss3/7/>
- Paris, D. & Alim, H. (2014). What are we seeking to sustain through culturally sustaining pedagogy? A loving critique forward. *Harvard Educational Review*. 84. 85-100. <https://10.17763/haer.84.1.9821873k2ht16m77>
- Piro, J.S. & O’Callaghan, C. (2019) Journeying towards the profession: Exploring liminal learning within mixed reality simulations. *Action in Teacher Education*, 41(1), 79-95. <https://doi.org/10.1080/01626620.2018.153422>.
- Roegman, R., Reagan, E., Goodwin, A.L., Lee, C.C., Vernikoff, L. (2020). Reimagining social justice-oriented teacher preparation in current sociopolitical contexts. *International Journal of Qualitative Studies in Education*, 34(2), 145-167. <https://doi.org/10.1080/09518398.2020.1735557>.
- Sealey-Ruiz, Y. (2020). Arch of Self. Yolanda Sealey-Ruiz. <https://www.yolandasealeyruiz.com/archaeology-of-self>.
- Shelton, L., & Alarcón, J.D. (2020). Unpacking the messiness in critical elementary education: A new teacher’s reflection. In B. Evans-Santiago (Ed.), *Mistakes We Have Made: Implications for Social Justice Educators*. Myers Education Press.
- Shim, J. M. (2020). Meaningful ambivalence, incommensurability, and vulnerability in an antiracist project: Answers to unasked questions. *Journal of Teacher Education*, 71(3), 345–356. <https://doi.org/10.1177/0022487119842054>.
- Valenzuela, A. (2016). Teaching for critical consciousness. In *Growing critically conscious teachers: a social justice curriculum for educators of Latino/a youth* (pp. 39–66). Teachers College Press.
- Watson, R. (2015). Bearing witness through poetry. In L. Christensen & D. Watson (Eds.) *Rhythm and resistance: Teaching poetry for social justice* (pp. 171–176). Rethinking Schools.
- Wright, L. (2020, July 20). *How Pandemics Wreak Havoc-and Open Minds*. The New Yorker. <https://www.newyorker.com/magazine/2020/07/20/how-pandemics-wreak-havoc-and-open-minds>.

DEVELOPING PROFESSIONAL DISPOSITIONAL RESILIENCE AMONG TEACHER CANDIDATES: REFRAMING CHAOTIC EXPERIENCE AS RESOURCE FOR TEACHER LEARNING

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Abstract

While engagement with content knowledge and pedagogical expertise enjoys considerable attention in teacher education, the simultaneous development of professional teacher dispositions remains a necessary task of teacher preparation. In this brief non-traditional paper, experiences of teacher candidates participating in a teacher preparation program and high school partnership pilot structured-field experience in the Rio Grande Valley in Texas are explored relative to the emergent development of teacherly dispositions. Initially, professional teacher disposition – and more particularly resilience as an essential type of teacherly disposition – is defined. Later, chaotic experiences arising within the context of participation in a research-supported structured-field program are framed as valuable opportunities for teacher candidates in situ learning of resilience as a vital professional disposition for future teaching. Crucially, a natural world-based multimodal pedagogical intervention foregrounding tacit engagement with resilience is described. In conclusion, three rudimentary strategies for how experiences of chaos and complexity can be integrated as a vital component of teacher preparation contexts are offered. Ultimately, this piece describes the need to explicitly engage chaotic situations within teacher preparation contexts to foster resilience as a quintessential disposition among teacher candidates preparing to engage the unforgiving complexity of teaching.

Keywords: Resilience, teacher education, structured-field experiences, complexity, conceptual metaphor

Introduction

The development of professional teacher dispositions remains a primary, essential task of teacher education (Diez & Raths, 2007; InTASC, 2013; Knoepen & Davidson-Jenkins, 2007; Lee Smith & Skarbek, 2013; NCATE, 2013). Professional teacherly dispositions, or “tendencies for individuals to act in a particular manner under particular circumstances, based on their beliefs” (Villegas, 2007, p. 373), are indispensable towards, among others, sustainable pedagogical practice (Burden & Byrd, 2019, pp. 3-4) and attendance to issues of social justice in the classroom (Villegas, 2007). One of these professional dispositions, resilience (Johnson et al., 2015; Mansfield et al., 2012; Mansfield 2020), or the “capacity to face, overcome, and even be strengthened by experiences of adversity” (Tait, 2008, p. 58), is inextricably related to personal efficacy and emotional intelligence (p. 61). It is also exemplified through critical professional traits such as social competence, problem solving, the ability to rebound from difficulty, learning from experience, self-care, and optimism (pp. 69-70). While the literature has traditionally focused on the importance of fostering student resiliency (Henderson & Milstein, 1996; Krovetz, 1999; Nottmeyer & Bush, 2013), it is significant to note that the same resilient practices that help inform student success are also relevant to teacher success. Consequently, learning resilience in pre-service teacher education contexts is ultimately essential towards novice teacher success, commitment, and retention (Tait, 2008) amidst the “unforgiving complexity of teaching” (Cochran-Smith, 2003, p. 3). Furthermore, teacher capacity to enact resilience as a multifaceted professional disposition is also a valuable means of modeling resilience as an essential life skill for students.

In this brief paper, the experiences of three teacher candidates participating in a teacher preparation program and high school partnership pilot structured-field experience in Texas' Rio Grande Valley in Spring 2019 are anecdotally described relative to the development of teacherly dispositions. While the bilingual, bicultural borderland (Cline & Necochea, 2006) of the Rio Grande Valley presents a unique, vibrant context in which to think about teacher education and learning to teach, the importance of professional dispositions for teacher learners is of broader concern. In particular, chaotic experiences arising within the day-by-day context of participation in a research-supported structured-field experience are here framed as valuable opportunities for teacher candidates in situ learning of resilience as a vital professional disposition for future teaching. In other words, such chaos, when mobilized, is a valuable resource for learning resilience. While field experiences may be *structured*, unforeseen situations arising from the messiness of everyday life mean that there is always chaos interspersing the structure. To this end, I tender the metaphor of bamboo (Deleuze & Guattari, 1987) – an exceptionally resilient plant – to illustrate the primary difference between the necessary planned, structured, and unplanned, chaotic elements of field-based teacher education experiences. In so doing, I wish to align my framing of the teacher education-focused structured-field experience with the philosophical reading of structure which pervades new materialist (Snaza et al., 2016) and complexity theories (Davis & Sumara, 2006), namely, that structure is simultaneously caused yet accidental, familiar yet unique, complete yet in-process.

Bamboo is a rhizome: a root system characterized by invisible subterranean complexity that gives rise to interconnected though seemingly separate sprouts above the surface. Teacher education in field-based contexts is akin to bamboo in at least two ways. First, the means through which we evaluate and measure teacher candidates' mastery of professional learning often – like bamboo sprouts above the surface – takes on the tidy evidence-based appearance of structure and organization. Teacher candidates demonstrate their pedagogical competence by completing highly structured key assessments. These include assessment and instructional planning, as well as data literacy assignments that require reliance on contextual data to identify concrete accommodations for learners with exceptionalities and English language learners. A second characteristic of the professional learning of teacher candidates that, like the intertwined root system of bamboo below the surface, is characteristically less visible and more complex, namely, the learning of professional teacher dispositions. Such learning is difficult to structure since it occurs most optimally in direct context to spontaneous everyday situations and demanding professional and interactional encounters and is illustrated by the following three post-experience student reflections.

Ronaldo, a young Latino teacher candidate, struggles to get from his field mentor teacher a substantial amount of information necessary to complete several teacher preparation course assignments directly related to the structured-field experience. He is moved from one mentor teacher to another on a weekly basis – a situation arising from scheduling conflicts within the high school. Ronaldo words this experience as follows:

One experience that stands out for me would be not knowing what teacher and classroom I would be in from week to week. Due to admin constantly pulling out my mentor teacher, I was usually with one of three teachers, varying depending on the time of day and if the teachers were absent or not. This helped me become more flexible as it was something I was worried about in the school setting as I am one who loves structure/order, but due to this I have grown to love being flexible in the school setting

Teresa, a young Latina teacher candidate, and her partner prepare a detailed lesson plan for their (co-)teaching demonstration only to be told by their mentor teacher that they now have a third less instructional time than was originally planned. Teresa reports:

While teaching our lesson we were told that we only had 30 minutes instead of 45 minutes. We had to rearrange the whole lesson to accommodate for the new time frame.

Consuela, a young Latina teacher candidate who is suddenly handed the responsibility to conduct a lesson for which she has not prepared after her mentor is called out of the class frames her experience as follows:

My mentor teacher just told me to teach the lesson. I was so nervous because I thought I was only going to observe and now she wants me to teach the class and I have no time to prepare. Then she leaves and I'm thinking, how am I going to teach the rest of this Social Studies lesson and what if the students dis me? I went into honey badger mode.

Consuela's reference to a "honey badger" – the second nature-based conceptual metaphor deployed in this paper – is significant as I usually initiate in-class teacher preparation course engagement with resilience prior to embarking on the structured-field experience by screening and debriefing several short video clips from both the National Geographic documentary film, *Snake Killers: Honey Badgers of the Kalahari* (Hughes et al., 2002) and the PBS nature documentary, *Honey Badgers: Masters of Mayhem* (Gooder, 2014). In these film clips, African honey badgers – or *Mellivora capensis* – are portrayed as overcoming significant complexities and challenges. I instruct teacher candidates to utilize the six characteristics of resilience provided by Tait (2008) and to jot down both what the challenge was confronting the honey badger as well as to identify the particular resilient skill deployed by the honey badger at such time: a) social competence, b) problem-solving, c) the ability to rebound from difficulty, d) learning from experience, e) self-care, and f) optimism (the last one requires some anthropomorphic projection on the part of teacher candidates). Later, teacher candidates apply the characteristics of resilience – social competence, problem-solving, the ability to rebound from difficulty, learning from experience, self-care, and optimism – to problems and challenges they have personally overcome before finally applying these strategies to real-world classroom and school scenarios that they either may be encountering or may encounter in future.

In context to resilience as a professional disposition, teacher education can learn a lot from the African honey badger. For one, the honey badger possesses particularly *thick skin* – a trait quintessential to teacher survival. Second, it can adapt its cognition and body to cope and thrive in most hostile environments. Third, the honey badger is revered for embodying dispositions like determination, tenacity, and boldness. In contrast, the honey badger's size is small and unassuming relative to its formidable surroundings. Its primary environment – the Kalahari Desert in Southern Africa – is an extremely challenging environment marked by chaos and complexity. Likewise, teacher education in field-based contexts is highly complex and presents challenges that often at first appear threatening and chaotic, yet which require resilience to negotiate, manage, and overcome. In fact, numerous teacher candidate reflections of our pilot structured-field experience – much like the brief narratives above – have since highlighted examples of chaos flooding programmatic attempts at implementing structure. Among others, teacher candidates commonly report experiences of suddenly being reassigned by school administrators from their designated mentor teachers to teachers who are not fully prepared to provide effective mentorship; mentor teachers being too tightly constrained for time to communicate around interrelated course/field key assessments that teacher candidates are expected to complete in regular consultation with their mentors, as well as insufficient opportunity to directly interact with students or provide program-mandated exploratory direct instruction under the auspices of their mentor teachers.

Value of Chaos and Complexity for Learning to Teach

Since chaotic and complex encounters are chaotic in that these are characterized by disorder relative to the stated aims of the field experience and are often difficult to immediately address and change due to the involvement of multiple role-players in the structured-field experience, they require reconsideration of the value of situated learning for developing professional teacher dispositions. Additionally, such experiences also require the reflexive means necessary to make sense of and reinforce context-based learning amidst the chaos of everyday life. Furthermore, due to their psycho-affective nature, the learning of teacherly dispositions requires the personal adoption and application of key professional and relational values and beliefs that inevitably change aspects of the character of teacher candidates. This means that rather than sheltering teacher candidates from unpleasant emotions like anxiety, teacher educators need to encourage and even model engagement with such emotions as a valuable constituent towards the integration of resilience as a vital teacherly disposition.

Teaching will always be complex (Davis & Sumara, 2006) – a reality stemming from the chaos principle, namely that disorder and unpredictability pervade not only the Cosmos but all of life (Bey, 2003). Consequently, linear predictability and certain outcome in curricular and instructional contexts are tenuous at best (Doll, 1993). Rather, chaos and its ensuing complexities are productive of new modes of becoming (Deleuze & Guattari, 1997), as well as pedagogical and curricular innovation (Bernard & Slattery, 1992; Doll, 2012). As pointed out by Doll (1993), “chaos is not a wild, random abandon. Far from it, the pattern is quite orderly but complex . . . random, but it is a pattern” (p. 93) – a process that Doll (2012) refers to elsewhere as “unpredictable determinism” (p. 17). In other words, chaos is not reckless abandon; it is a highly composite form of order that upon first glance, presents itself as disorder yet is only superficially disordered in that its deeper complex structures have yet to be deciphered and articulated. Such observation is of particular relevance to the contemporary context of teaching and learning. Recognition of the inevitable, omnipresent influence of chaos in processes of teaching and learning does not circumvent teacher responsibility. Instead, such enables a more complex, nuanced grappling with accountability that underscores the need for teacher preparation programs and experiences to foster professional teacherly dispositions characterized by heightened resilience, resourcefulness, and relationality in a manner that is, for instance, pliable in context to student needs.

Chaotic situations and contexts arising within pre-service educator preparation experiences – such as field-based experiences – can therefore be strategically utilized towards the development of greater dispositional resilience among teacher candidates. Resilience is, after all, a disposition characterized by the recognition and subsequent utilization of complexity as a professional resource. While I am still thinking through how to further develop my teacher educator engagement with and framing of chaos as a valuable resource towards the development of resilience as a teacherly disposition, I offer three rudimentary strategies for how experiences of chaos and complexity can be integrated as a vital component of teacher preparation contexts:

- Teacher candidates participating in field-based experiences should be encouraged to keep a reflective journal of challenging experiences encountered in the field, including reflecting on their accompanying emotions. Such practical reflective journaling can be incorporated into the teacher education class where teacher candidates think through, develop, and discuss proactive problem-solving actions.
- Teacher educators should avoid the temptation to coddle teacher candidates during field-based experiences characterized by uncomfortable emotions like anxiety and frustration. Instead, teacher educators would do well to offer encouragement and guidance, where appropriate, while explicitly framing the uncomfortable situation as a valuable opportunity for the teacher candidate to assume greater responsibility and experiment with a range of alternative attitudes and practices.
- On a philosophical level, teacher education curricula need to purposefully frame the messy, uncertain, unplanned aspects of teaching and learning, as well as human interaction in general, as an inevitable characteristic of life rather than as a failure or error of sorts. After all, success in any form is not a given; success is usually the product of multiple failures, perseverant reengagement, focus, and effort. Recently, while in conversation with a highly experienced and respected educator in the local community around the topic of resilience, this teacher described the process of resilience as running a course of *improvise, adapt, and overcome*.

Such strategies may go some way towards enabling teacher educators and teacher candidates to reflexively analyze and engage complex social and pedagogical interactions within structure field contexts. Here, in particular, teacher candidates as researchers of their localized contexts and practices are better enabled to learn dispositional resilience as a flexible and changeable attitude in the very encounter with social and pedagogical complexity since the work of trying to understand things should be accompanied by the recognition that “we are part of the things we are trying to understand” (Davis & Sumara, 2006, p. 16). Such approach stresses learning to teach as a highly personal experience in which uncertainty, and even error, is accorded profound pedagogical value and potency (Britzman, 2003).

Furthermore, bearing in mind that chaos is a highly composite form of order that upon first glance, presents itself as disorder, yet is only superficially disordered in that its deeper complex structures have yet to be deciphered and articulated, a recognizing, analyzing, and utilizing of apparent chaos needs to be a key component of how teacher educators stimulate the development of resilience as professional teacher disposition among teacher candidates. Chaos moves from disorder to order when its manifold parts are recognized as part of a dynamic structure that is complex. Yet, how can complexity – and by implication, complex phenomena – be made more palatable within teacher education contexts? A way to accomplish this is to provide teacher candidates with a basic analytical framework through which seemingly chaotic phenomena can be partly dissected. For instance, a basic triangular framework may comprise the following complexity-focused analytical foci as a means towards beginning to make better sense of apparent chaos:

- **Self-organization:** Identifying how actions of autonomous agents like teachers and students are interlinked and co-dependent in adaptive networks, and comprised of many small parts without centralized control (e.g. a flock of birds). Here, observable phenomena are framed as emergent and spontaneously being enacted from a bottom-up direction that transcends the total determinants of central organizers or governing structures.
- **Nonlinearity:** Identifying how social phenomena, including those in the sphere of education, are governed by negative (stabilization) and positive (amplification) feedback loops related to homeostasis (e.g. weather systems and the Butterfly Effect)
- **Adaptability:** Identifying how social systems like schools and classrooms embody their histories and are able to morph their own structures and adapt in order to maintain their viability within dynamic contexts (e.g. Darwinian evolution)

Conclusion

Complex social systems like schools and classrooms do not – and should not ever be expected to – operate in perfect balance or harmony since stable equilibrium implies death for the complex system. Such observation holds deep implication for how we view the normal, standard, correct, and orthodox not only with regard to education in general, but especially teacher education in particular. Ultimately, while not states to which we aspire, chaos and complexity as inevitable realities nonetheless hint at the social vibrancy of schools and classrooms and offer an opportunity for the emergence and practice of teacher agency amidst the unforgivable complexity of teaching.

References

- Bernard, H., & Slattery, P. (1992). *Quantum Curriculum*. Paper presented at JCT Bergamo Conference, Dayton, Ohio.
- Bey, H. (2003). *TAZ: The temporary autonomous zone – Ontological anarchy, poetic terrorism*. Autonomedia.
- Britzman, D. (2003). *Practice makes practice: A critical study of learning to teach*. State University of New York.
- Burden, P.R., & Byrd, D.M. (2019). *Methods for effective teaching: Meeting the needs of all students*. Pearson.
- Cline, Z., & Necochea, J. (2006). Teacher dispositions for effective education in the borderlands. *The Educational Forum*, 70(Spring), 268-281. <https://doi.org/10.1080/00131720608984902>
- Cochran-Smith, M. (2003). The unforgiving complexity of teaching: Avoiding simplicity in the age of accountability. *Journal of Teacher Education*, 54(1), 3-5. Retrieved from <https://journals.sagepub.com/doi/pdf/10.1177/0022487102238653>
- Davis, B., & Sumara, D. (2006). *Complexity and education: Inquiries into learning, teaching, and research*. Routledge.
- Deleuze, Gilles., & Guattari, Félix. (1987). *A thousand plateaus*. University of Minnesota.
- Diez, M.E., & Raths, J. (2007). *Dispositions in teacher education*. Information Age.
- Doll, W. (1993). *A post-modern perspective on curriculum*. Teachers College.
- Doll, W. (2012). Complexity and the culture of curriculum. *Complicity: An International Journal of Complexity and Education*, 9(1), 10-29. <https://doi.org/10.29173/cmplct116530>
- Gooder, S. (Director). (2014). *Honey badgers: Masters of mayhem* [Film]. Public Broadcasting service.
- Henderson, N., & Milstein, M.M. (1996). *Resiliency in schools: Making it happen for students and educators*. Corwin
- Hughes, D., & Hughes, C. (Producers). (2002). *Snake killers: Honey badgers of the Kalahari* [Film]. National Geographic Video.
- InTASC. (2013). *InTASC: Model core teaching standards and learning progressions for teachers 1.0*. Council of Chief State School Officers.
- Johnson, B., Down, B., Le Cornu, R., Peters, J., Sullivan, A., Pearce, J., & Hunter, J. (2016). *Promoting early career teacher resilience: A socio-cultural and critical guide to action*. Routledge.
- Knoepen, K.E., & Davison-Jenkins, J. (2007). *Teacher dispositions: Envisioning their role in education*. Rowman & Littlefield.
- Krovetz, M.L. (1999). *Fostering resiliency: Expecting all students to use their hearts and minds well*. Corwin.
- Lee Smith, R., & Skarbek, D (Eds.). (2013). *Professional teacher dispositions: Additions to the mainstream*. Rowman & Littlefield.
- Mansfield, C.F (Ed.). (2020). *Cultivating teacher resilience: International approaches, applications and impact*. Springer.
- Mansfield, C.F., Beltman, S., Price, A., & McConney, A. (2012). “Don’t sweat the small stuff:” Understanding teacher resilience at the chalkface. *Teaching and Teacher Education*, 28(3), 357-367. <https://doi.org/10.1016/j.tate.2011.11.001>
- NCATE. (2013). *Professional standards for the accreditation of teacher preparation institutions*. National Council for Accreditation of Teacher Education.
- Nottmeyer, A., & Bush, K. (2013). Adversity & resilience: A synthesis of international research. *School Psychology International*, 35(4), 747-487. <https://doi.org/10.1177/0143034312472758>

Snaza, N., Sonu, D., Truman, S.E., & Zaliwska, Z (Eds.). (2016). *Pedagogical matters: New materialisms and curriculum studies*. Peter Lang

Tait, M. (2008). Resilience as a contributor to novice teacher success, commitment, and retention. *Teacher Education Quarterly*, 35(4), 57-75. Retrieved from <https://www.jstor.org/stable/23479174>

Villegas, A.M. (2007). Dispositions in teacher education: A look at social justice. *Journal of teacher education*, 58(5), 370-380. <https://doi.org/10.1177/0022487107308419>

HOW TO CHANGE FEMALE PRE-SERVICE SCIENCE TEACHERS' SELF-EFFICACY AND ATTITUDES TOWARD SCIENCE

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Abstract

Female pre-service teachers' negative attitudes, attributes, and efficacy toward science are created over long-term enculturation as they matriculate from elementary school through science pedagogy classes. This narrative will explore the causes of low confidence, negative attitudes, and reduced efficacy that many female pre-service elementary teachers have toward science and science instruction. The discovery that all my pre-service elementary Science Pedagogy students not only disliked science as a subject but disdained the idea of teaching it caused me to reflect on my own teaching practices as a teacher educator. It caused me to thoughtfully deliberate and provide support and admiration to my students by design. From this deliberation, I employed techniques to change their perceptions. I changed their paradigm by building their teaching efficacy through simplifying science pedagogy expectations, creating an environment of exploratory learning with frequent encouragement, wonderment, and admiration. This article provides practical tips for changing the perceptions of female pre-service teachers about science with proven strategies from my own classroom.

Keywords: Female pre-service teacher, negative attitudes, attributes, efficacy, Science pedagogy, expectations, exploratory learning, encouragement, wonderment, admiration

Introduction

“How many of you like Science?” I asked my Science Pedagogy students on the first day of class last semester. Every one of my elementary and secondary aspiring teachers answered in the nil as if drinking a bitter cocktail. My passion and former teaching field, so it seemed, scared each of my students in different ways. “I don’t know anything about Science.” “I am afraid I will look dumb to my students.” “I was never good at Science.” “It is too complicated to understand.” “It never interested me.” “All my science teachers were boring.” And the coup de gras, “All we ever did was worksheets.” My Science Pedagogy class was composed entirely of young ladies. It became apparent to me upon asking “How many of you like Science?”, that there was more to not liking the subject than an aversion to the topic. All of my students had experienced some type of environment in their past schooling that caused them to have an entire perspective of aversion to science and science instruction. The research on girls’ and pre-service female teacher attitudes towards science verifies this observation as we will see. My mission was clear though, these future teachers were going to like, hopefully love, Science by the end of the semester and have confidence in their ability to engage elementary students. I changed their paradigm by building their teaching efficacy through simplifying science pedagogy expectations, creating an environment of exploratory learning with frequent encouragement, wonderment, and admiration.

Adolescent Female Attitudes Toward Science

“Many parents and teachers believe that boys are more capable in math and science than girls and some evidence indicate that adult stereotypes influence children’s self-perception of ability and decision about math and

science-related education and careers” (Kurtz-Costes et al., 2008, p. 389). This self-perception begins very early. When asked to draw a picture of scientists in elementary school, girls drew men as the icon twice as often as they drew women. Early school perpetuates the subconscious images of men as scientists. Thus, females enter STEM (Science, Technology, Engineering, and Math) fields at a much lower rate than males. Through her research, Berwick (2019) found that girls take advanced science courses on par with boys as they move into high school but drop dramatically as they enter college. Berwick (2019) called this stereotype threat. Girls continually get subtle social and cultural messages about male superiority in math and science. It is no secret that most elementary teachers are female. Research indicates that many elementary teachers feel unprepared and uncomfortable teaching science. When surveyed, 72% of elementary teachers did not feel competent to teach science (Bergman & Morphew, 2015). They often report insecurities, and these are reinforced by teachers who are anxious about teaching science. Teachers with this feeling of inadequacy may ultimately teach science poorly or avoid it altogether.

The researchers found that these insecurities can be created by the context of science teaching and assessment of girls. A study of admission tests to the most rigorous and elite schools in New York City found that girls guess less on the predominant multiple-choice tests that are used in science (Ennever, 2006). Girls perform better on open-ended questions, written answers, and assessments that allow them to demonstrate writing proficiency. Girls also report greater self-competence in verbal activities. This response suggests that science assessments in the classroom, which are predominantly multiple-choice, should take the form of open-ended assessments in a more blended way. But this is not happening, and girls continue to be exposed to an environment where multiple-choice tests dominate high school chemistry classes (Ennever, 2006). When considering the context of the science experience for girls, informal assessments have an impact as well. Because teachers still have the perception that girls are less knowledgeable than boys in science, they call on boys more often to answer verbal questioning in the classroom. Kurtz-Costes et al. (2008) found that the type and extent of feedback that children receive about performance greatly impacts attributional beliefs, especially in girls. This reduction in attention and experience causes low confidence in girls in the classroom environment. These self-concepts impact interests, behaviors, and values. This translates into girls believing they are not adequate to respond to questions and this is perpetuated as they less willingly respond (Javanovic & King, 1998).

Fostering positive attitudes towards science is important for girls. Compared to boys, Javanovic and King (1998) found that girls seem less interested in and attach less importance to science subjects. “These attitudes are a stronger predictor of science achievement in girls than in boys” (Javanovic & King, 1998, p. 478). The authors further found that girls do not take advantage of the learning opportunities available to them in science classrooms. Javanovic and King (1998) found that boys are more active, involved, and leading participants in experiments than girls. Girls more often take passive roles in experimentation such as organizing equipment or logging data. Boys had their hands on equipment more than girls. This reflects the traditional idea that boys tend to “hog” resources. The result is that girls sit back and observe, rather than take active roles. The good news is, that when girls took active, leading roles such as explaining a task, that their science ability perception improved.

This classroom experience is exacerbated by the social and cultural experiences that girls have. Girls make comparative judgments about their academic interests and performance. Consequently, boys do not make these kinds of comparative judgements. This success expectancy as defined by Watt (2004) is the perception of how well one perceives they will perform an impending task. During the course of a school year, girls perceived themselves as better at non-science subjects and tasks. By the time that they have reached middle school, a significant number of girls have formed identity beliefs that science and mathematics careers are not interesting or valuable. Adults other than teachers and parents can impact girls’ science competence beliefs as well. For example, a neighboring parent expressing displeasure at their daughter’s friend enrolling in advanced placement biology will have a social, cultural, and emotional impact. As if this were not enough, peers and social grouping also impact girl’s perception of their interests, values and worth. “As long as ability in mathematics and physical sciences is viewed as incongruous with a feminine identity, it is not

surprising that girls are turning to other areas in which to excel as they reach adolescence” (Kurtz-Costes et al., 2008, p. 405).

Female Pre-Service Teacher Attitudes Toward Science

“Teacher efficacy is a self-judgment of his or her capabilities to bring about desired outcomes of student engagement and learning even among those students who are difficult or unmotivated” (Arigbabu & Oludipe, 2010, p.28). From this and the above research, we see that as girls matriculate to college, many of them chose non-science courses, degrees, and professions. Much of this decision making is influenced by life experiences, school experiences, and envisioning oneself as successful and effective. Personality characteristics pre-dispose people to view their life experiences in certain ways. Students entering professions in education further build their views of inquiry and self-image as future teachers during pedagogy and most importantly, science teaching methodology courses. Those female pre-service teachers who are better at envisioning themselves as science teachers gained more from their programs (Roberts-Harris, 2014). Those that are confident in their scientific competence and abilities have a high self-efficacy. Decker (2008) found that:

1. Outgoing pre-service teachers had a higher self-efficacy than those who were not outgoing.
2. Those with a negative affect and anxiety were less confident in their teaching abilities.
3. Education courses that helped teachers explore and understand their own personalities proved helpful in their efficacy.

Efficacious teachers persist longer with difficult children, plan more frequently, and are less critical of student errors (Arigbabu & Oludipe, 2010). As I observed in 30 years of teacher observations, students learn more from teachers with high self-efficacy.

The fact that I am a male professor teaching a class of all-female pre-service, elementary science teachers has an impact on this self-efficacy as well. Having same gender instructors at the college level increases the performance of college students. Furthermore, a same-gender instructor can influence higher student outcomes by increasing expectations, motivation, and adjusting to learning styles that are aligned with gender (Artz & Welsch, 2014). The author found that female college students learn better with female professors. The good news is that as the female proportion in a class increases, the negative impact of a male instructor decreases to the point of no effect at all. I can say that after having a class of only female pre-service teachers this observation holds true. With the research supporting what I initially observed when every one of my students stated they did not like science, I will impart the techniques I employed to change their perspectives and efficacy.

Method

This inquiry and research started with an informal assessment of my 10, female, elementary Science Pedagogy students. After asking my students if they liked science and discovering that none of them did, I embarked on a mission to change this perspective. The techniques that I employed were not based on research into best practice but rather based on student needs and previous teaching experience. I had never experienced students with such a disenfranchised attitude towards science, their own abilities, and science instruction in the past. I determined that it was first imperative that my students knew what was required in the science testing standards that formed the course content. We used the excellent reference “Visible Learning for Science: What works best to optimize student learning” as our guide by (Almadore et al., 2018). I then focused on my students’ efficacy by simplifying science pedagogy expectations, creating an environment of exploratory learning, encouragement, wonderment, and admiration.

Clear Course Expectations

One of the requirements for this course was to expose students to the content test which they would take as a part of their certification. The contents of this section of their certification test and the study materials for it is easy to obtain from the Pearson Test Preparation Manual on their website. These competencies created the very structure, or outline of my course content. While these competencies are commonplace to a seasoned science teacher, they are quite daunting and would discourage any future science teacher. On the first day of class, after asking if anyone liked science, we examined these competencies together. Rather than get overwhelmed by the details, I had my students devise one or two words that best described the competency to them. So, competency 001 became science safety, 002 became science inquiry, 003 became science impact, and 013 became adaptations for example. I then demonstrated 3 to 4 of the competencies in very simple, visual, and interesting terms. The scope and sequence of the course and assignment calendar aligned to 12 of the 18 competencies. Operationally, this equated to two science themes per week with supporting and aligned demonstrations and labs. From the first day of class, students had clear expectations of what we would cover and simple, fun demonstrations to operationalize the competencies. The eighteen Science competencies are presented in Table 1 (Pearson, 2021).

Table 1

Subject Exam IV—Science (804) Competencies

Competency	Content
001	(Lab Processes, Equipment and Safety): The teacher understands how to manage learning activities, tools, materials, equipment and technologies to ensure the safety of all students.
002	(History and Nature of Science): The teacher understands the history and nature of science, the process and role of scientific inquiry and the role of inquiry in science instruction.
003	(Impact of Science): The teacher understands how science impacts the daily lives of students and interacts with and influences personal and societal decisions.
004	(Concepts and Processes): The teacher knows and understands the unifying concepts and processes that are common to all sciences.
005	(Students as Learners and Science Instruction): The teacher has theoretical and practical knowledge about teaching science and about how students learn science.
006	(Science Assessment): The teacher knows the varied and appropriate assessments and assessment practices for monitoring science learning in laboratory, field and classroom settings.
007	(Forces and Motion): The teacher understands forces and motion and their relationships.
008	(Physical and Chemical Properties): The teacher understands the physical and chemical properties of and changes in matter.
009	(Energy and Interactions): The teacher understands energy and interactions between matter and energy.
010	(Energy Transformations and Conservation): The teacher understands energy transformations and the conservation of matter and energy.
011	(Structure and Function of Living Things): The teacher understands the structure and function of living things.
012	(Reproduction and the Mechanisms of Heredity): The teacher understands reproduction and the mechanisms of heredity.
013	(Adaptations and Evolution): The teacher understands adaptations of organisms and the theory of evolution.
014	(Organisms and the Environment): The teacher understands the relationships between organisms and the environment.
015	(Structure and Function of Earth Systems): The teacher understands the structure and function of Earth systems.

016	(Cycles in Earth Systems): The teacher understands cycles in Earth systems.
017	(Energy in Weather and Climate): The teacher understands the role of energy in weather and climate.
018	(Solar System and the Universe): The teacher understands the characteristics of the solar system and the universe.

“Scientific literacy, or the knowledge and understanding of the scientific concepts and processes necessary for active engagement in society is essential for all of us to make informed decisions in our personal lives....” (Almarode et al., 2018, p. 10). Not only do pre-service teachers need tools for their toolbox but they need to understand how children learn science. *Visible learning for Science* provided my pre-service teachers with techniques and the impact or magnitude of specific techniques. This effect size describes the power of the tool used. Simply put, pre-service teachers must understand what techniques have the biggest bang for the buck. But more importantly, aspiring science teachers must understand how best to engage students in science. Almarode et al. (2018) made it very clear that students learn through a progression of surface, deep, and transfer phases. My ten pre-service science teachers were beginning to get the picture by day 2 that surface learning is developing conceptual knowledge and comprehension levels of understanding. At this level, they described and explained the formation of the Grand Canyon. Understanding deep learning helped them to realize that relationships exist in science. So, they applied their basic knowledge to analyze the relationship between erosion and weathering in the formation of the canyon. Finally, through transfer learning, my pre-service teachers understand that creating and evaluating similarities and differences for children solidifies their understanding. For example, when comparing the Grand Canyon and Palo Duro Canyon, learners begin to see the same processes working in a different setting. They transfer the processes that created the Grand Canyon to the context of another canyon. My pre-service teachers began to become scientifically literate and began to think like scientists. Once my students understood what they must know in simple, non-threatening terms and how to deliver it, I began working on their science and instructional self-efficacy. The techniques I used were not research-based at the time, they were techniques that fit my student needs. However, research supports the use of exploratory learning, encouragement, the wow factor, and admiration.

Exploratory Learning

My mission again, was to get my pre-service science teachers, all of whom expressed disdain for science, to like, hopefully love, Science by the end of the semester. Science preparation courses are weak in science, technology, engineering, and math (STEM) course requirements. Clear and consistent guidelines, content, rigor, and textbooks for science pedagogy classes are lacking across states. The use of exploratory and inquiry-based learning for pre-service teachers is supported by best practice research. Activities that require students to make observations, use their senses, ask questions, and predict outcomes are most engaging (Schmidt & Fulton, 2016). This is the approach that we took as a classroom team. We did many exploratory learning activities and demonstrations with unknown outcomes. Every week I modeled 4 demonstrations and 1 full lab. Modeling good science teaching techniques shows that we know what we are talking about, and that science teaching is attainable (Aleccia, 2011). By the end of the course, the students had a toolbox of 24 demonstrations, and 6 labs with associated reflections covering The Nature of Science, Matter, and Energy, Forces in Motion, Earth Science, Life Science, and Astronomy. Students created their own demonstration and lab plan for submission. This culminated in each student presenting their own demonstration and lab in the context of their classmates as elementary students. The overarching theme in each of these was that they required predictions, observations, and reactions with various acceptable outcomes.

Encouragement

Successful or not, I provided encouragement to every student in their demonstrations so that even if they were not entirely effective, they felt a high level of success and support in their effort. The perception that performance has been a failure lowers self-efficacy beliefs, which contribute to the expectation that future performances will also be inept. Organizations where teachers are encouraged by their leaders and where teachers encourage one another can reverse a cycle of low self-efficacy. Performance feedback that focuses on the positive achievements of student teachers and that encourages attributes that are controllable, have a positive effect on their development of efficacy (Tschannen-Moran et al., 1998). I consciously designed and provided performance feedback that was non-judgmental. In a discussion about food chains and energy pyramids, my pre-service teachers did not know what a predator-prey relationship was. Nor could they identify an example of a predator for rabbits. This scenario was repeated in discussions about matter, planets, galaxies, and magnetism. Rather than take a critical approach to feedback, I took the path of grace, providing gentle guidance rather than negative body language, facial expression, and critique. After their demonstrations and labs, feedback focused on positive attributes while ineffective techniques or information became opportunities for change. During opportunities for classmate feedback, this atmosphere of encouragement was expected and reciprocating. So, by the end of the semester, students experienced many opportunities for success, bolstered by support, confidence, and hope.

“Wow!” Factor

Wonder is a valid part of our knowledge experiences. Science may be able to tell us about stars, but, seeing them in the night sky can evoke astonishment and the desire to seek knowledge of them. The benefit of wonder and awe in education is that it motivates a person to explore and investigate (Kearns, 2015). By design, there was a “WOW” factor in every class meeting. I ensured that in every demonstration and exploratory activity students experienced a sense of wonder for two reasons. First, this made the subject interesting. Second, it caused my students to want to know more, to explore and investigate the world of science. The absorption spectrum and P and S waves are two deliberate subjects that instilled this sense of “wow, awesome, and so cool!” in my students. In the Astronomy module of my science pedagogy class, we investigated main sequence stars on the HR diagram. This could have been a mundane, worksheet-oriented demonstration. To instill this sense of wonder, I created a simple spectrometer. Not many natural phenomena evoke that sense of wonder as a beautiful and intense spectrum from white light. With the spectrometer and six-foot separation for COVID, my students observed the mercury-gas absorption spectrum from the lights in the classroom and a simple white light source. Jaws actually dropped, and the word “wowwww” came from each student as their interest and desire to investigate further was super-charged. They wanted to know more. This was no longer intimidating information, but a fascinating realization of naturally occurring information. The study of earthquakes is equally interesting if presented in an investigative fashion. As we plotted the travel time of earthquake waves from three recording stations on a world map, the ability to pinpoint the epicenter of a tremblor became a revelation. Each student looked up from their plot at different times with their mouth agape and uttered “Oh, my, gosh!” They were hooked. No more science fear just wonder and excitement to learn more.

Admiration

As mentors of aspiring teachers, we must humble ourselves before our students. Think less of our subject and self than we do our students. In this way, we can realize the power of admiration to our student efficacy (Weisman, 2012). Similar to the encouragement above, the demonstration of student admiration is a powerful ingredient. Again, even if students were not entirely effective in their demonstrations, I made it clear to them that their efforts were valuable steps to becoming successful and that I held them in esteem for being brave enough to take a chance. Admiration of our students involves an awareness of superior good in their actions. It also suggests a desire to emulate a certain characteristic or behavior (Zagzebski, 2015). While encouragement provides support to our students, admiration provides students with a sense of worth, value, and esteem. With each student demonstration, presentation, paper, prediction, and observation I made a point to provide individualized feedback in writing that expressed respect, marvel,

approval, and praise. Over the course of the semester, I could visibly see my students standing taller, speaking with conviction, and teaching with confidence. In one instance, a student was so sure that a solar eclipse was caused by the shadow of the earth that she confidently demonstrated a lunar eclipse. This was an opportunity for growth but weeks before she was not even sure what an eclipse was. I required each of my students to lead the class through a comprehensive lab in a science competency of their choosing. These labs were done in the last two weeks of the class as a benchmark assessment. By this time, all my female students were able to confidently present a lab introduction, hypothesis, procedures, observations, and expected outcomes in an effective presentation that could be duplicated. All of their labs would have been effective in an elementary classroom. Again, I deliberately focused on positive attributes in their written evaluations with an abundance of approval and praise.

Conclusion

On the last day of class, I asked the question that I had in the first class meeting. “How many of you like science now?” Every student proudly announced that “I am not afraid of science now. I am confident that I will not look dumb to my students. I love science now. I know what I need to do to teach science. How does gravitational lensing happen again?” This process caused me to reflect on my own teaching practices as a teacher educator. It caused me to thoughtfully deliberate and provide support and admiration to my students by design. As a public-school teacher and administrator for 30 years, I know the impact that these newly confident teachers will have on elementary students in the classroom. Their robust teacher-efficacy will translate into engaging, exciting, and effective classroom instruction. They will be able to scaffold their students from surface learning to deep, relational understanding, and finally to solving science problems through the transfer of concepts to differing contexts. They will be able to transfer the enthusiasm and wonder of interpreting the world with their senses to children who are just beginning to understand the world around them. Through the techniques employed and student feedback provided, it is evident that student science and teaching efficacy can be improved, strengthened, and perpetuated. In this example of a pedagogy class of all-female, pre-service teachers, it is also evident that these techniques can change attitudes and perspectives that have been encultured in these students over a long period of time. Both outcomes ultimately benefit the elementary science student in the classroom.

References

- Aleccia, V. (2011). Walking our talk: The imperative of teacher educator modeling. *The Clearing House*, 84(3), 87-90. Retrieved January 21, 2021, from <http://www.jstor.org/stable/41149875>
- Almarode, J. T., Fisher, D., Frey, N., & Hattie, J. (2018). *Visible learning for science, grades K-12: What works best to optimize student learning* (1st ed.). Corwin.
- Arigbabu, A., & Oludipe, D. (2010). Perceived efficacy beliefs of prospective nigerian science teachers. *Journal of Science Education and Technology*, 19(1), 27-31. Retrieved from <http://www.jstor.org/stable/2062774>
- Artz, B., & Welsch, D. (2014). The effect of peer and professor gender on college student performance. *Southern Economic Journal*, 80(3), 816-838. Retrieved from <http://www.jstor.org/stable/23809653>
- Bergman, D., & Morphew, J. (2015). Effects of a science content course on elementary preservice teachers' self-efficacy of teaching science. *Journal of College Science Teaching*, 44(3), 73-81. Retrieved from <http://www.jstor.org/stable/43631942>
- Berwick, C. (2019). Keeping girls in STEM: 3 Barriers, 3 solutions. Retrieved January 11, 2021, from <https://www.edutopia.org/article/>
- Decker, L., & Rimm-Kaufman, S. (2008). Personality characteristics and teacher beliefs among pre-service Teachers. *Teacher Education Quarterly*, 35(2), 45-64. Retrieved from <http://www.jstor.org/stable/23479223>
- Ennever, F. (2006). More than multiple-choice. *The Science Teacher*, 73(7), 54-56. Retrieved from <http://www.jstor.org/stable/24140292>
- Jovanovic, J., & King, S. (1998). Boys and girls in the performance-based science classroom: Who's doing the performing? *American Educational Research Journal*, 35(3), 477-496. Retrieved from <http://www.jstor.org/stable/1163445>
- Kearns, L. (2015). Subjects of wonder: Toward an aesthetics, ethics, and pedagogy of wonder. *The Journal of Aesthetic Education*, 49(1), 98-119. doi:10.5406/jaesteduc.49.1.0098
- Kohlhaas, K., Lin, H., & Chu, K. (2010). Science equity in third grade. *The Elementary School Journal*, 110(3), 393-408. doi:10.1086/648985
- Kurtz-Costes, B., Rowley, S., Harris-Britt, A., & Woods, T. (2008). Gender stereotypes about mathematics and science and self-perceptions of ability in late childhood and early adolescence. *Merrill-Palmer Quarterly*, 54(3), 386-409. Retrieved from <http://www.jstor.org/stable/23096251>
- Pearson Education, Inc.: Texas educator certification examination program, core subjects EC-6 (291), Subject Exam IV—Science (804). Retrieved January 19, 2021, from http://www.tx.nesinc.com/Content/StudyGuide/TX_SG_obj_291.htm#IV
- Helen M. G. Watt. (2004). Development of adolescents' self-perceptions, values, and task perceptions according to gender and domain in 7th- through 11th-grade australian students. *Child Development*, 75(5), 1556-1574. Retrieved from <http://www.jstor.org/stable/3696500>
- Roberts-Harris, D. (2014). What did they take away?: Examining newly qualified U.S. teachers' visions of learning and teaching science in K-8 classrooms. *Teaching & Learning Inquiry: The ISSOTL Journal*, 2(2), 91-108. doi:10.2979/teachlearninqu.2.2.91
- Schmidt, M., & Fulton, L. (2016). Transforming a traditional inquiry-based science unit into a STEM unit for elementary pre-service teachers: A view from the trenches. *Journal of Science Education and Technology*, 25(2), 302-315. Retrieved from <http://www.jstor.org/stable/43867798>

- Tschannen-Moran, M., Hoy, A., & Hoy, W. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research*, 68(2), 202-248. from <http://www.jstor.org/stable/1170754>
- Weisman, D. (2012). An essay on the art and science of teaching. *The American Economist*, 57(1), 111-125. Retrieved from <http://www.jstor.org/stable/23240716>
- Zagzebski, L. (2015). Admiration and the admirable. *Proceedings of the Aristotelian Society, Supplementary Volumes*, 89, 205-221. Retrieved from <http://www.jstor.org/stable/26623012>

DEVELOPING PEDAGOGICAL CONTENT KNOWLEDGE THROUGH REMOTE INSTRUCTION: EMBEDDING ENVIRONMENTAL EDUCATION IN A SCIENCE METHODS COURSE

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Abstract

This article presents an action research approach to adapting the traditional face-to-face Project Wild workshop to a four-week online experience. As a result of the ongoing COVID-19 pandemic, the shift to online courses presented the Science Methods faculty with the opportunity to maximize the use of Growing Up Wild (GUW), an early childhood Project Wild resource, to support the preparation of teacher candidates to teach science. The online workshop design addressed the instructional challenges of using technology to create and deliver a course focused on environmental science inquiry while fostering community. Four sections of the Science Methods participated in the GUW online workshop, totaling 82 teacher candidates. Data from various sources were collected to analyze the teacher candidates' experiences and inform the workshop improvement. This article examines teachers' weekly reflections on the perceived value and future application of the instructional resources explored during the workshop. Results show that the workshop components successfully supplied rich opportunities to develop pedagogical content knowledge to teach science inquiry. Nevertheless, there is an opportunity to include more self-regulated opportunities to engage in scientific investigations.

Keywords: education technology, remote learning, outdoor education, teacher preparation, science education

The instructors at a Hispanic-serving institution in south-central Texas embedded Project WILD (PW) resources in the Science Methods course to “engage students in the conceptually rich, intellectually ambitious, and meaningful experience” (NASEM, 2020, p. 91); develop inquiry skills and early childhood strategies (Council for Environmental Education, 2011). Prior to the Spring 2021 semester, teacher candidates attended the single-day workshop at a nature center located at a large city park to participate in a series of planned environmental activities. The shift to online instruction resulting from the ongoing COVID-19 pandemic presented the lead faculty with the opportunity to maximize the online use of Growing Up WILD. Guided by the Quality Matters standards (2018), the PW facilitators and faculty redesigned the workshop to provide teacher candidates with tools, skills, and knowledge to engage future pupils in doing environmental science. However, this opportunity came with some challenges. The first challenge was adapting a nature-based outdoor education curriculum for online delivery while maintaining outdoor learning and scientific inquiry opportunities. The second challenge was to minimize the disruption of instruction delivery due to internet accessibility and connectivity for both instructors and teacher candidates. The third challenge was to ensure rigor in creating quality materials relevant to the Science Methods curriculum. Finally, fostering community was a priority across the four-course sections by establishing communication channels between instructors and teacher candidates. This article presents an action research approach to adapting the traditional face-to-face PW to an online four-week workshop to address the recognized challenges using technology to create and deliver the course. Multiple data sources were used to examine

teacher candidates' learning experiences, including posts, reflections, and surveys. The analysis presented here examines the teacher candidates' weekly reflections to identify their experiences in learning to teach inquiry-based environmental science.

Embedding Project WILD in the Science Methods Course

Project WILD is a collection of activities organized into a conceptual framework focused on fostering an understanding of wildlife and habitat to make responsible and wise decisions about natural resources (AFWA, n.d.). PW encompasses resources related to terrestrial, aquatic, and birdlife. One of the components, Growing Up WILD (GUW), is an early childhood set of activities with a focus on field exploration, music, dance, investigation, and art for children ages 3-7. The guide incorporates play, content, literacy, and healthy eating habits while connecting children to nature. The GUW curricular materials are recognized by the Texas Education Agency and aligned to the Texas Essential Knowledge and Skills, i.e., the standards that teacher candidates will use to guide their future teaching practice.

For many years, instructors at a prominent urban Hispanic-serving institution in south-central Texas have embedded PW in the Science Methods course. Before COVID-19, the university teaching program collaborated with Texas Parks and Wildlife Department to organize and hold a day-long learning event with teacher candidates each semester with an agenda focused on the Project WILD K-12 and Growing Up WILD curriculum teaching strategies and content throughout the years. Participants receive a combo set from the PW series in a combination workshop, such as Project WILD K-12, Aquatic Project WILD, and Growing Up WILD. During the transformation to an online course, the PW facilitators and faculty decided to embed one of the series, GUW, in the Science Methods course, limiting the PW series, however, continuing to promote multiple ways of teaching science in early childhood through sixth grade. The limited time available for the Science Methods as an online course during the COVID-19 pandemic was a factor in selecting one activity resource from the PW series.

The primary intention of planning for the face-to-face workshop was to provide rich hands-on learning opportunities for teacher candidates about one or more of the following concepts: awareness and appreciation of wildlife, ecological systems, and responsible human actions, environmental issues and trends, cultural and social interaction with wildlife, habitat, and environmental systems, and human values and the wildlife resource (Texas Parks & Wildlife, n.d.). Workshop participants were exposed to one or more of these concepts and the teaching skills to facilitate them in early childhood and elementary classrooms. An example of this is teacher candidates engaging in the Oh Deer! PW activity (Council for Environmental Education, 2014) to learn about the elements of habitat and how the availability of shelter, water, food, and space impact the deer population. At the same time, they develop strategies to foster social-emotional, cognitive learning, and physical activity to learn science and math. After the workshop, teacher candidates plan and deliver a lesson based on GUW and the 5E approach (Bybee, 2015).

Relevant Literature

COVID-19 impacted how the teaching program faculty plans and delivers instruction in the Science Methods course. As a result of the health and safety mandates put in place at the university, all courses were migrated online. Course planning took into consideration multiple variables, including available technology and reliance on students-regulated learning. Remote learning was the only instructional delivery approach to accommodate all students enrolled in the early childhood to upper elementary Science Methods course. Transitioning to remote learning required extensive planning, preparation, and identifying appropriate education technologies to facilitate the knowledge and skills teacher candidates need for clinical teaching. In addition, the instructors had to maintain the focus on teaching and learning inquiry while creating a learning community.

Technology introduces the advantage of increasing access to education for all students. A traditional classroom may incorporate technology to support instruction and learning within the physical learning space. However, due to the COVID-19 pandemic shift, educators were revisiting questions and concerns about virtual and remote learning. As more

online universities and education programs have become available in recent years, higher education institutions have examined the effectiveness of teaching online (Pokhrel & Chhetri, 2021). Common challenges to remote learning include access to technology, the proper software, and applications to guide learning and connectivity for everyone to access the lessons and the materials (Pokhrel & Chhetri, 2021). Individual institutions leverage their resources to ameliorate the impact of technology access on students. For example, students rely on the information technologies supported through their campus to address connectivity issues and access computers.

The lockdown because of COVID-19 exacerbated the existing limitations on students' access to technological resources (Teräs et al., 2020). Universities and colleges worked with faculty to provide remote learning resources for students taking their courses from diverse US locations and abroad.

Traditionally, instructors have used course management tools to communicate with the students, share documents, and encourage academic exchanges outside the classroom. After lockdown, course management tools, such as Blackboard became more prominent to support all levels of student-to-student and student-to-teacher interaction and accomplish learning. Nevertheless, Blackboard has limitations to support collaborative work, and access is granted only to students enrolled in the same class. In the case of Project Wild, the facilitators provided access to the workshop to four sections of the Science Methods course. Instructors considered other online management tools, for instance, Slack, to include all the students and open communication and collaborative work opportunities. Being part of a community allows individuals to collaborate, share information, and learn from one another resulting in more robust learning experiences (Smith et al., 2016). Slack users can post tasks, collaborate, and connect with peers, thus *fostering an online community*. The digital platform includes tools to communicate the coursework expectations, allowing students to ask questions or seek direction and connect with the instructor (Prince, 2021). In the case of adapting the PW workshop, it supported aspects of the inquiry process.

Inquiry is a process grounded in reasoning through experience and research that encourages the formulation of questions based on observations and investigation to draw conclusions (NRC, 1996). Engaging in inquiry uses critical thinking skills such as questioning, thoughtful discussion, argumentation, and problem-solving through hands-on experience (Alvarado & Herr, 2003; Cusick, 2001). Inquiry processes can occur in formal school settings and daily life. Since the first implementations of distance learning, researchers have identified tensions between distance learning and outdoor education. Moseley et al. (2010) examined the impact of teachers' and students' interactions in nature and how learning virtually about the environment can conflict with the environmental education guidelines of direct experience through nature. According to the research by Moseley et al. (2010), teaching environmental education online may introduce barriers to interaction with nature, minimizing the effectiveness of the outdoor experience.

The concern is the drift from the guidelines in environmental education based on the historical goals outlined in international collaborations and agreements to increase awareness of the value and intersectionality of nature with humans and human influences (Mosely et al., 2010; Quay et al., 2020; Smith et al., 2016). To adapt Project Wild to an online environment, facilitators and faculty reimagined experiential learning to incorporate self-regulated learning experiences to alleviate the tension between virtual education and learning through nature.

Method

Context

The action research project (Saldaña, 2011) to adapt the Project Wild workshop included four sections of a Science Methods course. The course is a requirement of the Early Childhood-Sixth (EC-6) interdisciplinary degree teacher track. Each section averaged 22 teacher candidates, with a total of 82 students completing all the workshop requirements.

Transforming the Project WILD Workshop

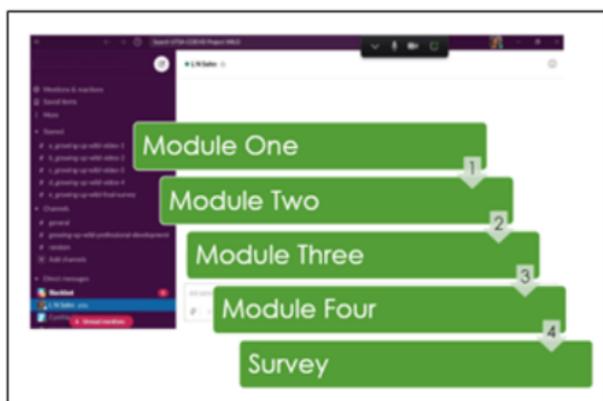
The online G UW workshop design process considered the challenges of online instruction, including (1) minimizing disruption of instruction delivery due to internet accessibility and connectivity for both instructors and teacher candidates, (2) replacing instructor-led with self-guided opportunities for teacher candidates to experience learning outdoors, and (3) maintaining the integrity and learning expectations of the science methods curriculum.

The online G UW workshop was a series of four asynchronous modules that teacher candidates could complete at their own pace within a four-week time frame. The digital platform Slack minimized the disruption of instruction delivery for instructors and teacher candidates due to limited internet connectivity and accommodated students' schedules. At the same time, it opened communication channels between the instructors and teacher candidates. Slack served as a resource hub by providing a space to store all the workshop materials (Figure 1). Additional advantages of Slack are that it supports many users and provides a straightforward approach to organize materials, discussions, and collaborations through channels that serve as self-contained conversation spaces.

Another aspect that the workshop needed to address was the isolating conditions for teacher candidates created by COVID-19 and the need to build community among the participants and the PW facilitators. Even though the course was delivered asynchronously, the Slack platform fostered a learning community for teacher candidates across the four-course sections. Furthermore, the project management tool allowed users to message facilitators and participants to clarify and share information.

Figure 1

Growing Up WILD Slack Environment



Each week, teacher candidates completed (1) a 20-40 minute video, (2) a science or science teaching task, and (3) a reflection using Google forms. Table 1 presents an overview of the four modules. The Science Methods instructors used Panopto and Zoom video platforms to record four videos to introduce G UW activities and their alignment to the 5E lesson plan (Bybee, 2015). The G UW videos aimed to equip teacher candidates with ready-to-implement activities and instructional strategies to teach inquiry-based environmental science. Other objectives included making connections with young students' homes, communities and involving parents in doing science. Table 1 presents a concise description of the activities adapted and included in each of the modules.

Table 1*Growing Up Wild Workshop Modules*

	Video content	Task
Module 1	Introduction to Texas Parks & Wildlife Overview of Growing up WILD resources G UW Activity: Adaptation as a factor in survival.	Post a photo of a local bird. What shape is the birds' beak? Based on your observations, what do you think they eat?
Module 2	G UW Activity: Observing changes in plants and animals over an extended period.	Conduct a nature walk, and describe the wildlife encountered. The objective is to learn to respect all the organisms and the environment.
Module 3	G UW Activity: Literacy and Math connections	Reflect on strategies to facilitate interdisciplinary approaches to science learning.
Module 4	G UW Activity: Making home connections by looking at leaves.	Reflect on the overall Project WILD workshop. Engage in discussions with peers and instructors.

The shift to remote learning impacted one of the tenets of G UW in that the program promotes the value of integrating play and outdoors to provide meaningful learning experiences, which needed to be at the forefront of the online workshop. Thus, the instructors needed to address the tension between virtual learning and experiential learning (Mosely et al., 2010; Quay et al., 2020; Smith et al., 2016) and position teacher candidates as active science learners (Loughran, 2014). The online workshop included two science tasks incorporating outdoor learning while also leveraging the Slack communication tools to share evidence and observations collected by teacher candidates. The first science task asked teacher candidates to record observations of a bird and predict the type of food it might eat based on its beak's shape. The second task was to conduct a nature walk and record wildlife sightings. Teacher candidates posted pictures of birds and their predictions about the foods they might eat based on their beaks' shape and descriptions of their wildlife observations.

The Google reflection form served a dual purpose. First, it allowed the instructors to monitor teachers' progress towards completing the workshop requirements to obtain the PW certificate. Second, the form was a reflection tool used by teacher candidates to identify the strategies, knowledge, and skills they considered most valuable to prepare them to teach science.

The course instructors used the Quality Matters (QM) standards (2018) to maintain the rigor of the online workshop. Specifically, the standards guided the integration of course elements, including the introduction, scaffolds to students' self-regulation process through reflection, quality curricular materials, and various technologies. Module 1 set up teacher candidates' expectations and provided an overview of the workshop and the curricular connection to the Science Methods course. Given the four-week timeframe to complete the workshop and its reliance on teacher candidates' self-regulation, it was essential to provide various approaches to allow students to monitor their learning. The Google reflections, Slack posts, and Q&A channels served the double purpose of scaffolding teacher candidates' self-regulated learning and collecting evidence of their learning experience. Table 2 presents the G UW workshop alignment

to the QM standards (2018). It is important to note that the facilitators did not use all the QM standards because PW is not a formal online course. Instead, it is a short four-week workshop. Nevertheless, the facilitators and faculty acknowledge that designing an online experience is not straightforward. Using QM standards can increase the rigor of the final product.

Table 2*Project WILD Workshop Alignment to Quality Matters Standards*

General Standards	Specific Standards	Workshop Elements
Course overview and introduction	1.1 Instructions to get started and finding various components.	1.1 Week 1: Overview of the course and its components.
	1.2 Introduction to purpose and structure of the course	1.2 Week 1: Workshop purpose and its structure.
	1.3 Communication expectations for interactions	1.3 Use of email and direct messaging through Slack.
Assessment and measurement	3.5 The course provides learners with multiple opportunities to track their learning progress.	3.5 Weekly reflections and posts in the discussion space in Slack.
Instructional materials	4.1 The instructional materials contribute to achieving learning objectives.	4.1 All instructional materials are aligned to the Science standards and teacher preparation standards.
	4.4 The instructional materials represent up-to-date theory and practice in the discipline.	4.4 PW books are updated and reflect the most current research-based practice for science teaching and learning.
Learning activities and learner interaction	5.2 Learning activities provide opportunities for interaction that support active learning.	5.2 Inclusion of science and science tasks to provide learning opportunities.
Course technology	6.1 The tools used in the course support the learning objectives or competencies.	6.1 The G UW workshop included Slack to create a community of learners, Google forms to scaffold self-regulated learning, and data collected. Panopto to edit and store videos.
	6.3 A variety of technology is used in the course.	6.3 Use of Panopto, Google, and Slack to design the workshop.
Accessibility and Usability	8.1 Course navigation facilitates ease of use.	8.1 Slack provides a navigation panel for ease of access to the workshop components.

Data Collection and Analysis

Multiple sources of data were collected and used to explore the teacher candidates' perceived learning experience. The data collected includes teacher candidates' weekly Slack posts, reflections, workshop evaluations, and microteaching assignments. Data collected were coded for emergent themes. The following section presents the results obtained from the weekly reflections' analysis.

Results

The teacher candidates reported opportunities to develop various dimensions of pedagogical content knowledge (PCK) to teach science inquiry, including science content, interdisciplinary science, and knowledge of content and teaching. The post-workshop reflections indicate that teacher candidates learned the *scientific content* addressed in the weekly videos. Teacher candidates highlighted learning about adaptation and life cycle. One of the teacher candidates commented that "It was nice being reminded of how species evolve" during Module 1. Similarly, a teacher candidate focused on flowers when reflecting on Module 2: "What I enjoyed most of the video was the information that was given to us about flowers. I have not learned about them since I was in school." These statements demonstrate the opportunities to learn content offered throughout the workshop. Furthermore, it shows the effectiveness of the workshop to position teachers as active science learners.

The data further revealed that teacher candidates identified *interdisciplinary connections*, for instance, math and literacy. A teacher candidate expressed: "I like the idea of integrating topics in multiple content areas." Given the interdisciplinary nature of the teacher preparation program, embedding PW in the Science Methods course was vital in introducing interdisciplinary connections, keeping the workshop content relevant for our teacher candidates, and aligned to the overall course objectives.

Finally, teacher candidates developed knowledge of content and teaching. First, they established relationships between the activities and specific learning objectives. During Module 4, one of the teacher candidates noticed that "different type(s) of leaves allow for more understanding...". The teacher candidate recognized that presenting students with various leaves to explore shapes and colors supports understanding the natural world and developing observational skills. Second, teacher candidates identified approaches to data collection with young children and how to use them to identify patterns in nature.

I really liked the idea about using cameras to take pictures... while the students are making observations. Then the pictures could be reviewed again during a different season, when the nature outside looks different... this would help children understand the changes and patterns that occur in our natural world.

The teacher candidate reflections demonstrate an articulation between the science activities, how to facilitate data collection, and the student learning elicited, in this case, changes and patterns in the natural world. Thus, the reflections constitute evidence of PCK development to create teaching opportunities to support young learners make sense of science. Another aspect relevant to the development of PCK is the knowledge of students. Data revealed that close to 10% of teacher candidates identified the benefits of outdoor learning experiences to teach about the environment. Moreover, they reflected on the relevance of building on students' prior experiences and linguistic resources to develop knowledge and scientific language, respectively.

Discussion

The action research project to adapt the G UW workshop for online asynchronous delivery enabled us to think critically about the student learning experiences and design process. Engaging in this project is vital to design a quality workshop that provides appropriate learning opportunities to prepare teacher candidates to teach science inquiry. Given

that action research is intended to discern problems and identify solutions for positive change, the lessons learned from this project can potentially shed light on other teacher educators' experiences with online learning, as it did for us.

The action research project revealed that the challenges related to technology access (Teräs et al., 2020) and the tensions between virtual learning and environmental education (Mosely et al., 2010; Quay et al., 2020; Smith et al., 2016) could be addressed leveraging various technologies and curricular design. The reflection on the design process indicated that following the Quality Matter standards guided us to articulate the different workshop components. The inclusion of self-regulated learning opportunities leveraging the Slack platform to communicate and share observations provided inquiry opportunities focused on the environment. Scientific inquiry was at the forefront of the workshop through models of teaching, strategies to promote inquiry with young children and engaging teacher candidates in scientific observation. The analysis of teacher candidates' weekly reflections demonstrated that the weekly videos and tasks successfully provided rich opportunities to develop pedagogical content knowledge to teach science inquiry, similar to the face-to-face workshop. Furthermore, they identified effective strategies to facilitate observations using the hula hoops to focus young learners' attention while exploring nature and a Venn Diagram to sort wild and domesticated animals.

Throughout the reflection process, the facilitators and faculty contemplated approaches to enhance students' learning opportunities of PCK to teach science inquiry. The learning experience analysis indicates that teacher candidates learned strategies to facilitate observation and data collection. Faculty and instructors consider that the workshop should engage teacher candidates in a complete inquiry cycle to collect data, discuss observations and seek emergent patterns. Teacher candidates need opportunities to be active science learners to develop a deeper understanding of scientific inquiry teaching and learning (Loughran, 2014). Similarly, the weekly tasks can incorporate more scaffolding of nature experiences to foster self-regulated opportunities to learn about science and science teaching.

Overall, the action research project has highlighted the relevance of engaging teacher candidates in the PW to develop their PCK to teach science inquiry. The findings have implications for future revisions of the workshop and for teacher educators who were required to design online courses due to the restrictions imposed by COVID-19 or want to improve

References

- Alvarado, A. E., & Herr, P. R. (2003). *Inquiry-based learning using everyday objects: Hands-on instructional strategies that promote active learning in grades 3-8*. Corwin Press.
- Association of Fish and Wildlife Agencies. (n.d.). *Teach WILD. Learn WILD, Be WILD*.
<https://www.fishwildlife.org/projectwild>
- Bybee, R. (2015). *The bscs 5e instructional model: Creating teachable moments*. National Science Teachers Association Press.
- Cusick, J. (2001). *Practicing science: The investigative approach in college science teaching*. National Science Teachers Association Press.
- Council for Environmental Education. (2014). *Growing up WILD: Exploring nature with young children*.
<https://www.fishwildlife.org/projectwild>
- Loughran, J. J. (2014). Developing understandings of practice. In N. G. Lederman & S. K. Abell (Eds.), *Handbook of research on science education: Volume II* (pp. 811–829). Routledge.
- Moseley, C., Herber, R., Brooks, J., & Schwarz, L. (2010). “Where are the field investigations?” An investigation of the (implied) paradox of learning about environmental education in a virtual classroom. *Canadian Journal of Science, Mathematics and Technology Education*, 10(1), 27-39. <https://doi.org/10.1080/14926150903574262>
- National Academies of Sciences and Medicine. (2020). *Changing expectations for the K-12 teacher workforce: Policies, preservice education, professional development, and the workplace*. National Academies Press.
<https://doi.org/10.17226/25603>
- National Research Council. (1996). *National science education standards*. National Academies Press.
- Prince, N. (2021). Communicating to improve the lived experiences of learning during COVID-19. *The Christian Librarian*, 64(1), 17-19. Retrieved from
<https://digitalcommons.georgefox.edu/cgi/viewcontent.cgi?article=2250&context=tcl>
- Pokhrel, S., & Chhetri, R. (2021). A literature review on impact of COVID-19 pandemic on teaching and learning. *Higher Education for the Future*, 8(1), 133–141. <https://doi.org/10.1177/2347631120983481>
- Texas Wildlife and Parks Department. (n.d.). Texas Project WILD Suite. <https://tpwd.texas.gov/education/project-wild>
- Quality Matters. (2018). *Standards from the Quality Matters Higher Education Rubric*. <https://www.qualitymatters.org>
- Quay, J., Gray, T., Thomas, G., Allen-Craig, S., Asfeldt, S., Beames, S., Cosgriff, M., Dymont, J., Higgins, P., Ho, S., Leather, M., Mitten, D., Morse, M., Neill, J., North, C., Passy, R., Pedersen-Gurholt, K., Polley, S., Stewart, A., Takano, T, Waite, S., & Foley, D. (2020). What future/s for outdoor and environmental education in a world that has contended with COVID-19? *Journal of Outdoor and Environmental Education*, 23, 93–117.
<https://doi.org/10.1007/s42322-020-00059-2>
- Saldaña, J. (2011). *Fundamentals of qualitative research*. Oxford University Press.
- Smith, H. A., Dymont, J. E., Hill, A., & Downing, J. (2016). ‘You want us to teach outdoor education where?’ Reflections on teaching outdoor education online. *Journal of Adventure Education and Outdoor Learning*, 16(4), 303–317. <https://doi.org/10.1080/14729679.2016.1147966>
- Teräs, M., Suoranta, J., Teräs, H., & Curcher, M. (2020). Post-Covid-19 Education and Education Technology ‘Solutionism’: a Seller’s Market. *Postdigital Science and Education*, 2, 863–878.
<https://doi.org/10.1007/s42438-020-00164-x>

THE MEANING OF A WORD: ELEMENTARY PRE-SERVICE TEACHERS' PERCEPTIONS OF MATHEMATICS

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Abstract

Elementary pre-service teachers often enter teacher preparation programs with negative beliefs about mathematics. In this study, elementary mathematics content methods instructors explored the beliefs of pre-service teachers at the beginning and end of the semester by asking them to complete the phrase 'Math Is...' using one word. Analyses of pre-service teachers' one word responses and their justifications revealed most pre-service teachers shifted from negative or neutral to positive words by the end of the semester. Three Sparks of Change influencing pre-service teachers' perspectives emerged from additional analyses of the data: field experience, self-perception, and self-efficacy or confidence.

Keywords: pre-service teacher preparation, mathematics education, beliefs

Introduction

Elementary pre-service teachers often start their teacher preparation journey with a set of fixed beliefs about mathematics as well as the teaching and learning of mathematics based on their previous experiences (Philipp, 2007; Briley, 2012). When these experiences are acknowledged and explored in a teacher preparation program, there is the potential for elementary pre-service teachers' perceptions to be reinforced or possibly changed. This study explored whether pre-service teachers' perceptions of mathematics changed over time based on their experiences in a field-based math methods course. Pre-service teachers shared their perceptions by completing the phrase 'Math is...' using one word.

Literature Review

"One teacher can have a long-lasting impact on a student's outlook on mathematics" (Guillaume & Kirtman, 2010, p. 139). This impact can be positive or negative. For many pre-service teachers, their experiences are negative and impact how they think about teaching mathematics (Lutovac, 2020). Pre-service teachers often carry these feelings into their teacher preparation programs. So, what are the perceptions pre-service teachers have about mathematics in general and about teaching mathematics? What role do teacher preparation programs have in changing or reinforcing these perceptions?

Perceptions About Mathematics and Mathematics Teaching

Mathematics is a discipline that causes fear and at times anxiety for some students, including elementary pre-service teachers (Bates et al., 2011). Often, elementary pre-service teachers perceive doing mathematics as following given rules or memorizing facts rather than understanding concepts (Liljedahl et al., 2006). Pre-service teachers often

hold on to the idea that math is something you “do” rather than an understanding or an experience. In other words, they perceive mathematics as something that is done to a person rather than an experience involving the learning of concepts. These perceptions about mathematics, in general, color pre-service teachers’ perceptions as they move through their educational journey to become a teacher.

The impact of pre-service teachers’ perceptions about mathematics and mathematics learning on their teaching practices is well-researched (Swars, 2006; Burton, 2012). Swars (2006) found that pre-service teachers with positive experiences with mathematics had positive beliefs about mathematics teaching. Conversely, pre-service teachers with negative experiences had negative beliefs. Experiences, whether positive or negative, seem to be a common factor that influences pre-service teachers’ beliefs about mathematics. Gresham (2009) also found that negative attitudes about mathematics can lead to doubts about pre-service teachers’ own effectiveness in teaching mathematics to children. Furthermore, pre-service teachers often progress from more traditional concepts of mathematics teaching and learning to a more problem-solving approach towards mathematics during a methods course, which changes their beliefs about mathematics (Liljedahl et al., 2006). Therefore, methods courses in teacher preparation programs provide spaces where pre-service teachers’ perceptions can potentially change.

Teacher Preparation Programs

Pre-service teachers’ training and perspectives as future educators do not begin when they enter teacher preparation programs. Rather, as Guillame and Kirtman (2010) noted:

U.S. teachers are products of the school systems that they pass through as students and reenter as professionals. These years of experiences with mathematics in school (and out) influence convictions, beliefs, and values that teachers bring with them to their professional program and to the classroom. (p. 124)

Furthermore, one of the most common college degrees in the US is a generalist in elementary education. This degree often provides pre-service teachers with limited preparation for effectively teaching mathematics (Jeffery et al., 2018; Aud et al., 2012; CBMS, 2012). Considering elementary pre-service teachers’ prior experiences in and out of school in conjunction with limited preparation of effective mathematics teaching, it is not surprising that many elementary pre-service teachers do not have positive perceptions about mathematics teaching and learning. However, studies have shown that pre-service teachers’ beliefs can be influenced by teacher preparation programs (Beswick, 2006; Gill et al., 2004; Swars et al., 2007). There is hope that elementary pre-service teachers can enter the profession with a more positive outlook on mathematics teaching and learning.

While there is extensive research about pre-service teachers’ perceptions about mathematics and mathematics teaching, this study explored if pre-service teachers could clearly and succinctly articulate beliefs about mathematics and express if their beliefs changed over time.

Research Questions

The purpose of this study was to explore pre-service teachers’ perceptions of mathematics by answering the following research questions:

1. What are elementary pre-service teachers’ perceptions of mathematics, and how do these perceptions change from the beginning to the end of a mathematics methods course based upon their single-word responses to the prompt ‘Math is ...’?
2. What justifications do pre-service teachers offer for their single-word choices?

Methodology

To gain insight into elementary pre-service teachers' perceptions of mathematics, the researchers gathered and analyzed pre-service teachers' single-word responses they used to complete the phrase 'Math is ...' at the beginning and end of a mathematics methods course during the spring semester of 2019. Thus, an opportunity to observe possible changes in perceptions emerged as these data were collected at the beginning and end of the course. Single-word responses were collected rather than a different mode of expression, such as drawings (Burton, 2009), because often students have weak connections between mathematical concepts and the words or language used to explain the mathematics (Shockey & Pindiprolu, 2015). Also, in mathematics, communicating with others and using language in mathematics are important habits of mind (Seeley, 2014).

124 pre-service teachers across six classes of an elementary mathematics methods course at a midsized university in the south participated in this study during the semester directly before their student-teaching experience. The classes met once a week for 3-hours as part of a block of content-focused courses that included mathematics, science, social studies, and classroom management. During these course meetings, pre-service teachers explored and discussed research-based practices for teaching mathematics to elementary students, planned mathematics lessons, and reviewed elementary mathematics content. In addition to important mathematics content, the elementary mathematics methods courses focused on active learning, group-worthy tasks, hands-on learning with manipulatives, station-based exploration, and other research-based elementary mathematics practices and pedagogy (e.g. Featherstone et al., 2011; Parks, 2020). The pre-service teachers spent 4 weeks in a field placement in local elementary schools where they were required to teach at least one math lesson to students.

As an introductory activity in their first course meetings, pre-service teachers provided their single-word responses. The researchers, also the instructors for the course, held on to these responses until the end of the semester. During the final course meetings, the pre-service teachers revisited their original word and provided a second word to complete the sentence 'Math is ...'. Additionally, the researchers asked the pre-service teachers to write a few sentences describing why they selected their word choice and why their words changed or stayed the same as compared to what they provided at the beginning of the semester.

The researchers conducted an iterative, thematic analysis of pre-service teachers' single-word responses (Corbin & Strauss, 2008; Miles et al., 2014). During the first round of analyses, the researchers organized and analyzed the words that students submitted at the beginning and end of the semester to begin to make sense of the kinds of words students were using. During the initial pass through the data, there emerged a clear delineation between negative words and positive or neutral words to describe mathematics. Examples of these types of words are provided in Figure 1. For the second round of analyses, the researchers used the identifiers of Positive, Neutral, and Negative to code all words submitted by the students.

Figure 1*Examples of Positive, Neutral, and Negative Words*

Positive	Neutral	Negative
Complex	Alright	Challenging
Dynamic	Okay	Confusing
Everywhere		Difficult
Exciting		Frustrating
Fun		Hard
Hands-on		Struggle
Interesting		Tricky
Rewarding		
Teachable		

For the final round of analyses, pre-service teachers' single-word pairs (beginning and end of semester words) were categorized into four groups: Same Word, Positive/Neutral-to-Positive/Neutral, Negative-to-Positive/Neutral, and Positive/Neutral to Negative. These analyses allowed the researchers to observe changes or no changes to participants' perceptions of mathematics based on the type of words students were using to describe mathematics. These categories were determined based on whether or not the pre-service teachers used positive or negative words to describe mathematics and whether or not their beginning and end of semester words changed. The Same Word category indicated that the pre-service teacher used the exact same word to describe math at the beginning and end of the semester. The other three categories indicated that the pre-service teacher used a different word when revisiting the sentence 'Math is' If it was unclear whether or not a word was positive or negative, the researchers reviewed participants' written responses about their word choice selections for clarification.

After the single-word response pairs were categorized, we conducted additional analyses on participants' written responses about the reasons for their word choices to identify key themes that arose across and within the four groups. From these thematic analyses, the researchers identified three key factors, or what were deemed Sparks of Change, identified by pre-service teachers in their written responses that resulted in changes in their perceptions about mathematics including: Field Experience, Self-Perception, and Self-Efficacy or Confidence.

Results and Findings

Overall, 124 pre-service teachers participated in this study with one participant only completing the original single-word response and another participant only completing the final single-word response and description. These two pieces of data were omitted from the analyses since they were incomplete. Thus, we analyzed 122 pairs of single-word responses and pre-service teachers' descriptions of their word choices. For this study, the researchers wanted to gain insight into not only what perceptions pre-service teachers held about mathematics at the beginning and end of the semester of a mathematics methods course but also how these perceptions changed and what factors influenced pre-service teachers' changing or unchanged perceptions.

'Math Is...' Words Analysis

To make sense of pre-service teachers' perceptions at the beginning and end of the semester of a math methods course, the researchers focused their analyses on students' use of positive or neutral and negative words to describe mathematics as well as how pre-service teachers' word choices shifted at the end of the semester. Table 1 shows how

many positive and negative words pre-service teachers chose at the beginning of the semester as compared to the end. These results indicate that while the majority of pre-service teachers in our elementary mathematics methods courses initially held negative perspectives towards mathematics at the start of the semester (53% of 122 words), these perspectives overwhelmingly shifted over the course of the semester with a majority of students using positive words (94% of 122 words).

Table 1

Type of Word in Pre- and Post-Context

Word Type	Beginning of Semester	End of Semester
Positive	52	114
Neutral	5	1
Negative	65	7

Additionally, the researchers analyzed how the pre-service teachers' words changed at the end of the semester. Table 2 shows how many different instances of each of the four types of single-word response pairs occurred in the sample of 122 pairs.

Table 2

Categories of Single-Word Response Pairs

Category	Number of Pre-Service Teachers
Same	32
Positive	25
Neutral	1
Negative	6
Positive/Neutral-to-Positive/Neutral	27
Positive-to-Positive	23
Neutral-to-Positive	4
Negative-to-Positive	61
Positive-to-Negative	2

Both Table 1 and 2 demonstrate that a majority of pre-service teachers that chose a positive word when describing mathematics maintained a positive perspective towards mathematics at the end of the semester with only one participant switching from a positive to a negative word choice. This participant originally chose *Engaging* to describe mathematics but switched to *Challenging*. In her brief reflection on why she chose her new word, she stated: "...because children are on so many different levels, and I would worry about that. I'm not as comfortable teaching math as I thought."

Alternatively, most of the participants that started with a negative word choice switched to a positive word. Of the 65 original negative words, only six pre-service teachers maintained a negative word using the same word they originally used. These words were: *Hard*, *Challenge*, *Challenging* (3 instances), and *Tricky*.

Sparks of Change

Based on participants' written responses about why their word choices changed or stayed the same, the researchers identified three Sparks of Change, or factors, influencing participants' perceptions of mathematics. These factors included: 1) Field Experience, 2) Self-Perception, and 3) Self-Efficacy or Confidence. The researchers also found that while some participants' words did not change, their reasons or justifications for their word choices indicated a change in their motivation or reasons for their word selections related to the Sparks of Change.

Field Experience

Many participants identified Field Experience as a key factor influencing their choice of words. In the context of their classroom experiences in their field placements, participants identified that their observations, teaching of mathematics to actual students, and relationships with and guidance from their mentor teachers often shifted their perceptions about mathematics. One participant stated, "I changed my word to multi-faceted because I realized my students all approached math problems differently. There are multiple paths to arrive at the same correct answer." This participant's experience observing student learning in her field placement showed her that students do solve mathematics problems in many different ways, an important idea emphasized throughout the math methods course.

Another participant reflected about her experiences in her field placement classroom based on the content that was covered: "There was heavy focus on reading. I didn't get to see kids learning [math]." This participant originally chose the word *Exciting*, but she changed her word to *Underappreciated*. Her field experience influenced her word choice as she observed a lower emphasis on mathematics teaching and learning in her field placement classroom in favor of reading instruction. In contrast, another participant wrote, "My mentor teacher showed me many ways to make math more hands-on and interactive." This participant originally chose the word *Boring*, but she changed her word to *Interactive*. She identified her mentor teacher in her field placement as a major influence on her shifted perception as communicated through her word choices.

Self-Perception

Another Spark of Change that emerged from the data was Self-Perception. The researchers found that participants often identified a shift from viewing themselves as a student of mathematics at the beginning of the semester to viewing themselves as a teacher of mathematics at the end of the semester. Often, participants' original words related to their own personal experiences learning mathematics, and their final words related to viewing mathematics from an educator's point of view. One participant originally chose the word *Fun* but changed her word to *Flexible* at the end of the semester. She reflected, "I still think math is fun, but I learned that there is not just one way to solve a problem. I was not taught this way and will definitely show my students many different ways." This participant's words highlight the Spark of Change of Self-Perception highlighted throughout the data set.

The researchers identified a shift from participants viewing mathematics from their own personal experiences as students to viewing mathematics from the perspective of the teacher. This shift in perspective is evident as participants were taking ownership of their future profession in their responses by using language such as "my students" or "our students." Another participant who originally selected *Difficult* but shifted to *Engaging* stated, "Throughout my experience, I noticed that math is not difficult. Students are interested in learning, and our job is to provide engaging lessons to help our students." This participant contrasted her original views about mathematics to her changing viewpoints from the semester when considering her role as an educator.

A number of participants highlighted a contrast between their views of mathematics as a learner and their views of mathematics as a teacher. One participant stated, “Math is still a subject I like, but it is not my favorite to teach ... I had a lot more fun teaching science and history.” This participant’s response indicates that she had different viewpoints when comparing her experiences as a learner of mathematics to that as an educator of mathematics and other subjects. Another participant noted, “To teach [math], I need to remember exactly what students need to know based on [Texas Essential Knowledge and Skills (TEKS) standards] and not everything I know.” In other words, this participant acknowledged that her views on mathematics broadened from being based on her own understandings of mathematics to now considering the mathematics her students were required to learn as determined by standards documents.

Self-Efficacy or Confidence

A final Spark of Change the researchers observed in participants’ written responses was related to students’ self-efficacy or confidence in mathematics. One participant wrote, “... I’ve gained more knowledge and confidence in the subject.” Math is not *Complicated* to me anymore but rather *Interesting* as I keep learning more.” This participant identified an increase in her confidence in mathematics which impacted her perceptions of mathematics as communicated through her choice of words. Another participant identified an increase in confidence specific to the teaching of mathematics. This student originally identified mathematics as *Difficult* but changed her word to *Okay*. She wrote about her experience: “I learned how to teach math using differentiated instruction. My mentor would explain lessons and how to teach them. This built my confidence in teaching mathematics.”

The Sparks of Change identified in the data were not always attributed to Negative-to-Positive or Neutral-to-Positive shifts and these Sparks of Change were not mutually exclusive. A participant could identify a field experience that also impacted their confidence in mathematics. Additionally, the Sparks of Change did not always result in a change in word. For example, a participant those chose the word *Fun* both at the beginning and end of the semester stated:

My word did not change because I’ve always looked at math as a game. You are solving for an answer, and I find it fun. Another reason that it is fun is because there are so many different ways to teach how to solve a problem.

While this participant’s word did not change, the Spark of Change of Self-Perception is highly evident. She originally discusses mathematics from her perspective as a student of mathematics. Then, she shifts to talking about her perspective as a teacher of mathematics. She identifies both of these perspectives as involving fun, but for different reasons.

Another participant who used the word *Challenging* both at the beginning and end of the semester remarked: I kept my word the same because math is puzzling and challenging. It’s also challenging to teach because you have to meet each child’s needs and fix broken pieces from previous years. You have to make sure no one gets left behind, and it gets hard at times.

From this participant’s response, we can again see that while the word remained the same, the reason or motivation for the word has shifted. This participant continues to view mathematics as challenging, but she has shifted her view from that of a student of mathematics to that of a teacher of mathematics.

These written responses show that while it may seem that participants maintained a negative outlook towards mathematics, the participants that used the same negative words to describe mathematics had thoughtful reasons for their choices. One participant acknowledged that she gained more mathematical knowledge in the course, but still found mathematics to be difficult. Multiple participants expressed needing additional experience in teaching mathematics to become more comfortable with mathematics. These participants’ responses focused on their comfort teaching mathematics as heavily influential on their feelings about mathematics itself.

In summary of the study results and findings, most pre-service teachers began the semester with a neutral or negative word identified for completing the sentence ‘Math Is...’. At the end of the semester, a majority of the students had shifted their word to a positive term. Additional analyses showed that participants’ written responses about why their word choices changed or stayed the same, highlighted three Sparks of Change: 1) Field Experience, 2) Self-Perception,

and 3) Self-Efficacy or Confidence. Also, even when participants' words did not change, often their reasons or justifications for their word choices indicated a change in their motivation or reasons for their word selections.

Discussion

The findings from this study suggest that field experiences have the potential to shift pre-service teachers' perceptions and beliefs about mathematics teaching and learning. Based on participants' responses, the researchers found that the three Sparks of Change often resulted from and were tied to the pre-service teachers' time and experiences in their field placement during the semester prior to student teaching. Mentor teachers and stakeholders supporting pre-service teachers in their field placements have opportunities to reinforce negative viewpoints or help with positive shifts in pre-service teachers' perceptions about mathematics teaching and learning. Ronfeldt (2015) suggested that school settings substantially influence teachers' beliefs, perceptions, and efficacy. Understanding the role that field experiences play in the development of elementary pre-service teachers, especially with respect to mathematics instruction, is very important for teacher preparation programs to consider. Are pre-service teachers' field placements reinforcing negative perceptions or do classrooms, curriculum, and stakeholders in these placements support and align with the recommended pedagogies and practices that are often taught in mathematics methods courses? One thing this study demonstrates is that change can occur over the course of the semester.

Additionally, the findings from this study highlight that pre-service teachers' perceptions about mathematics teaching and learning are often more complex than just a positive or negative viewpoint. Instead, the participants in this study indicated that their perceptions about mathematics and mathematics teaching were multifaceted and influenced by previous learning experiences (Hiebert, 2003), teaching experiences, beliefs, feelings, people, observations, and other factors. In other words, there was not a single catalyst, lever, or experience for shifting participants' perspectives about mathematics and mathematics teaching to positive perspectives that emerged from the data. The data also showed that some pre-service teachers were flexible enough in their thinking to let go of long-held beliefs as they shifted from student to teacher perspectives.

This work adds to the growing body of research that examines pre-service teachers' multiple representations of perceptions of mathematics teaching and learning rather than depending on traditional methodologies such as survey instruments. These findings support the work of Utley et al. (2020) as well as Jao (2016) that suggested mathematics methods courses provide different opportunities for pre-service teachers to represent their thinking about mathematics teaching and learning using multiple modalities. Providing opportunities for pre-service teachers to express their beliefs in various modalities can move pre-service teachers forward in their development as novice mathematics educators.

Implications

This study revealed that pre-service teachers' perceptions of mathematic teaching and learning often changed, as evidenced by a shift in word choice for completing the phrase 'Math Is...' and that factors influencing these changes in a positive way often related to their experiences in their field placements. The results of this study have implications on practice in three areas: 1) elementary mathematics methods coursework in teacher preparation programs, 2) corresponding field-based partnerships, and 3) future study of pre-service teachers' perceptions and beliefs about mathematics teaching and learning.

Elementary mathematics methods coursework and field-based experiences tied to these courses have the potential to positively influence elementary pre-service teachers' perceptions and beliefs about mathematics teaching and learning. First, consideration should be placed on the content and learning opportunities pre-service teachers have in mathematics content methods courses allowing for alternative methodologies to explore beliefs and perceptions including word analogies, drawing pictures, digital renderings, and other representations. Secondly, in light of the findings of this study, additional time and energy should be put towards establishing, growing, and maintaining productive school partnerships. Mentor teachers and other field-based stakeholders are pivotal contributors to pre-service teachers'

preparation, and therefore have considerable influence over pre-service teachers' perspectives and beliefs about mathematics teaching and learning. Additionally, further research examining what specific aspects of field experience are catalysts for change of perceptions of mathematics teaching and learning is needed.

Lastly, studies of elementary pre-service teachers and their experiences in teacher preparation programs should continue to evaluate what factors influence pre-service teachers' experiences and consider what factors have the potential to impact their perceptions and beliefs about mathematics teaching and learning. This study illustrates a first step in this process by identifying field-based experiences as particularly influential on pre-service teachers' changing perspectives.

References

- Aud, S., Hussar, W., Johnson, F., Kena, G., Roth, E., Manning, E., Wang, X., and Zhang, J. (2012). The Condition of Education 2012 (NCES 2012-045). U.S. Department of Education, National Center for Education Statistics. Washington, DC. Retrieved October 20, 2020, from <http://nces.ed.gov/pubsearch>
- Bates, A. B., Latham, N., & Kim, J. A. (2011). Linking preservice teachers' mathematics self-efficacy and mathematics teaching efficacy to their mathematical performance. *School Science and Mathematics, 111*(7), 325-333. <https://doi.org/10.1111/j.1949-8594.2011.00095.x>
- Beswick, K. (2006). Changes in preservice teachers' attitudes and beliefs: The net impact of two mathematics education units and intervening experiences. *School Science and Mathematics, 106*(1), 36-47. <https://doi.org/10.1111/j.1949-8594.2006.tb18069.x>
- Burton, M. (2012, January). What is Math? Exploring the perception of elementary pre-service teachers. *Issues in the Undergraduate Mathematics Preparation of School Teachers, 5*, 1-17. Retrieved from <https://eric.ed.gov/?id=EJ970350>
- Briley, J. S., (2012, August). The relationships among mathematics teaching efficacy, mathematics self-efficacy, and mathematical beliefs for elementary pre-service teachers. *Issues in the Undergraduate Mathematics Preparation of School Teachers, 5*, 1-13.
- Burton, M. (2009). Exploring the changing perception of mathematics among elementary teacher candidates through drawings. In Swars, S. L., Stinson, D. W., & Lemons-Smith, S. (Eds.). *Proceedings of the 31st Annual Meeting of PMENA*. (pp. 363-370). Atlanta, GA: Georgia State University.
- Corbin, J. & Strauss, A. (2008). *Basics of qualitative research, 3e*. Thousand Oaks CA: SAGE.
- Featherstone, H., Crespo, S., Jilk, L. M., Oslund, J. A., Parks, A. N., & Wood, M. B. (2011). *Smarter together!: Collaboration and equity in elementary math classroom*. Reston, VA: National Council of Teachers of Mathematics.
- Gill, M. G., Aston, P. T., & Algina, J. (2004). Changing preservice teachers' epistemological beliefs about teaching and learning in mathematics: An intervention study. *Contemporary Educational Psychology, 29*(2), 164-485. <https://doi.org/10.1016/j.cedpsych.2004.01.003>
- Gresham, G. (2009). An examination of mathematics teacher efficacy and mathematics anxiety in elementary pre-service teachers. *Journal of Classroom Interaction, 44*(2), 22-38. Retrieved Oct. 10, 2020, from <http://www.jstor.org/stable/23869610>
- Guillaume, A. M. & Kirtman, L. (2010). Mathematics stories: Preservice teachers' images and experiences as learners of mathematics. *Issues in Teacher Education, 19*(1), 121-143. Retrieved from <https://eric.ed.gov/?id=EJ887300>
- Hiebert, J. (2003). *The constantly underestimated challenges of improving mathematics instruction*. In K. R. Leatham (Ed.), *Vital directions for mathematics education research* (pp. 45-56). Springer: New York.
- Jao, L. (2016). Shifting pre-service teachers' beliefs about mathematics teaching: The contextual situation of a mathematics methods course. *International Journal of Science and Mathematics Education, 15*, 895-914. <https://doi.org/10.1007/s10763-016-9719-9>
- Jeffery, T. D., Hobson, L. D., Conoyer, S. J., Miller, K. E., & Leach, L. F. (2018, August). Examining EC-6 pre-service teachers' perceptions of self-efficacy in teaching mathematics. *Issues in the Undergraduate Mathematics Preparation of School Teachers, 5*, 1-13. Retrieved from https://scholarworks.sfasu.edu/elementaryed_facultypubs/37/
- Lutovac, S. (2020). How failure shapes teacher identities: Pre-service elementary school and mathematics teachers' narrated possible selves. *Teaching and Teacher Education, 94*, 1-11. <https://doi.org/10.1016/j.tate.2020.103120>

- Liljedahl, P., Rösken, B., & Rolka, K. (2006). Documenting changes in pre-service elementary school teachers' beliefs: Attending to different aspects. In Alatorre, S. Cortina, J. L. Sáiz, M. & Méndez, A. (Eds.), *Proceedings of the 28th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Mérida, México: Universidad Pedagógica Nacional.
- Miles, M., Huberman A., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook*. Thousand Oaks, CA: SAGE.
- Parks, A. N. (2020). Creating Joy in PK–Grade 2 Mathematics Classrooms. *Mathematics Teacher: Learning and Teaching PK-12*, 113(1), 61-64. <https://doi.org/10.5951/MTLT.2019.0250>
- Philipp, R. (2007). Mathematics teachers' beliefs and affect. In Frank K. Lester (Ed.), *Second handbook of research on mathematics teaching and learning* (pp. 257–315). Reston, VA: NCTM.
- Ronfeldt, M. (2015). Field placement schools and instructional effectiveness. *Journal of Teacher Education*, 66(4), 304-320. <https://doi.org/10.1177/0022487115592463>
- Seeley, C. L. (2014). *Smarter than we think*. Sausalito, CA: Math Solutions.
- Shockey, T. & Pindiprolu, S. (2015). Uniquely Precise: Importance of conceptual knowledge and mathematical language. *Journal of School Educational Technology*, 11(1), 28-33. Retrieved from <https://eric.ed.gov/?id=EJ1097424>
- Swars, S., Hart, L. C., Smith, S. C. Smith, M. E., & Tolar, T. (2007). A longitudinal study of elementary pre-service teacher' mathematics beliefs and content knowledge. *School Science and Mathematics*, 107(8), 325-335. <https://doi.org/10.1111/j.1949-8594.2007.tb17797.x>
- Swars, S. L. (2006). Examining perceptions of mathematics teaching effectiveness among elementary preservice teachers with differing levels of mathematics teacher efficacy. *Journal of Instructional Psychology*, 32(2), 139-147. Retrieved from <https://www.proquest.com/docview/213902062?pq-origsite=gscholar&fromopenview=true>
- Utley, J., Reeder, S. & Redmond-Sanogo, A. (2020). Envisioning my mathematics classroom: Validating the Draw-a-Mathematics-Teacher-Test rubric. *School Science and Mathematics*, 120(6), 345-355. <https://doi.org/10.1111/ssm.12426>

USING INSTRUCTIONAL DESIGN TO TRANSFORM THE LESSON PLANNING PROCESS FOR TEACHER CANDIDATE PREPARATION

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Abstract

Researchers designed and used a lesson plan outlining tool with teacher candidates in an elementary language arts methods course to help them better construct a learning segment of three consecutive days of lesson plans. The tool and assignment were designed as a preparation for working with an edTPA© portfolio. This qualitative study used surveys and follow-up interviews throughout the outlining process to understand participants' focus and progress during lesson planning using the supports provided in the outlining tool. Results showed a connection to instructional design theory criteria through the themes identified related to understanding the goals and organization of lesson planning, which provides insight into the preparation of teacher candidates.

Keywords: preservice teachers, language arts methods, edTPA, qualitative research

As state mandates for teacher licensure change, faculty members in educator preparation programs (EPPs) are faced with the need to revisit their program curricula and processes to meet updated standards and better prepare teacher candidates. One particular change related to state licensure for educators has been the implementation of edTPA©. This task-oriented portfolio assessment expects teacher candidates to plan, teach, and assess with a focus on self-reflection, which is a vastly different approach to initial teacher certification assessment than the traditional standardized exams.

For the past five years, the researchers have been involved in creating and updating assignments embedded into coursework that are designed to prepare teacher candidates for creating edTPA© portfolios during the student teaching internship. This study highlights one assignment within a language arts course at a small liberal arts college that focuses on the lesson planning process for elementary education and early childhood education majors. Although the assignment has been used in the course for several years, it was updated to include an outlining tool designed to provide support for teacher candidates in the lesson planning process.

For this assignment, teacher candidates in the course are asked to create a learning segment consisting of three consecutive days of lesson plans. The learning segment must focus on either comprehending or composing text, and the end result of the assignment is three consecutive lesson plans. Prior to writing the lesson plans, the instructor guides the class through an outlining process using a tool created to support the participants. The outlining process is discussed in class, and teacher candidates are encouraged to collaborate with one another and share their ideas while completing the outlines on the tool. The outlining process lasts three weeks and is discussed in four of six class sessions during a three-week period. After completing the outlining process, teacher candidates use the information they listed on the outline

(and feedback provided by the instructor) to create a learning segment consisting of three consecutive literacy lessons for an elementary classroom. Early childhood majors must choose a grade level in K-3, while elementary education majors can choose a grade level from K-6. Participants are given one week to write their lesson plans using a provided template.

Description of Lesson Planning Outline Tool

The tool was created in an attempt to support teacher candidates in their construction of consecutive lesson plans. The outline process uses the created tool and is conducted over four class periods; teacher candidates are guided through a discussion of each part of the outline tool. Time is also provided for teacher candidates to discuss their ideas with classmates as well as the instructor. At the end of each section of the tool, the instructor provides feedback on progress.

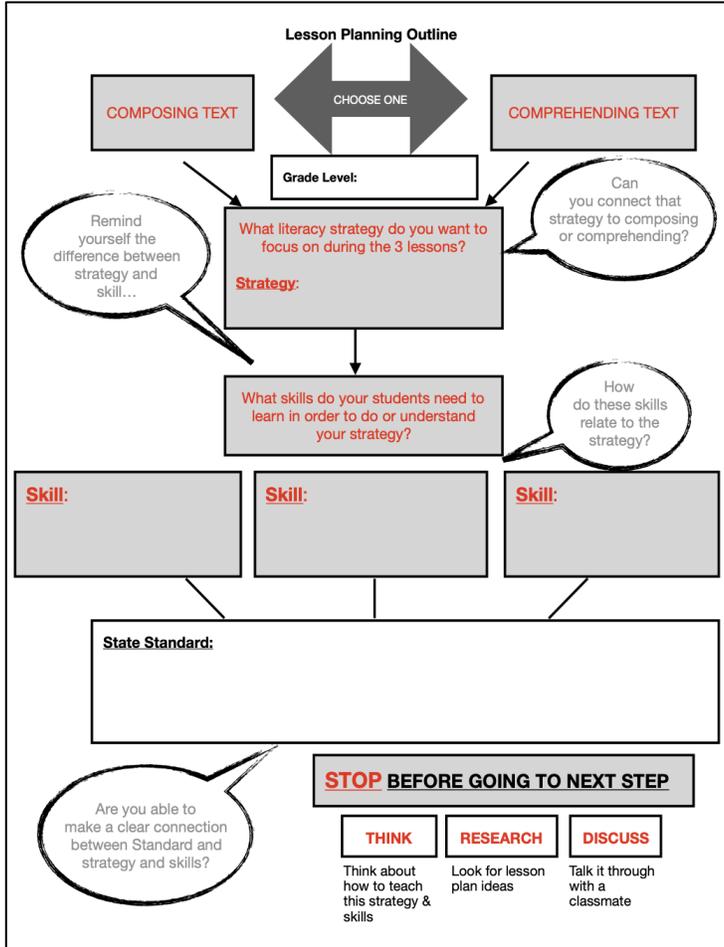
The documents created for the outline process tool are divided into four parts:

1. Deciding on comprehending or composing text, listing strategy and supporting skills, connecting to state standards.
2. Summarizing the lesson for each day and connected assessments (assessments can be formal or informal).
3. Writing learning objectives (using the ABCD method of audience, behavior, condition, and degree).
4. Embedding vocabulary instruction and activating prior knowledge.

Each part of the outline tool is constructed in the format of a graphic organizer to help teacher candidates visually see their ideas in an organized manner and understand connections between specific parts of the lesson. Additionally, tips and hints are provided on the graphic organizers to support teacher candidates as they develop their ideas for the learning segment. A visualization is presented in Figure 1.

Figure 1

Image of Part One of Outlining Documents (Note: Lesson planning graphic to assist student organization)



Theoretical Framework

The goal of the project was to help teacher candidates to better understand the process for outlining, writing, and developing lesson plans for a learning segment within edTPA[®]. As we refined the outlining documents used with teacher candidates, we wanted to capture their view of how the tool was helping them with the lesson planning process. Instructional design theory was identified as a framework for exploring teacher candidate performance through edTPA[®], including the development of quality lesson plans for a specific learning segment that engage learners, and to identify curricular changes necessary to adhere to edTPA[®] performance portfolio requirements while incorporating quality instruction.

Instructional design models are regularly used to develop specific aspects of instruction or teaching (Seel, 1997). Instructional design theory centers around the development and delivery of quality instruction. These models tend to pay attention to the unique conditions of various instructional settings as well as alternative orientation to the instructional process itself (Richey and Klein, 2011). Reigeluth (1999) used the term *instructional-design theory* to describe this approach that "offers explicit guidance on how to help people learn and develop. The kinds of learning and development may include cognitive, emotional, social, physical and spiritual" (p. 5). His view of instructional design, which incorporates the systematic development of quality instruction based on instructional theory and how to best engage student learners, serves as the basis for this study. Reigeluth (1999) suggested the instruction include the follow four criteria:

1. Clear information
 - Descriptions and examples of the goals, knowledge needed, and the performances expected.
2. Thoughtful practice
 - Opportunity for learners to engage actively and reflectively whatever is to be learned-adding numbers, solving word problems, writing essays.
3. Informative feedback
 - Clear, thorough counsel to learners about their performance, helping them to proceed more effectively.
4. Strong intrinsic or extrinsic motivation
 - Activities that are amply rewarded, either because they are very interesting and engaging in themselves or because they feed into other achievements that concern the learner (Perkins, 1992, p. 45).

These criteria can be applied to this study on two layers: the redesign of coursework by faculty of EPPs and the creation of lesson planning by the teacher candidates. A major pedagogical goal of EPPs is for teacher candidates to be able to provide targeted quality instruction that addresses the individual needs of their students. For teacher candidates to be successful at providing such learning opportunities, they need to know how to plan quality lessons. Additionally, many state boards of education are moving to a more rigorous performance-based assessment for teacher certification that requires teacher candidates to plan quality lessons, teach those lessons, analyze student data to make additional targeted instructional decisions, and reflect on the entire process. This requires faculty members in EPPs to evaluate their programs and assignments to find where curricular changes are needed to adequately prepare teacher candidates not only for performance-based certification assessments, but for their future professions.

Quality Lesson Planning: Lesson Plans

The term *instructional design* refers to the systematic and reflective process of translating principles of learning and instruction into plans for instructional materials, activities, information resources, and evaluation (Smith and Ragan, 1999). This approach shifts the learning environment or classroom from teacher-centered to student-centered with the primary focus of engaging students while assessing learners' knowledge and mastery of the objectives. In doing so, teacher candidates need to have specific materials and activities to engage learners while utilizing assessments to guide students' understanding of the objectives taught. To properly implement instructional design, teacher candidates must create a positive low-risk learning environment for students while offering engaging, quality lesson plans.

Teacher Candidate Performance

We posit that a clear connection exists between instructional design theory and teacher candidate performance. In this case, the teacher candidate performance is evaluated through an edTPA© portfolio. Stanford University faculty and staff at the Stanford Center for Assessment, Learning, and Equity (SCALE) developed edTPA© with input from teachers who had experience with portfolio-based assessments from the National Board for Professional Teaching Standards (NBPTS), the Interstate Teacher Assessment and Support Consortium (InTASC) Standards portfolio, and the Performance Assessment for California Teachers (PACT). More and more universities are transitioning from a traditional computer-based exam, Pedagogy and Professional Responsibilities (PPR) or Praxis, to edTPA©, a subject-specific portfolio. Currently there are 926 EPPs in 41 states and the District of Columbia participating in edTPA©. (edTPA© Participation Map, 2020. <http://edtpa.aacte.org/state-policy>)

edTPA© is a subject-specific performance assessment portfolio covering 27 teaching fields. The portfolio is structured with specific tasks. All portfolios have three tasks and include both artifacts and commentary. Task 1: *Planning or Intended Teaching*, outlines the learning segment the student candidate will teach and the evidence is assessed using rubrics 1-5. Task 2, which is *Instruction or Enacted Teaching*, provides video evidence to support student learning and the evidence is assessed using rubrics 6-10. Task 3: *Assessment or Impact of Teaching*, demonstrates student understanding of the learning segment and is assessed using rubrics 11-15. All tasks include oral and written

language used for academic purposes, *academic language*. Once the portfolio is complete, the teacher candidate submits the portfolio to Pearson and a Pearson scorer reviews and evaluates the portfolio and gives the teacher candidate an overall score.

edTPA© Lesson Plans

Instructional design theory outlines planning and teaching which directly align with the edTPA© portfolio. Specifically, the lesson plans should include the essential elements of edTPA©: (a) planning, (b) instruction, and (c) assessment each aligning with instructional design. The lesson plans should include:

- *Planning*: the teacher candidates demonstrate teacher readiness by creating, developing, and instructing students utilizing detailed lesson plans to support students' areas of strengths and needs.
- *Instruction*: the teacher candidate delivers and instructs students based on lesson plans that engage students in meaningful ways and build on each other during the learning segment.
- *Assessment*: the teacher candidate analyzes student learning and then makes adjustments or accommodations to their instruction as needed.

When teacher candidates begin preparing to write the commentary for Task 1, it is imperative to stress the importance of detailed lesson plans. Specific criteria are required for edTPA© lesson plans and include learning objectives, state standards, instructional strategies and learning tasks, formal and informal assessments, support of diverse learners, and resources. The lesson plans are created for a learning segment of 3-5 days, can be up to four maximum pages per plan, and include up to five pages per lesson plan for instructional materials (i.e., handouts, slides, assignments). The intended teaching focus is either comprehending or composing text.

The edTPA© portfolio rubrics, for all tasks, align with instructional design theory. One example from each task is outlined. The teacher candidates create detailed lesson plans tied to learning objectives to check for student mastery (Task 1, Rubric 1) The teacher candidate creates a classroom environment that is mutually respectful and provides a low-risk learning environment for students (Task 2, Rubric 6). Candidates then evaluate and analyze students' responses to learning objectives (Tasks 3, Rubric 11). Students were given lesson plan checklist for teacher candidates (see Appendix B).

Prior to clinical experience, teacher candidates in this study have experienced classroom observations that includes interaction with students but no direct teaching. Also, lesson planning up to this point in their program has not been planning for lessons that they will directly teach in an elementary classroom. Since the teacher candidates have not had previous experience teaching their own planned lessons, the lesson planning they have done up to this point has typically been focused on creating one isolated lesson; they have not had practice designing a series of consecutive lessons that build on one another in progression.

Curricular Change

Using Ragleigh's (as cited in Perkins, 1992) four criteria for instructional design as a guide, faculty can reflect on the specific courses taught within an EPP to determine where and what kind of changes can be made to better prepare teacher candidates for edTPA© and their future careers. Faculty being *clear about information* includes the use of explicit instruction and modeling so that teacher candidates have a clear and full understanding of what they are expected to do in their future classrooms. Allowing time for *thoughtful practice* about teacher candidates' learning and experiences gives teacher candidates opportunities to reflect on the process of writing lesson plans and to fully understand the lesson plan cycle process. *Informative feedback* serves as a tool to look more closely at candidate performance and efforts can be made to build in opportunities where faculty members provide specific feedback on teacher candidates' strengths and areas of growth. *Strong intrinsic or extrinsic motivation* is used as a model to engage teacher candidates in meaningful, active learning. Specifically, faculty members can look at designing meaningful teaching opportunities for teacher

candidates to practice real classroom application. This involves having learning opportunities that directly relate to what they will do as teachers in a real-world classroom setting, which can be motivating because the teacher candidate can see the connections between what they are learning in the moment and what they will be expected to do as classroom teachers. Participation in EPP course activities and assignments that have meaningful and purposeful connections to teaching in the classroom has a more of an impact on teacher candidate motivation than what they often consider 'busy work.' Through surveys conducted during the lesson planning process, the researchers sought to know how the outlining tool supported teacher candidates and identify the connection to the four criteria for instructional design.

Methodology

Setting and Participants

This study was conducted at a small liberal arts college in the southern region of the United States. The participants in this study were enrolled in a language arts methods course for teacher candidates who are classified as juniors or seniors. The 13 students enrolled in the class have been accepted into the Education Program and are one or two semesters from doing their student teaching internship. All participants identified as female, and two were early childhood majors with the remaining majoring in elementary education. The majority (62%) identify as white, while 18% of participants identify as Latina, 18% identify as African American, and 8% as Asian.

The lesson planning assignment asks teacher candidates to create a learning segment consisting of three consecutive lessons on either composing or comprehending text. The teacher candidates can choose which grade level they would like to focus on, but early childhood majors are asked to choose between grades K-3. Elementary education majors can choose from grades K-6. The assignment has been used previously in this course to prepare teacher candidates for the lesson planning process they are expected to do in Task 1 of their edTPA© portfolio, but the addition of the outlining process was added when data were collected for this study.

Procedure

Participants were given survey questions (see Appendix A) at milestones in the process of outlining and writing lesson plans for the learning segment. The milestone points included: before attempting the outlining process (informed of assignment expectations), after the outlining process concluded, and after participants had completed writing lesson plans and received feedback on the assignment. Additionally, each participant was interviewed after all survey questions had been completed to allow the participant to expand on answers and/or clarify answers. The interviews consisted only of the questions posed on the surveys.

The evaluation coding process (Pitman & Maxwell, 1992) was used to take the open-ended responses and categorize the perceptions. The results were read multiple times and initially placed into eight categories. Each category was given a code that was descriptive of all items listed in the category. Codes were then combined into groups with similar results to produce broad themes.

Results

All open-ended responses to the surveys were grouped and coded to find themes. Three themes with the most responses connected to the chronological time frame of before the outlining process, during, and after the process was finished. Themes and connecting responses are presented in Table 1.

Prior to starting the outlining process, the participants were asked if they had previously used any outlining format when creating lesson plans. Only one participant had used an outline, and she explained it was for a single mathematics lesson. The outlining she used consisted of listing ideas in short phrases in a bullet format. The responses related to *clear information* that was provided related to the lesson planning process at this stage.

Additionally, participants listed their concerns about the lesson plan assignment before they began outlining. Participants could list any concern and were not limited to certain options. The largest percentage of participants (85%) listed “breaking the idea for teaching the skill into parts for each day.” The next concern with the highest percentage (69%) reported they were overwhelmed by creating three days of lesson plans opposed to just one lesson plan. The other two concerns held by more than half of the participants (62%) were building on the prior day’s lesson and activating students’ prior knowledge. The edTPA© portfolio will expect teacher candidates to construct a learning segment covering 3-5 days, and they will have to explicitly explain the building process of those days in Task 1 Commentary in 1C (edTPA© Elementary Education: Literacy with Mathematics Task 4 Assessment Handbook, 2018).

Table 1
Survey Responses and Connected Themes

Place in Process	Overall Theme of Responses	Theme Connected to Instructional Design	Specific Responses Connected to Theme
Before Process	Trying to Understand Big Picture versus Each Day	Clear Information Informative Feedback	“Connecting the lessons together” “Building on the prior day” “Breaking the idea for teaching the skill into parts for each day” “Overwhelmed by where to start” “Overwhelmed with doing 3 days”
During Process	Concerned with Making Connections Between Lessons	Thoughtful Process Informative Feedback	“Connecting days together” “Trying to find appropriate vocabulary”
After Process	Organization Provided Helped to See Connections Between Parts (or sections) of Lessons	Thoughtful Process Rewards	“I could see an overview and details of how to teach” “I liked starting with a general idea then getting more specific” “Made me differentiate specifically for ESL, IEP, 504” “Made me be more specific or detailed - I had not been that specific before” “Made me think about how to give support to students during my lessons” “Incorporating vocabulary teaching into lesson” “Helped me get ideas down so I could expand later” “Develop good questions because I don’t normally list questions in lesson plans” “Helped to make sure standards and objectives were connected” “Activating prior knowledge” Seeing how the lesson connected to each other” “I focused more on how I would teach instead of just using activities” Made me include modeling”

Discussion

The concerns expressed by the participants are to be expected for teacher candidates at this stage in their program and teaching experience. Many courses early in an EPP require writing a single lesson plan, so it is understandable that the participants felt overwhelmed by the prospect of writing three lesson plans that build from one lesson to the next and expressed difficulty in seeing the big picture. The participants' concerns also speak to the necessity of faculty-provided scaffolding tools and activities to help them move from the development of skills in planning a single lesson to planning a multi-day learning segment, which connects to the need for *clear information* and *informative feedback* in the Instructional Design model. Additional aspects of concern can include teacher candidates who plan too much content or embed too many strategies for a single lesson. The central focus required in the edTPA© learning segment should include an essential literacy strategy and related skills (Elementary Education: Literacy with Mathematics Task 4 Assessment Handbook, 2018). Planning a multi-day learning segment can help teacher candidates see how to teach skills and concepts in smaller chunks in a developmentally appropriate way. By providing the outlining tool, the instructor was able to see the teacher candidate's thought process in planning and provide feedback for specific aspects of the lesson plan.

After the outlining process was completed, the participants were asked what their primary focus was during the process. They had not started writing their lesson plans when asked this question. Most participants (77%) reported their primary focus when outlining was connecting the days together, and 31% said trying to find the appropriate vocabulary was their primary focus. All participants listed more than one primary focus. Most of the participants reported that their primary focus during the outlining process was connecting the lessons across the multi-day learning segment. This focus aligns with the primary concerns they had prior to beginning the lesson planning process. Whatever experiences /observations teacher candidates have had up to this point in their program include watching teachers deliver instruction without fully understanding the planning process. After walking them through the planning process, they report in these results that the outlining tool helped them zero in on making connections throughout the learning segment and supporting vocabulary. Language demands that include vocabulary will be asked about in edTPA© commentary in Task 1 (4C) and Task 3 (3A) (edTPA© Elementary Education: Literacy with Mathematics Task 4 Assessment Handbook, 2018). Without a template of some kind leading teacher candidates through questions to consider when planning lesson plans, faculty cannot be certain teacher candidates will know what to focus on in such an exercise. This type of scaffolding tool helped them to see what was missing from their planning while they can get clear feedback at specific points from faculty.

After the lesson planning process was completed, the participants were asked about their opinions regarding the use of the outlining process to write their lesson plans and how they believed the outlining helped them write their lesson plans. Most participants answered that they did more revising of ideas when outlining (62%), and over half of the participants were more focused on differentiation (54%) and being more detailed (54%). Teacher candidates at this stage in their program do not necessarily understand the importance of including specific details in their lesson plans, but they will be required to consider such a level of detail in their edTPA© portfolio. They are reminded in the edTPA© Handbook to, "...be detailed enough that a substitute or other teacher could understand them well enough to use them" (edTPA© Elementary Education: Literacy with Mathematics Task 4 Assessment Handbook, 2018, p. 13).

Participants believed the outlining process helped them in several ways. The majority reported that the process helped them better connect standards and objectives (77%) and focus more on how to teach instead of just listing activities (77%). The results also showed that a majority of participants believed the outlining process helped them incorporate vocabulary (69%), get ideas down to expand on later (69%), organize to better connect the days (62%), activate prior knowledge (62%), develop better questions (54%), and include modeling (54%). The clear information and informative feedback in the beginning stages of planning lead to the more thoughtful process that could occur during planning.

Once feedback was given to participants regarding their completed lesson plans, they were asked what they believed to be their area of weakness when writing lesson plans. Most participants (77%) claimed their weakness as providing clear details in lessons about how to teach the lesson. Additional areas of weakness were planning for accommodations (69%), activating prior knowledge (62%), pacing/timing (62%), and planning assessments (54%). After lesson plans were graded and feedback was provided, the participants were asked to list their perceived areas of weakness. Clear feedback is part of instructional design theory and provides teacher candidates with the ability to better understand their areas of weakness going into future planning. Participants focused on 5 major areas: providing details, creating assessment, activating prior knowledge, planning for accommodations, and timing/pacing. When comparing the five listed areas to individual scores and feedback on lesson plans, a clear connection is made because the five areas listed by teacher candidates as their weakness were the lowest rated areas on lesson plans. This connection demonstrates that the teacher candidates read and considered the feedback to their lesson plans. Such consideration of what could be done better directly relates to questions asked in edTPA© commentary regarding what would be changed (Commentary Question 5A, Task 2, edTPA© Handbook for Elementary Education: Literacy with Mathematics Task 4, p. 25). The lesson plan template asked for a connection between strategies used in the lessons and an educational theory, but the outlines did not focus on theory.

Implications

The implementation of edTPA© was the catalyst for making changes to coursework, but it resulted in a scaffolding tool that helped teacher candidates become more reflective in their lesson planning process. In this study, the assignment was redesigned with the four criteria of instructional design in mind (Perkins, 1992). Teacher candidates participating in the revised assignment that included the outline were provided clearer information regarding building a lesson plan than they had been given previously. As they moved through each part of the outlining tool, they were asked to stop and reflect on the construction of their lessons, and feedback was given throughout the process instead of just at the end of the assignment. By showing how this process links to both a certification portfolio assessment as well as better preparation for the field, teacher candidates can understand the value of participating in the process of outlining as a motivating force. Participants reported having more depth and reflection in this lesson planning process than they had experienced previously. Future research could look at a lesson plan written without the lesson planning tool to compare the level of quality.

Additional research can explore direct connections between scaffolding tools and performance on edTPA© portfolios. This study can serve as a guide to faculty in EPPs who are considering ways to scaffold the process of writing multi-day lesson plans for their candidates as they prepare them for Task 1 of the edTPA© portfolio, and as faculty implement different tools with different populations, the research related to such endeavors could serve as a way to better understand how preparing candidates for a portfolio can additionally prepare them to do lesson planning in their beginning years in the profession.

Conclusion

For teacher candidates and new teachers to truly understand lesson planning, teacher education programs should provide examples of lesson plans early in the educator preparation program and continue to scaffold throughout the time in the program. Such scaffolding allows students to become familiar with the lesson plan writing process and to have critical assignments align with coursework within the EPP. Then the teacher candidate will have more exposure to the edTPA© rubrics and lesson plan expectations. In this redesign of an assignment, the teacher candidates are getting experience writing multi-day lesson plans with a scaffolding tool that will better prepare them for their teaching internship later, edTPA©, and for their teaching career. The more experience that students have writing lesson plans in coursework prior to clinical teaching will allow students to be better prepared for the expectations of edTPA© lesson plans as well as their first year of planning as a teacher.

References

- edTPA Participation Map (2020, April 20). <http://edtpa.aacte.org/state-policy>.
- Pitman, M.A., & Maxwell, J.A. (1992). Qualitative approaches to evaluation: Models and methods. In M.D. LeCompte, W.L. Millroy, & J. Preissle (Eds.), *The handbook of qualitative research in education* (pp. 729-770). San Diego: Academic Press. <https://doi.org/10.17763/haer.62.3.8323320856251826>
- Perkins, D. N. (1992). *Smart schools: From training memories to educating minds*. Free Press. <https://psycnet.apa.org/record/1992-98305-000>
- Reigeluth, C. M. (1999). What is instructional-design theory and how is it changing? In C. M. Reigeluth (Ed.), *Instructional-design theories and models: A new paradigm of instructional theory* (Vol. 2, pp. 5-29). Mahwah, NJ: Lawrence Erlbaum Associates.
- Richey, R. C., and Klein, J. D. (2011). *The instructional design knowledge base: Theory, research and practice*. New York: Taylor and Francis Group. <https://doi.org/10.4324/9780203840986>
- Seel, N. M. (1997). Model of instructional design: introduction and overview. In R. D. Tennyson, F. Schott, N. Seel, and S. Dijkstra (Eds.), *Solving instructional design problems, instructional design: International perspective Vol.1* (pp. 355-360). Mahwah, NJ: Lawrence Erlbaum.
- Smith, P. L. and Ragan, T. J. (2004). *Instructional design* (3rd ed.). Hoboken, NJ: John Wiley & Sons.
- Stanford Center for Assessment, Learning, and Equity (SCALE). (2018). *edTPA Elementary Education: Literacy with Mathematics Task 4 Assessment Handbook* (Vol., 7, pp. 1075). Board of Trustees of the Leland Stanford Junior University. <https://scale.stanford.edu/teaching/consortium>

Appendix A

Results from Surveys

<i>The following question was asked PRIOR to the outlining process. Teacher candidates had been informed of the details of their assignment.</i>	Yes	No
Have you used any kind of outlining format previously for lesson planning?	1	12

<i>The following question was asked PRIOR to the outlining process. Teacher candidates had been informed of the details of their assignment.</i> What are your concerns before creating learning segment (3 consecutive days of lesson plans)?	Number who listed:
Breaking the idea for teaching the skill into parts for each day	11/13 = 85%
Overwhelmed with doing 3 days	9/13 = 69%
Connecting the lessons together	8/13 = 62%
Building on the prior day	8/13 = 62%
Activating prior knowledge	6/13 = 46%
Overwhelmed by where to start	5/13 = 38%
Matching skills to standards	4/13 = 31%
How to write a lesson summary	1/13 = 8%
Timing	1/13 = 8%

<i>The following question was asked AFTER the outlining process was completed and BEFORE lesson plans were written.</i> What was your primary focus while doing the outlining process?	Number who listed:
Connecting days together	10/13 = 77%
Trying to find appropriate vocabulary	4/13 = 31%
Is lesson developmentally appropriate?	2/13 = 15%
Finding accommodations for specific groups (ESL, 504, IEP)	2/13 = 15%
Finding motivation to complete 3 days instead of just 1	2/13 = 15%
Getting organized	2/13 = 15%

<i>The following question was asked AFTER lesson plans were completed.</i> What are your impressions or thoughts about using the outlining process?	Number who listed:
I did a lot of revising of ideas and had not done that before when writing lesson plans	8/13 = 62%
Made me differentiate specifically for ESL, IEP, 504	7/13 = 54%
Made me be more specific or detailed – I had not been that specific before	7/13 = 54%
Did not realize how specific I needed to be	2/13 = 15%
I could see an overview and details of how to teach	2/13 = 15%
I liked starting with a general idea then getting more specific	2/13 = 15%
Made me find materials or resources or text to match my skill	2/13 = 15%
I had to make sure everything on outline was in the lesson plans	2/13 = 15%

<i>The following question was asked AFTER lesson plans were completed.</i> How did the outline process help you when you were writing your lesson plans?	Number who listed:
Helped to make sure standards and objectives were connected	10/13 = 77%
I focused more on how I would teach instead of just using activities	10/13 = 77%
Incorporating vocabulary teaching into lesson	9/13 = 69%
Helped me get ideas down so I could expand later	9/13 = 69%
Helped me organize the days so they connected	8/13 = 62%
Activating prior knowledge	8/13 = 62%
Develop good questions because I don't normally list questions in lesson plans	7/13 = 54%
Made me include modeling	7/13 = 54%
Seeing how the lessons connected to each other	5/13 = 38%
Made me think about how to give support to students during my lessons	5/13 = 38%
Liked the first, next, last format – helped me explain my lesson better	4/13 = 31%
Helped me with timing	4/13 = 31%
Gave a basic structure for the lesson	3/13 = 23%
Outlining gave me confidence when actually writing plans	2/13 = 15%

<i>The following question was asked AFTER lesson plans were graded and feedback was provided.</i> What are your areas of weakness in lesson planning?	Number who listed:
Providing clear details in lesson of how I will teach	10/13 = 77%
Planning for accommodations	9/13 = 69%
How to activate prior knowledge	8/13 = 62%
Timing or pacing	8/13 = 62%
Creating assessments	7/13 = 54%
Connecting each day/lesson	3/13 = 23%
Teaching about vocabulary in lesson	2/13 = 15%

Appendix B

Lesson Plan Checklists for Elementary Education and Early Childhood Majors Who are Working their edTPA© Portfolio

Lesson Plan Checklist for edTPA© - Elementary Education Literacy

When Meeting with Teacher About

Lesson Planning:

- ✓ Decide on days to teach
 - ✓ Decide focus of Lessons: Compose or comprehend text
 - ✓ State Standards
 - ✓ Which students could be focus students?
 - ✓ Vocabulary
 - ✓ Teaching strategies to include?
 - ✓ Needs of students
 - ✓ Assessments
 - Informal
 - Formal
 - ✓ How should assessments be scored?
 - ✓ Make a plan for collecting assessment samples
- Ask for any other suggestions, feedback, and advice

Lesson Plans MUST Contain:

- ✓ 3-5 Consecutive Days
 - ✓ 4 pages MAX per plan
 - ✓ Focus of Lessons:
 - Compose or comprehend text
 - ✓ State Standards
 - Number and text of standard
 - Include portion if only cover portion of standard
 - ✓ Learning objectives
 - Clear?
 - Can be measured?
 - Match standards?
 - ✓ Language Function
- ✓ Supports for language function
 - ✓ Vocabulary
 - ✓ Syntax or discourse
 - ✓ Summary that clearly outlines what happened in lesson
 - ✓ Is modeling included?
 - ✓ Are students applying literacy strategy?
 - ✓ Meeting diverse needs of students?
 - ✓ Assessments
 - Informal
 - Formal

Lesson Plan Checklist for edTPA® - Early Childhood

When Meeting with Teacher About

Lesson Planning:

- ✓ Decide on days to teach
 - ✓ Decide focus of Lessons: Language & literacy development in an interdisciplinary context
 - ✓ State Standards
 - ✓ Which 2 students could be focus students? (one with needs)
 - ✓ Active & multimodal
 - ✓ Vocabulary
 - ✓ Teaching strategies to include?
 - ✓ Needs of students in class
 - ✓ Assessments
 - Informal
 - Formal
 - ✓ How should assessments be scored?
 - ✓ Make a plan for collecting samples
- Ask for any other suggestions, feedback, and advice

Lesson Plans MUST Contain:

- ✓ 3-5 Consecutive Days
- ✓ 4 pages MAX per plan
- ✓ Focus of Lessons: Language and literacy development in an interdisciplinary context
- ✓ State Standards
 - Number and text of standard
 - Include portion if only cover portion of standard
- ✓ Learning objectives
 - Clear?
 - Can be measured?
 - Match standards?
- ✓ Shows active and multimodal nature of young children's learning
- ✓ Describes learning strategies and activities

- ✓ Key Vocabulary
- ✓ Supports for vocabulary
- ✓ Summary that clearly outlines what happened in lesson
- ✓ Is modeling included?
- ✓ Meeting diverse needs of students?
- ✓ Assessments
 - Informal
 - Formal
- ✓ Instructional resources included? (be sure to include citations when needed)

****You will need to consider your observation tools of the 2 focus students in documenting their development of language and literacy. See p. 30 & 47 of handbook for details.*

MAKE A PLAN FOR DOING THIS PRIOR TO TEACHING.

INTEGRATING QUALITATIVE RESEARCH IN A LITERACY EDUCATION COURSE

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Abstract

In this article, the authors presented the outcomes of a redesigned English language arts (ELA) pedagogical course to include a qualitative research project. From a phenomenological standpoint, the authors sought to answer the research question: How do the students enrolled in a teacher preparation course perceive their experience of learning qualitative research? Fifteen students, seeking elementary teaching certification, participated in this study. They conducted seven 50-minute observations of ELA instruction and wrote notes in their field journals. The instructor of the course, who was also the principal investigator, taught the following: characteristics of qualitative research, observation as a data collection method, conducting a literature search in an electronic database, and writing a qualitative research report. The preservice teachers produced a basic qualitative research paper as a major course requirement. The participants were interviewed to learn their perspectives on participating in the redesigned course. Qualitative data analysis revealed that the preservice teachers saw the value of observation as a qualitative research method but had difficulties finding related literature. The authors made recommendations on how to improve the implementation of a qualitative research project in a teacher education course.

Keywords: undergraduate research, qualitative research in education

Introduction

Undergraduate research is an investigation done by an undergraduate student to make an original contribution to the discipline. It is transformative and high impact because of the opportunities for students to deepen understanding by connecting theory with practice (Gentry et al., 2016; Manak & Young, 2014). Conducting research teaches students to be analytical, original, and collaborative (Wuetherick, et al., 2018). It also has the potential to lay the foundation for pursuing a graduate degree (Groth et al., 2016). However, despite the documented benefits of engaging students in undergraduate research, it is not prevalent in teacher education programs and courses (Breidenstein et al, 2000). It was found that it is not yet standard practice for education majors to participate in research in teacher education programs (Manak & Young, 2014).

The International Literacy Association (2018), in a position paper, has called for the inclusion of research in literacy teacher preparation, stating that “preservice teachers need to engage in research as fundamental to their practice” (p. 7). This organization recommended that teacher educators not only conduct research about their practices but also prepare their students to conduct research in their classrooms. With this focus on research, teacher preparation holds the

potential to create among teacher candidates the “disposition to question, to grow practices using the tools of scientific inquiry, and to create powerful communities of practice that are dialogic and expansive” (p. 8). In a similar stance, the National Council on Undergraduate Research made a case that all undergraduate students, regardless of academic discipline should experience mentored research, both as a program outcome integrated with the curriculum as well as a pedagogy used in their courses (Wuetherick et al., 2018).

Research as pedagogy is aimed to facilitate and assess student learning. It is along with these constructs that the first author redesigned an English language arts (ELA) pedagogical course to include a strong research component. Her intent was to deepen the preservice teachers’ learning of content and give instruction on qualitative research as used in education.

This article is focused on the processes and outcomes of implementing an undergraduate qualitative research project for a group of senior-level university students pursuing elementary teaching certification. The students, while doing the required field experience component of the course, observed public elementary school teachers’ ELA instruction. Using field notes as raw data, the students sought to answer the research question: “How does English language arts instruction occur in the elementary classroom I am assigned to observe?” This study was conducted to learn the perspectives of the participants on the benefits and challenges of undergraduate research to improve its integration in teacher preparation.

Literature Review: Positioning Qualitative Research in Teacher Education

Only a few examples of undergraduate research in education programs are documented in scholarly literature, but analysis of those examples suggested the potential for research experience to include inquiry-based learning, examining evidence-based practices, and reflecting on one’s teaching (DeVore & Munk, 2015). While a qualitative inquiry approach to learning how to teach is perceived to be more demanding and requires more scaffolding from teacher educators, it is an effective way to develop future teachers as practitioners who will form the habits of collecting and analyzing information to update, evaluate, and improve one’s teaching (Lassonde, 2008). In addition, qualitative research has been used to develop a reflective orientation towards teaching and learning in an educator preparation program (Breidenstein et al., 2001). In fact, doing systematic observations and interviewing teachers have been employed as data collection procedures preservice teachers engaged in to pursue answers to original research questions (Wuetherick et al., 2018).

Context of the Study

The study took place in the spring semester of 2019 at a university center in lower South Texas, an off-campus location for the educator preparation program in which the participants were enrolled. The Institutional Review Board (IRB) approved the study on January 9, 2019, for one year. The first author was the instructor of the course, and the second author was an undergraduate student who took the course and participated in the research project. The third author, who is a senior faculty member, served as a peer debriefer in the study. After the interviews of all the participants were conducted, the first author invited the second author to be a co-investigator of the study because of her strong interest in research. Upon completion of the required researcher training, an amendment to the protocol was submitted to and approved by the IRB to include her in the study.

The first author redesigned a senior level, field-based pedagogy course, Teaching Language Arts in the Elementary School, required for undergraduate students seeking elementary teaching certification. This reading education course was the last in the sequence of courses teacher candidates take before student teaching. It dealt with the application of linguistics and theories of language development to ELA learning. Moreover, there was an emphasis on the interrelationships between oral and written language occurring in the classroom and best practices for teaching ELA. Aside from the face-to-face class sessions students attended, they also completed 80 hours of classroom observation as

required and coordinated by the university's educator preparation program with elementary schools in lower South Texas.

The figure below lists observation points the first author gave the participants to guide them in doing field observations. She cautioned and instructed the preservice teachers to take a neutral stance in doing the observations to avoid making judgments on their mentor teacher's teaching performance

Figure 1

Observation Guide

1. Which pattern of practice does the teacher use for teaching English language arts--literature focus units, literature circles, reading and writing workshop, or thematic units?
2. How does the teacher implement a read aloud?
3. What reading materials are used in the classroom (basal readers, trade books, ebooks, fiction/nonfiction books)? How do the students use such materials?
4. How does the teacher encourage the students to write?
5. How does the teacher group students for reading instruction?
6. How do the students interact with each other? Do they work in partners, triads, or small groups?
7. How are the students made to reflect on what they are learning?
8. How does the teacher engage students with higher-level thinking skills (synthesizing, analyzing, comparing and contrasting, evaluating/making judgments)?
9. How are the English language arts lesson objectives or standards displayed and communicated to students?
10. How does the teacher differentiate instruction in teaching English language arts?
11. What do you notice about the kinds of questions (literal, inferential, or evaluative) the teacher asks students?
12. Is technology incorporated in the English language arts lessons? If yes, how?

In addition to the traditional and existing Student Learning Outcomes (SLOs) for this course pertaining to ELA instruction, the instructor added the following SLOs relevant to undergraduate research: (a) gain an understanding of the characteristics and uses of qualitative research in educational settings, assessed through written assignments and discussions, (b) develop skills in observing teaching and learning processes in a public elementary classroom, assessed through the application of field notes rubrics and (c) apply APA conventions such as the use of in-text citations, references, and formatting, assessed through the production of a qualitative research paper.

The instructor included a unit on qualitative research that focused on the following topics: characteristics of qualitative research, relevant applications of qualitative research on classroom settings, observation as a data collection method data, inductive analysis of observational data, using an electronic database to search for academic literature and the use of APA conventions in writing a basic research paper. These topics were taught within four weeks.

The research activities and project collectively comprised 35% of the final course grade. As formative and summative assessment tools, the instructor examined the students' field journals and the research paper using a rubric. She also assessed the students' learning of qualitative research concepts by way of class discussions and the submission of a reflective paper at the end of the course. To add, students were required to meet with the course instructor during office hours to monitor progress and give feedback. Figure 2 presents the instructor-designed rubric for the field observation log.

Figure 2*Field Log Assessment Rubric*

The student's field log shows...	No Evidence (0)	Needs Improvement (1)	Basic (2)	Proficient (3)	Exemplary (4)	Comments
careful recording of the actions and processes observed in the classroom						
data collected is relevant and adequate to contextualize language arts instruction observed						
the amount of data collected is sufficient to support the final summary						
the time, date and location of the observation						

Methodology

The focus of this study was the participants' viewpoints on the shared phenomenon of learning how to conduct basic qualitative research in a pedagogical course. Thus, this study followed phenomenological traditions. As a qualitative research methodology, the focus of phenomenology is to describe an event or a phenomenon using the words of individuals who experienced it (Patton, 2002). In addition, using phenomenology as a method can help educators learn from the experiences of others (Neubauer et al., 2019).

By keeping an open mind and setting aside the researchers' preconceived notions of the phenomenon under study, the participants' understandings of a phenomenon were brought to the forefront of this study. The goal of this study was to construct an understanding of preservice teachers' experiences of doing field observations in elementary classrooms and how they used these observations as data in writing a basic qualitative research report. The main research question was: How do the students enrolled in a teacher preparation course perceive their experience of learning qualitative research? The product of this study was the description of the participants' experiences in doing field observations and writing a qualitative research report for an undergraduate teacher preparation course.

Research Sample

Eighteen preservice teachers completed the redesigned course, but only fifteen students gave consent to participate in this study. Of the 15 participants, 14 sought early childhood to 6th grade generalist teaching certification and one sought bilingual elementary teaching certification. All participants completed the course. There were two male participants and 13 females whose ages ranged from 21 to 43 years.

Data Collection

The first author interviewed 15 participants in the 2019 spring semester at the University Center after the course was completed and final grades were given in the fall semester of 2018. Interviews were done during dates and times

convenient for the participants. The purpose of interviews was to develop a deep understanding of the participants' perspectives on qualitative research. Their responses were audio-recorded and manually transcribed by the researchers. The audio recordings and participants were numbered one to 15, based on the chronological sequence the interviews were done. For each interview session, the first author used an interview guide. Prompt questions or probes were asked as necessary. The interview guide is presented in Figure 3.

Figure 3

Interview Guide

1. Have you ever done research in or for a college level course before? If yes, could you describe what you did?
2. Have you ever heard of or learned about qualitative research before taking this class? If yes, what did you know about doing qualitative research before taking this class?
3. What were your first thoughts or impressions when you learned that you will be learning about and doing qualitative research in this course?
4. In which campus were you placed to do field observations?
5. What grade level(s) and subject(s) did you observe?
6. Could you describe to me the process you did in writing your observation notes? For example, when did you usually write your field observation notes/log? How many minutes did it take you to write them? How did you feel about writing your observations?
7. What did you learn about writing your observations? Are there any insights that you gained? Was there anything that surprised you in the process of doing your classroom observations?
8. Did you find it easy or difficult to learn how to do qualitative research? Please explain.
9. Do you think that you learned how to do basic qualitative research in your college course? Why? Why not?

Analysis

Two hours and eight minutes of individual interviews were recorded. Forty-nine pages of interview transcripts were analyzed using inductive content analysis (Patton, 2015). This process was initiated by repeated readings of the transcripts followed by open coding. Statements relevant to the research question were reread, highlighted, and labeled to examine the emergence of patterns in the data. Interview transcripts were annotated with words or phrases to identify themes, using the same words that participants had used in the text. Then, summaries were written to generate themes. A list of main themes and subthemes was constructed, which allowed for detailed checking of each transcript and a comparison of themes to be made across participants. The researchers supported the themes by including interview excerpts.

Credibility of Findings

To ensure the trustworthiness of the results of this study, the researchers used member checking. The data and results were returned to the participants to check for accuracy and resonance with their perspectives. None of the participants disagreed with the findings presented in this study.

Findings

As required by the instructor of the course, all participants completed seven observations that lasted 50 to 55 minutes. Their observations were recorded in notebooks that were submitted to the instructor. Six participants observed third grade classrooms; four observed fourth grade; two were assigned in first grade, and three observed kinder classes. All participants, except for one who was assigned in a Spanish-English bilingual classroom, observed reading classes taught in English. They wrote observations in their field journals while in these classrooms. These notes were written quickly, and a few were in the form of bulleted lists. Some participants added notes later in the day to fill in the information they had quickly written. One participant drew sketches of the physical arrangement and positions of students in the elementary classroom. Below is a sample description of a participant's data collection:

Really awesome cool things happened, and I didn't want to forget, so I stopped and wrote it right there (in the classroom). But also, I didn't want to miss any of the lesson, so I had to write after the lesson. It would always be the day of, so I wouldn't forget anything. I had a format that I would always follow: What were the objectives? What were the TEKS? What were the standards? What were the methods used? What were the student responses? What was the outcome? And how I felt the students felt.

Participants reported that they have never learned about qualitative research before taking the course. In the beginning, the majority felt overwhelmed, intimidated, terrified, scared, confused, and thought that it would make the course difficult to complete. Only a few participants held positive perceptions initially and expressed that it would be beneficial to know how to do research. One participant was not worried about finding out about the research required but instead "took a deep breath, knew (she could) take it step by step" with the course instructor "walking (them) through it".

Results of the analysis indicated that conducting classroom observations, recording data in the form of field notes, and synthesizing results in the form of a qualitative research paper were generally perceived to be beneficial. Out of 15 participants, five clearly mentioned interest in pursuing graduate studies. These participants revealed that doing the research project might have given them an initial experience of what could be expected in graduate school. They reported that having completed a research paper gave them some level of confidence in doing future research if they decide to enroll in graduate school. Specifically, three core themes were identified that represented the participants' perceptions of doing undergraduate qualitative research. These themes are presented in the succeeding section, illuminated with relevant quotes.

Theme One: Learning from Observations

The participants expressed varying insights in response to the question, "What did you learn from writing observations?" However, the common thread among these responses was that there is more than occurs in language arts teaching than they actually thought. Participants commented that they noticed the details of the actual workings of a teacher and realized that there are things that they had taken for granted. Participant 5 expressed that "there's more going on besides what we already see". In fact, insights were gained on how children learn. For example, Participant 6 described, "younger children like to move around; they play; rhythm, rhyme, and music help them remember". In addition, a participant noted that she learned how learning theories and teaching strategies are applied in the elementary classroom. The following interview excerpts further reinforce the idea that observations can lead to insights far beyond what can be learned from attending lectures and reading the course textbook.

Participant 8 said:

I didn't realize how much time and planning goes into what she (the teacher) is doing behind the scenes to get ready. It looks so simple teaching little kids to read and do these activities, but once I really started observing and seeing, there's a lot of stuff beneath the surface. There was a definite rhyme and reason to what she was doing, a definite pattern, and consistency in her instruction. If I had not done the qualitative research and made to keep the logs, and go back and highlight, and look at the patterns, I wouldn't have seen it.

Participant 12 noted:

When you are writing your observations, you really see it in a bigger perspective--how the children are learning because you write down all their responses--like if the child is getting it, or not. You get to see it first-hand and write it down. I think I just saw everything in a whole different light when you actually have it, when you read it on paper.

Participant 15 reported:

I feel like writing the observations just helps me realize patterns more, seeing how people act. You are actually paying attention to what they are doing in the class. You notice that they do the same things all the time. Some things don't really work, and some of the things really do work.

Theme Two: Experiencing the Research Project

The preservice teachers' field observation experience was purposeful, with a tangible product which was the research paper produced by the end of the semester. However, this emerged as a challenging aspect of doing the research project for several reasons. First, the preservice teachers have never written a qualitative research paper following APA conventions. Second, they had to learn to use the university's electronic database to gather peer-reviewed articles to support their observations and findings. Third, the instructor could not present a sample student work because this was the first undergraduate research project implemented in her department. Instead, she showed and discussed with students her qualitative research manuscripts to illustrate the concepts and skills she taught. While a few participants noted that the instructor's own research examples were helpful, one participant stated that she was unsure of "what Dr. Modesto (the instructor) really was looking for", and the majority wanted to read student samples and direct guidance on the writing process.

The participants also reported that they felt rushed in completing the research requirements. Most of them expressed that they needed more time to observe. The statement of Participant 8 represented this view. She said, "I would have liked to have spent a little more time... (we) could have collected more data and seen more patterns" and recommended starting the observations much earlier in the semester. Participant 14 echoed the same opinion but also added that learning both ELA content and learning how to do research demanded more time and also caused unnecessary distractions. She said that "we learned a lot in class about how to do qualitative research but seeing how it was mixed in with the class (content), I feel like more time on qualitative research (should have been given) because it was kind of broken between half class (content), half qualitative research. I think more time on qualitative research would have helped--time in observations, time in learning, and actually doing and writing it." In addition, participants also felt challenged gathering journal articles to support their writings and were unsure if they were writing the paper correctly.

The researchers also found that some participants developed dispositions and skills associated with doing research, such as being organized, inquisitive, analytical, and reflective. For example, Participant 14 "wrote notes on (her) notes, marking things that were similar or different, highlighted things that stood out and picking out things (she) had noticed." The words of Participant 11 also supported this theme:

As I was doing this research, I started seeing things, like maybe I could do research on this. I wanted to do my own research on certain things... I thought about the STAAR test. Maybe these teachers are focusing too much on the STAAR test. Maybe I should do research on that. I started to think about questions like that and everywhere I went. It's crazy, no lie.

Participant 1 also made this comment:

I believe it's important that every teacher should know how to conduct some sort of research. I'm student teaching right now, and I see these things and think: Wow, this could be a research topic! Why don't we know more about this information? I don't know about anyone else, but it (the research project) made me crave wanting to learn and wanting to research things a little bit more. Why don't we have more data? There's a learning experience in everything, so I really enjoyed this research project because it gave me something to learn about. It's only going to help me in my education because I do plan on getting my master's someday. This just helped propel me forward.

Theme Three: Valuing the Experience

The participants described their experience of doing qualitative research as "helpful", "fun", "insightful", "informational", "reasonable" and "well worth it". One participant remarked that it provided "in-depth learning" as compared to other classes she has taken. Participant 13 saw the value of qualitative research comparing it with quantitative research:

I believe that there is value because, you know, aside from quantitative, that it is more surveys and numbers, which is important too, but qualitative (research) is about quality...you being there first hand, as opposed to just grabbing numbers and counting them...qualitative (research) is more valuable because you are there experiencing it first-hand.

While the majority of participants felt negatively at the beginning of the process, they reported that they “enjoyed” it and felt “grateful” and “learned so much”. Participant 10 stated, “after I was done writing my paper, I would compare it to the examples that we’ve gotten, and I felt this is good. I was really proud of myself...if a teacher tells me you have to do a qualitative research paper, I think, I would do a pretty good job at it.”

Participant 10 reported a sense of community that developed out of the process:

Our class was structured and the students, as a whole, wanted to be there and wanted to learn and were really helpful, myself included, with each other. Whenever we missed something, we would say, ‘Oh no no, this is what that means.’ So, we were all on the same page. We all wanted to succeed. We all wanted this project to succeed because we were very excited about it.

Overall, the outcomes of the course redesign were positive but with specific areas of improvement that need to be addressed. Participants were apprehensive at the beginning of the course but reported a deepened sense of appreciation for teachers’ work and the research process. Researchers noted that the execution of a research-integrated course can be improved by doing the following: (a) increase the number of observations to gather more data (b) early implementation of the actual research process to give ample time for students to fulfill requirements adequately, (c) providing student samples of the final product, and (c) giving more direct instruction on how to write a qualitative research paper, supported with progress monitoring.

Conclusion

The findings from this study correlate with the current literature stating that preservice teachers benefit from engaging with undergraduate research. Specifically, the participants’ development of critical reflection skills intersects with the study conducted by Szecsi et al. (2019) who found that the systematic and gradual infusion of research skills in teacher education courses produce uneven but steady growth in students’ scholarship abilities. In addition, the participants’ perceptions that they felt rushed and needed more time to observe and write their research papers are supported by other researchers’ viewpoint that the lack of time and resources and the demands of education course content limit effective implementation of research for teacher candidates (Manak & Young, 2014). Finally, the participants’ assignment of positive values to their research experience and that they deepened appreciation for teacher work support a recent call by Baldwin and Darner (2021). They urged teacher educators to engage preservice teachers to become acculturated into a community of practice that facilitate deep understanding of the practices of their discipline, enabling them to integrate engagement in disciplinary practices into pedagogy.

Limitations of the Study

The potential weaknesses of this study emanate from the characteristics of qualitative research: the results are not generalizable to the larger population and the researchers are the primary tool for data collection and analysis (Creswell, 2009). Participants in qualitative research projects are chosen based on their first-hand experience of a particular phenomenon under scrutiny (Rubin & Rubin, 2005). Thus, the results are not generalizable to the larger population of preservice teachers pursuing elementary teaching certification.

Because the authors brought personal opinions to the research process, human bias and shortcomings played a role in this study. To reduce human bias and shortcomings, they collected data thoroughly, followed the research protocols as approved by the IRB, documented the steps taken to transform raw data into findings, and employed member checking. The authors presented thematic descriptions, illuminated by participants’ words, to arrive at the essence of doing qualitative research in a pedagogical course.

References

- Baldwin, K. E., & Darner, R. (2021). Preservice science and mathematics teachers' acculturation into communities of practice: A call for incorporation of undergraduate research into teacher preparation. *Journal of STEM Teacher Education*, 56(1), 16-37. DOI: <https://doi.org/10.30707/JSTE56.1.1624981200.240105>
- Breidenstein, A., Liberatore, I., Lioi, T., Miro, E., Weber, S., & Stoeck, S. (2001). Outcomes of preservice teachers' qualitative research. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 74(3), 141-144. DOI:10.1080/00098650109599180
- Creswell, J.W. (2009). *Research design: Qualitative, quantitative, and mixed method approaches* (3rd ed.). Thousand Oaks, CA: Sage.
- Devore, S., & Munk, D. (2015). Undergraduate research in teacher education: A rationale for broader engagement. *Council of Undergraduate Research Quarterly*, 35(4), 12-17. DOI: 10.5951/MTE.2020.0008
- Gentry, J. E. Baker, C. & Lamb, H. (2016). Professionalization of teaching in America: Two case studies using educational research experiences to explore the perceptions of preservice teachers/researchers. *Administrative Issues Journal*, 6(1), 53-72. Retrieved from <https://dc.swosu.edu/aij/vol6/iss1/8>
- Groth, R., Burgess, C., Bergner, J., & Holdai, V. (2016). Re-imagining imagination of mathematics teachers through undergraduate research. *Council of Undergraduate Research Quarterly*, 36(3), 41-46. DOI: <https://doi.org/10.30707/JSTE56.1.1624981200.240105>
- International Literacy Association (2018). *Transforming literacy teacher preparation*. Retrieved from <https://www.literacyworldwide.org/docs/default-source/where-we-stand/ila-transforming-literacy-teacher-preparation.pdf>
- Lassonde, T. A. (2008). Looking "beneath the surface": Authenticating research and inquiry for undergraduate teacher candidates. *Teacher Education and Practice* 21(1), 33-45.
- Manak, J., & Young, G. (2014). Incorporating undergraduate research into teacher education: Preparing thoughtful teachers through inquiry-based learning. *Council of Undergraduate Research Quarterly*, 35(2), 35-38.
- Neubauer, B.E., Witkop, C.T., & Varpio, L. (2019). How phenomenology can help us learn from the experiences of others. *Perspectives on Medical Education*, 8, 90-97. <https://doi.org/10.1007/s40037-019-0509-2>
- Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.
- Patton, M. Q. (2015). *Qualitative research and evaluation methods* (4th ed.). Thousand Oaks, CA: Sage.
- Rubin, H. J., & Rubin, I. S. (2005). *Qualitative interviewing: The art of hearing data* (2nd ed.). Thousand Oaks, CA: Sage.
- Szecs, T., Gunnels, C., Greene, J., Johnston, V., & Vazquez-Montilla, E. (2019). Teaching and evaluating skills for undergraduate research in the teacher education program. *Scholarship and Practice of Undergraduate Research*, 3(1) 20-29. DOI: 10.18833/spur/3/1/5
- Wuetherick, B., Willison, J., & Shanahan, J. O. (2018). Mentored undergraduate research at scale: Research in the curriculum and as pedagogy. In J. Moore, M. Vandermaas-Peeler, & P. Miller (Eds.), *Excellence in Mentoring Undergraduate Research*, (pp. 181-202). Washington, DC: Council on Undergraduate Research.

COVID-CREATED COLLABORATION: VIRTUAL ESL FIELD EXPERIENCES

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Abstract

The effects of the pandemic are expected to exasperate the academic barriers faced by English Learners. Meanwhile, pre-service teachers faced their own barriers such as a lack of authentic field experiences that would equip them to meet the needs of English Learners. This article describes a strategy that one university educator preparation program used to supplement traditional field experiences with virtual field experiences through a collaboration with a partnership school district. The justification of why this innovative pilot program emerged and details of how this pilot program benefited pre-service teachers, English Learners, and in-service educators are described.

Keywords: English as a Second Language (ESL), virtual, field experience, preservice teachers, school partnership

The aftershocks from the COVID-19 pandemic will continue long after the virus is no longer a threat to our community. Unfortunately, many English Learners (ELs) did not have access to appropriate accommodations in virtual settings. Moreover, basic access to virtual instruction was a serious barrier to ELs' learning due to insufficient resources such as devices and/or bandwidth (Sugarman & Lazarín, 2020). Some school districts responded to students' needs by distributing technology support and Wi-Fi hotspots (Cushing-Leubner et al., 2021). However, some districts reported that fewer than half of their ELs were participating in online instruction at a time when all instruction was virtual or remote (Sugarman & Lazarín, 2020). Cardullo et al. (2021) recognized that in addition to communication barriers with parents in a virtual world, teachers struggled with self-efficacy and student engagement as they learned to navigate new virtual platforms. These consequences of the pandemic should be alarming to teachers, educational leaders, and educator preparation professionals because ELs were already a population of concern. The achievement gap between English proficient students and ELs is expected to be even greater than it was pre-COVID.

Importance of English as a Second Language Training

Prior to the pandemic, many teachers felt unprepared to teach ELs and attributed their lack of preparation to insufficient coursework in English as a Second Language (ESL) methods, as well as a lack of pre-service field experience with ELs (Correll, 2016; Kolando et al., 2013). Teachers who have field experiences with ELs during their educator preparation program feel more prepared to teach them in their classrooms (Coady et al., 2011; Correll, 2016; Tran, 2015). Kolando et al. (2013) reported that the most powerful method to prepare mainstream teachers to meet the needs of ELs was a combination of personal experiences and academic experiences. Specifically, teachers expressed that time was needed to get to know the student and to develop strategies that would meet the needs of EL students. When pre-service teachers are afforded the opportunity to take an active role, rather than participate as passive observers in field experiences, they gain a deeper understanding of pedagogical methods.

Yet, Garcia (2014) examined the coursework and field experience requirements of five Texas university educator preparation programs and observed inconsistencies in how teacher candidates were prepared to support ELs. While all educator preparation programs in Texas are required to address English Language Proficiency Standards (ELPS) in their program, there is no policy that requires pre-service teachers to have field experiences specifically with ELs. With 18% of Texas K-12 students currently classified as ELs (National Center for Education Statistics, 2020), there is a clear need for teacher preparation programs to address their specific learning needs.

Unfortunately, the pandemic also brought field experiences to a screeching halt. Schools closed their doors, and school personnel worked diligently to launch virtual instruction. Pre-service teachers no longer had the option to apply and develop ESL methods in the field. Some educator preparation programs substituted traditional face-to-face field experiences with video observations and virtual internships (Ferdig & Pytash, 2021), but the abrupt changes left educator preparation faculty with limited options in how to meet field experience requirements. As a result, many pre-service teachers did not get authentic field experience.

Virtual Field Experience and Course Requirements

To overcome the lack of authentic field experiences, one Texas university educator preparation program launched a collaborative pilot program with a partnership school district in the spring of 2021. University faculty collaborated with the school district's educational leaders to orchestrate synchronous virtual field experiences with ELs via Zoom. The pre-service teachers registered as virtual volunteers in the school district to remain within district compliance. Then, teams of two pre-service teachers were matched with an EL who needed additional support and agreed upon a series of Zoom meetings where the pre-service teachers could consistently meet with the EL. To accommodate schedules, the pre-service teachers sometimes joined the Zoom meetings simultaneously, and at other times met with the EL independently. To the best ability, pre-service teachers were matched with students who were in the grade level they intended to teach. Specialists from the school district's multilingual department hosted routine Zoom meetings lasting between 30-45 minutes to connect the pre-service teachers with selected ELs at multiple campuses. Pre-service teachers were expected to complete a minimum of five hours of virtual field experience, so students who participated in half-hour meetings met their EL student on ten occasions while students who participated in 45-minute meetings met their EL student six to seven times throughout the semester.

The university instructor required preservice teachers to complete five assignments with ELs in which they applied course content. The first assignment required the pre-service teachers to get to know their EL. University students were guided in how to ascertain the academic, linguistic, cultural, and personal backgrounds of their ELs so they could get to know their student. The second assignment required the pre-service teachers to estimate speaking proficiency using the Texas English Language Proficiency Assessment System (TELPAS) English proficiency language descriptors. As part of the first and second assignments, the pre-service teachers were asked to observe and reflect on specific Texas Essential Knowledge and Skills (TEKS) and ELPS they could emphasize for the remainder of their meetings. Although most pre-service teachers planned to address English Language Arts and Reading content, secondary pre-service teachers were encouraged to apply ESL methods while addressing TEKS of their specialized content-area subjects. The third and fourth assignments required the pre-service teachers to use a sheltered instruction strategy while addressing appropriate TEKS and ELPS then reflect on whether their goals were met. For the fifth assignment, pre-service teachers were asked to design a linguistically accommodated assessment that could be used to assess whether the EL demonstrated academic and linguistic growth on the emphasized TEKS and ELPS, again reflecting afterward on the success.

Finally, to consolidate knowledge the pre-service teachers gained through the virtual field experiences, pre-service teachers presented a case study of their experience with the EL to their peers in class. The requirements of the case study aligned with three of the four questions on the Texas New Teacher Survey which is distributed to all first-year teachers to evaluate how well their educator preparation program prepared them for the classroom (Texas Education

Agency, 2021). In the survey, first-year teachers assigned to teach ELs are asked about their level of preparation to design lessons that support ELs with TEKS, to design lessons that support ELs with ELPS, and to develop appropriate assessments for ELs. Thus, the case study reinforced this portion of educator preparation program accountability.

Because pre-service teachers met with the same EL throughout the semester, they were coached on how to personalize instruction with appropriate accommodations for their EL. However, pre-service teachers were also encouraged to be creative, innovative, and to synthesize course content with what they knew about their student to design mini-lessons and activities that were relevant to the student. Because university students were partnered with another student in the class, some class time was devoted to discussion about their observations and shared goals for the student and cooperative planning to meet such goals. Coursework aligned with the field experience expectations in that the topics and strategies discussed in class were expected to be applied in the virtual field. After applying methods and strategies via Zoom, pre-service teachers were expected to demonstrate reflective practices through written responses so the instructor could provide further guidance, resources, and teaching suggestions. Emphasis was placed on employing sheltered instruction methods and linguistic accommodations to support the EL's grade-level academic standards in accordance with the language proficiency levels.

While opportunities for improvement were identified throughout the pilot program, the overall results were largely positive. Pre-service teachers gained authentic experiences, and despite the short-term nature of the program, some pre-service teachers expressed developing a relationship. Overall, pre-service teachers reported they had gained confidence in how to support ELs and demonstrate culturally responsive pedagogy. The intentionally planned virtual field experiences with ELs afforded pre-service teachers the opportunity to apply ESL methods, while also supplementing the work of in-service teachers. Thus, in-service teachers and educational leaders were grateful for the instructional support. Most importantly, ELs benefited from personalized attention, instruction, and positive relationship. Finally, faculty members from both the partnership schools and educator preparation programs were available to support pre-service teachers through coaching, guidance, and feedback on a flexible schedule.

Challenges and Misconceptions Overcome Through Virtual Field Experiences

As the consequences of missed learning during school closures becomes more apparent in the next few years, it can be expected that ELs will have further exacerbated gaps when compared to their non-EL peers (Cushing-Leubner, 2021). ELs will need exceptional teachers who can compensate for missed learning opportunities, implement sheltered instruction strategies effectively, and apply linguistic accommodations appropriately. Yet, teacher attrition and turn-over has been a long-standing problem in the United States, and pandemic-induced stressors accelerated teacher attrition and early retirement options. An unplanned benefit of the virtual field experience was the professional networking pre-service teachers developed within the partnership school district.

It is a common misconception that high-quality pedagogy can compensate for ESL methods, but as deJong and Harper (2005, p. 102) expressed, "just good teaching" is not good enough for ELs. Teachers need specific training to understand how language and culture affect ELs (deJong & Harper, 2005). An understanding of ESL methods is critical for teachers to go from "just good teaching" to good teaching for ELs. For example, high quality reading instruction begins with words that are already in a child's oral vocabulary. However, ELs often do not have these words in their vocabulary. Thus, ELs may internalize the notion that reading is just saying the words aloud; understanding their meaning is not required. Like all field experiences, the virtual field experience provided an opportunity to apply skills and strategies obtained from coursework and to reflect on practice for deeper, personal learning. Teague (2010) noted that teachers develop abstract competencies such as how to develop culturally responsive lessons and how to work with diverse learners through experiences with diverse learners. Pre-service teachers need adequate training and field experiences with ELs to practice supporting culturally diverse learners prior to entering the field, and virtual field experiences are a viable solution to this need.

All educator preparation programs seek to prepare candidates to instruct diverse learners, but too often, educator preparation programs generalize ELs as diverse learners, grouped into a category along with students with special education needs (Kolando et al., 2013). This overgeneralized assumption that the needs of ELs can be met with the same methods used for students with special needs leaves teacher candidates without any experience in how to teach language proficiency standards, how to effectively select linguistic accommodations, and how to capitalize on the assets ELs bring into the classroom. Thus, virtual field experience with ELs began with identifying the strengths of the student, intentionally addressing ELPS, and strategically selecting accommodations.

Benefits for Educator Preparation Programs

All educator preparation programs aim to develop exceptional teachers, and recent legislation has increased the accountability measures for educator preparation programs in Texas (Texas Education Agency, 2021). Surveys distributed to first-year teachers by the Texas Education Agency each spring include questions relating to how well teachers were prepared to meet the needs of diverse learners. For first-year teachers who are assigned to teach ELs, an additional four questions are posed. The additional questions address how well novice teachers were prepared to support ELs in mastering content area standards and English proficiency standards, develop assessments for ELs, and understand laws pertaining to ELs. The virtual field experiences provided opportunities for pre-service teachers to develop these skills before clinical teaching, so it is expected that in their first year of teaching the candidates who participated in the pilot program will report being well prepared in this domain.

Pre-service teachers who have field experiences with ELs have been reported to develop greater cultural competence (Teague, 2010; VanDeuses, 2019). Teague (2010) ascertained that experiences with diverse learners helped future teachers challenge their own beliefs, assumptions, and stereotypes while addressing their own emotional response to diversity. However, Teague (2010) noted that the process of self-examination must be done with scaffolding. Bennett (2013) affirmed that with prompting, the pre-service teachers engage in deep reflective practices and examine their personal biases and assumptions. Equitable educational access begins when educators hold an asset-based mindset about diverse students, maintain high expectations for all learners, and have developed the skills and strategies to support students in achieving high levels of learning. For educator preparation programs that do not require coursework specific to ELs, field experience with ELs could be arranged within their respective content area methods courses (VanDeuses, 2019). Because pre-service teachers reflected upon their culturally responsive practices in their virtual field experience case studies, it can be inferred that these teachers will enter the field with a greater understanding of diversity, equity, and inclusion.

Although the COVID-19 pandemic has become less of a threat as vaccinations become more commonplace, many school districts are planning for virtual campuses to open in the fall of 2021. Preparing teachers to serve students in both virtual and traditional face-to-face contexts will increase their career opportunities. Virtual field experiences for pre-service teachers are not new (Hixon & So, 2009; Simpson, 2006), but they have recently become a necessity and may become a standard in educator preparation programs with the expansion of online schools, scheduling benefits, and access to specific student populations. Pre-service teachers who benefited from the virtual field experience with ELs learned how to teach via synchronous virtual learning and were able to reach students who were home or at a school over 50 miles from their university, saving a great deal of travel time and expenses. Most importantly, pre-service teachers were able to work with a specific type of learner for reciprocal benefits.

Benefits for Education Leaders

The shortage of ESL and bilingual teachers has been a problem for many years in Texas (Texas Education Agency, 2020). Because nearly one of every five Texas students are identified as an EL, Local Education Agencies are often tasked with training in-service teachers to implement sheltered instruction methods for teachers who were underprepared to teach ELs. Partnerships between Local Education Agencies and educator preparation programs would

allow ELs to gain personalized attention and open the opportunity to recruit teachers who have engaged in coursework and field experiences with ELs.

Given the need for ESL and bilingual teachers and the need for personalized EL instruction, educational leaders should support partnerships with educator preparation programs to arrange virtual ESL field experiences. These will benefit ELs by providing personalized instruction and assisting pre-service teachers in developing the skills needed to meet the needs of ELs. In the pilot program described above, some administrators arranged for the virtual field experiences to occur during intervention time, while others arranged for the meetings to support virtual learners who were needing additional support at home. However, educational leaders must help cast the vision and explain how all participants can benefit. Educational leaders are also needed to establish the norms and expectations for all participants, including in-service teachers, pre-service teachers, ELs, and educator preparation program faculty. More importantly, educational leaders must periodically monitor the progress of the sessions to determine whether ELs are benefiting from the experience, just as the educator preparation program faculty must monitor the progress of pre-service teachers.

Conclusion

Although this virtual field experience pilot program was designed to overcome pandemic barriers, virtual field experiences may be a useful strategy in future contexts to prepare teachers in ESL methods. All who participated in the pilot program, including pre-service teachers, in-service teachers, university faculty, and EL students received some benefit from the program. In addition to providing the much-needed individualized instruction to ELs, the virtual setting afforded preservice teachers the opportunity to experience virtual platforms as Cardullo et al. (2021) recommended. Because many Texas school districts will offer a virtual campus in the coming 2021-2022 school year, it would be ideal to prepare teachers to experience the field in both face-to-face and online settings. For teachers who expect to teach in the traditional brick and mortar settings, virtual instruction may still be required during times of school closures such as those caused by natural disasters.

A formal study of the pilot program has yet to be completed, but anecdotal evidence suggests that the virtual field experience with ELs conducted in the spring of 2021 was a success. Pre-service teachers demonstrated the application of ESL methods and expressed appreciation for the opportunity to virtually teach ELs. ELs benefited from academic support and expressed gratitude for the experience. Administrators who supported the pilot program were appreciative of the personalized learning provided to ELs and have requested that the program continues in the upcoming school year. The faculty of the educator preparation program is looking forward to improving and continuing the collaborative program.

References

- Bennett, S. V. (2013). Effective facets of a field experience that contributed to eight preservice teachers' developing understandings about culturally responsive teaching. *Urban Education, 48*(3), 380-419. <https://doi.org/10.1177/0042085912452155>
- Cardullo, V., Wang, C.-h., Burton, M. and Dong, J. (2021). K-12 teachers' remote teaching self-efficacy during the pandemic. *Journal of Research in Innovative Teaching & Learning, 14* (1), 32-45. <https://www.emerald.com/insight/content/doi/10.1108/JRIT-10-2020-0055/full/pdf>
- Coady, M., Harper, C., & de Jong, E. (2011) From preservice to practice: Mainstream elementary teacher beliefs of preparation and efficacy with English Language Learners in the state of Florida. *Bilingual Research Journal, 34*(2), 223-239. <https://doi.org/10.1080/15235882.2011.597823>
- Correll, P. K. (2016). *Teachers' preparation to teach English Language Learners (ELLs): An investigation of perceptions, preparation, and current practices*. [Doctoral Dissertation, University of Kentucky]. UKnowledge. https://uknowledge.uky.edu/edc_etds/19
- Cushing-Leubner, J., Morita-Mullaney, T., Greene, M. C. S., Stolpestad, A., & Benegas, M. (2021). The (im)possibilities of equitable education of multilingual emergent bilinguals in remote teaching: A survey of English language teachers in the Great Lakes region. *Planning & Changing, 50*(3/4), 139-164. https://education.illinoisstate.edu/downloads/planning/Cushing_PandC_50.3-4.pdf
- de Jong, E. J., & Harper, C. A. (2005). Preparing mainstream teachers for English-Language Learners: Is being a good teacher good enough? *Teacher Education Quarterly, 32*(2), 101-124. <https://files.eric.ed.gov/fulltext/EJ795308.pdf>
- Ferdig, R. E., & Pytash, K. E. (Eds). (2021). *What teacher educators should have learned from 2020*. Association for the Advancement of Computing in Education (AACE). <https://www.learntechlib.org/p/219088/>
- Garcia, D. E. (2014). *Preparing pre-service teachers to instruct English Language Learners: A study of ESL instruction in teacher preparation programs in Texas universities* (Order No. 1556462645) [Doctoral dissertation, Tarleton State University]. ProQuest Dissertations & Theses Global.
- Hixon, E., & So, H. J. (2009). Technology's role in field experiences for preservice teacher training. *Educational Technology & Society, 12*(4), 294-304. https://www.jstor.org/stable/jeductechsoci.12.4.294?seq=1#metadata_info_tab_contents
- Kolando, L. Q., Dávila, L. T., Lachance, J., Coffey, H. (2013). Multicultural teacher education: Why teachers say it matters in preparing them for English Language Learners. *CATESOL Journal, 25*(1), 41-65. <https://files.eric.ed.gov/fulltext/EJ1111871.pdf>
- National Center for Education Statistics. (2020, May). *English Language Learners in public schools*. [https://nces.ed.gov/programs/coe/indicator_cgf.asp#:~:text=The%20states%20were%20Alaska%2C%20California,and%20Nevada%20\(17.1%20percent\)](https://nces.ed.gov/programs/coe/indicator_cgf.asp#:~:text=The%20states%20were%20Alaska%2C%20California,and%20Nevada%20(17.1%20percent))
- Simpson, M. (2006). Field experience in distance delivered initial teacher education programmes. *Journal of Technology and Teacher Education, 14*(2), 241-254. <https://www.learntechlib.org/primary/p/5509/>
- Sugarman, J., & Lazarín, M. (2020). *Educating English Learners during the COVID-19 pandemic*. Washington, DC: Migration Policy Institute. <https://www.migrationpolicy.org/sites/default/files/publications/mpi-english-learners-covid-19-final.pdf>
- Teague, B. L. (2010). *Preparing effective teachers of English Language Learners*. Doctoral Dissertation, Vanderbilt University. <https://core.ac.uk/download/pdf/216049393.pdf>
- Texas Education Agency. (2020). *2020-2021 Teacher Shortage Areas and Loan Forgiveness Programs*. https://tea.texas.gov/sites/default/files/TAA_teacher_shortage_vF.pdf

- Texas Education Agency. (2021). *Teacher Survey to Evaluate Educator Preparation Programs*.
<https://tea.texas.gov/texas-educators/preparation-and-continuing-education/teacher-survey-to-evaluate-educator-preparation-programs>
- Tran, Y. (2015). ESL pedagogy and certification: Teacher perceptions and efficacy. *Journal of Education and Learning*, 4(2), 28-42. <http://dx.doi.org/10.5539/jel.v4n2p28>
- VanDeusen, A. J. (2019). A cultural immersion field experience: Examining preservice music teachers' beliefs about cultural differences in the music classroom. *Journal of Music Teacher Education*, 28(3), 43-57.
<https://journals.sagepub.com/doi/10.1177/1057083718824729>

A BRIEF OUTLOOK OF TEXAS SPECIAL EDUCATION TEACHERS' KNOWLEDGE AND SKILLS IN AUGMENTATIVE AND ALTERNATIVE COMMUNICATION

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Abstract

Texas special education teachers need be well-equipped to meet the needs of all students with disabilities, including those with complex communication needs. To do so, special education teachers need to gain knowledge and skills in augmentative and alternative communication. Unfortunately, research has consistently suggested that special educators are unprepared to effectively serve students with complex communication needs. The aim of this article was to supplement the current research by providing a brief outlook on the state of knowledge and skills of special education teachers in Texas in augmentative and alternative communication. Findings suggest that special education teachers in Texas reported low levels of knowledge and skills in augmentative and alternative communication, with years of experience serving students with complex communication needs as the only influencing factor. Implications and recommendations for future pre- and in-service training are discussed.

Keywords: augmentative and alternative communication, special education teachers, teacher certification

Special education teachers require specialized training to address the educational needs of students with disabilities. According to the U.S. Bureau of Labor Statistics (2020), in Texas there are approximately 38,400 special education teachers. Texas offers two potential routes to obtain teacher certification in special education, by completing (1) a teacher preparation program or (2) an alternative process such as *Teach for America* or *Teachers of Tomorrow*. Across the state there are 47 universities that have teacher preparation programs that lead to a special education teacher certification. Among these universities, 28 offer both bachelor's and master's degrees, 18 universities offer either a bachelor's ($n = 12$) or a master's degree ($n = 6$), and 1 university only offers a certification program. Most of these teacher preparation programs lead to a certification in *Special Education, Early Childhood-Grade 12*, with a few universities offering certification in *Deaf and Hard of Hearing, Early Childhood-Grade 12*.

The *Special Education Early Childhood-Grade 12* teacher certification enables special education teachers in Texas to serve students across *all* disability categories, including students being served under the IDEA categories of

mild to severe disabilities (see IDEA, 2004 §662). Across the United States 18 (35.29%) states, including Texas, offer a cross-categorical special education teacher certification, 23 (45.10%) offer a categorical certification, and 10 (19.61%) offer cross-categorical certifications with the possibility of an added categorical endorsement. The main differences among these certification options are in the way teacher preparation programs are tasked to equip special education teachers to serve students with disabilities. These requirements are closely linked to standards set by the State for teacher preparation programs. Specifically, in a *cross-categorical* certification teachers are prepared to serve students across all disability categories and often across all grade levels; while in a *categorical* certification, teachers are prepared to serve a specific sub-group of disability categories, for example to serve students with high-incidence disabilities (e.g., learning disabilities, emotional and behavioral disturbances) or students with low-incidence disabilities (e.g., autism, intellectual disabilities), and often across all grade levels. In Texas, for special education teachers to gain specialized training in a specific disability category, they can choose to complete a master's degree with a focus on their area of interest. Because Texas offers a cross-categorical special education teacher certification, teacher preparation programs are responsible for ensuring that future special education teachers enter the field well-equipped to effectively serve *all* students.

Among students with disabilities being served by special education teachers in Texas, there is a subset of students with more significant needs, also known as severe disabilities (Westling et al., 2020). Many of these students receive services under the eligibility categories of autism, developmental delays, intellectual disabilities, multiple disabilities, or traumatic brain injury (IDEA, 2004, §1462). Students with severe disabilities often present comorbidity of complex communication needs (Page & Quattlebaum, 2012), and can benefit from the use of augmentative and alternative communication (AAC) systems. The goal of AAC is to support users' by increasing their independence and at the same time, reduce their communication challenges, by replacing or supplementing their oral speech abilities by using a speech-generating device, tablet with communication apps, manual signs, picture symbols, among other modalities (Da Fonte & Boesch, 2019).

Given the importance of AAC systems and practices, it is important to determine the extent to which Texas teachers have knowledge and skills in this area. Research spanning over 25 years has consistently shown that special education teachers have limited preparation in AAC (Andzik et al., 2018; Andzik et al., 2019; Costigan & Light, 2010; Koul & Lloyd, 1994). However, less is known about how specific states compare to findings from nationwide studies. Based on the differences between special education teacher certification across states, there is a need to critically evaluate the current knowledge and skills of special education teachers at the state level. While Andzik et al. (2018) examined the preparation in AAC received by special education teachers across various states, the authors did not report findings based on individual states. Therefore, the aim of this article was to report the findings on the self-reported knowledge and skills in AAC of special education teachers in Texas. Specifically, by addressing the research questions of: (1) What are Texas special education teachers reporting as their primary sources of knowledge and skills in AAC? (2) What factors influenced the knowledge and skills in AAC of special education teachers in Texas? (3) What was the most beneficial pre-service training of Texas special education teachers to support students with complex communication needs? (4) What do special education teachers report on AAC professional development training opportunities in Texas? (5) What are Texas special education teachers' recommendations for pre-service and novice teachers on AAC training?

Methods

Participants

The participant pool was extracted from a nationwide survey led by Da Fonte et al. (in press). The inclusion criteria for this paper were for participants to (a) be working as special education teachers in Texas; (b) have a special education teacher certification, and (c) have experience serving students with complex communication needs. General education teachers, related service providers such as speech-language pathologists and occupational therapists, and school administrators, such as special education directors or instructional coaches were excluded.

Survey Instrument

A cross-sectional (Creswell & Creswell, 2021) online survey was developed to collect data pertaining to the AAC knowledge and skills of special education teachers. The Research Electronic Data Capture (REDCap™) platform was used to create and disseminate the survey. A total of seven individuals, who were not involved with the study, evaluated the survey for its usability. Evaluators included four special education teachers and three university professors who provided feedback on the survey's format, clarity of the questions, and type of responses. The survey was revised based on the feedback prior to its dissemination. A total of 32 questions were analyzed for this study including, 16 demographic questions, 13 questions on knowledge and skills in AAC, and 3 open-ended questions on participants' reflections and recommendations on AAC training. Cronbach's alpha (.97) and Pearson's correlations were calculated to analyze the internal consistency of the survey, resulting in high internal reliability ($p < .01$), as the coefficient of variation was low for each question. Construct validity was also assessed to mitigate any potential threats that exist with self-report (Conway & Lance, 2010). Specifically, a principal component factor analysis was used to determine if knowledge and skills factors could be categorized by one common factor, thereby identifying relations within the dependent variables (Brown, 2015). Factor loadings ranged from .865 to .93; thus, 80.9% of the variance could be explained by one common factor.

Procedures

To recruit participants, an email list of 1,167 school administrators (e.g., special education directors, principals, and superintendents) was created by the research team by searching the Texas Education Agency website for administrators' contact information. The survey link was sent to the school administrators alongside a brief description of the study, a statement indicating the university's Institutional Review Board approval, and a request for the administrators to disseminate the survey link to all special education teachers in their schools. Reminders were sent every three weeks for six months.

Data Analyses

Data for all fully completed surveys were analyzed using SPSS Statistics software. Descriptive statistics correlate the extent of knowledge and skills in AAC, and thematic analysis was used to examine the data. All questions with a Likert scale of 1 to 5 were added to ascertain a total score on the participants' knowledge and skills, ranging from 8 to 40 possible overall scores, given that there were 8 questions. To further quantify the mean scores of knowledge and skill, scores ≤ 24.99 were classified as "low" levels of knowledge and skills, and scores ≥ 25.00 were classified as having "high" levels.

To determine the relationship between participants' self-reported knowledge and skills in AAC and their demographics, one-way ANOVAs (F tests) were used. Furthermore, to assess the differences for each item, repeated measures ANOVAs were conducted and Chi-square tests (χ^2 ; $p < .05$) were used to determine if statistical differences existed between the participants' demographic variables and their knowledge and skills in AAC (low and high). Eta-squared (η^2) was also calculated to evaluate the relationship between the two variables, and to determine effect sizes of significant correlates (Cohen, 1988; Durlak, 2009). A small effect size was 0.01, the medium was 0.06, and a large effect size was 0.14 (Cohen, 1988).

Thematic analyses were conducted for each open-ended question. Each question was independently coded by two coders to determine coding reliability. Based on participants' responses, each response could be coded once under a particular theme or across various themes. To assess reliability between coders Cohen's Kappa was calculated with results indicating almost perfect agreement (0.968).

Results and Discussion

A total of 25 special education teachers from Texas served as participants in this study (see Figure 1 and Figure 2). Approximately 52% ($n = 13$) of the participants' highest degree was a bachelor's, and the remaining 48% had a master's degree ($n = 12$). On average, participants had 10 years of teaching experience (ranging from 1 to 20+) and approximately 7 years of experience serving students with complex communication needs (ranging from 1 to 20+). Approximately 52% of the participants worked in urban settings ($n = 13$), 28% in suburban settings ($n = 7$), and 20% in rural settings ($n = 5$). Most of the participants (76%; $n = 19$) taught in public schools and in public charter schools (16%; $n = 4$), and the remaining taught in private (4%; $n = 1$) and residential schools (4%; $n = 1$). Close to half of the participants taught in elementary schools (48%; $n = 12$), 40% ($n = 10$) taught in middle schools, and 12% ($n = 3$) taught in high school settings.

Figure 1
Participant Experience Demographics

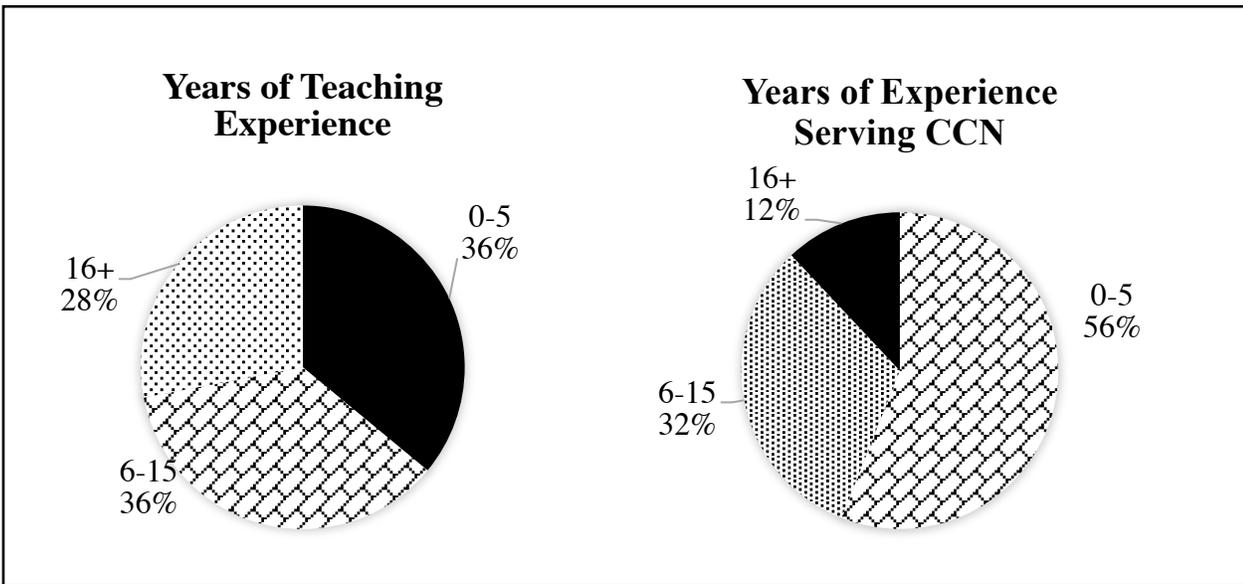
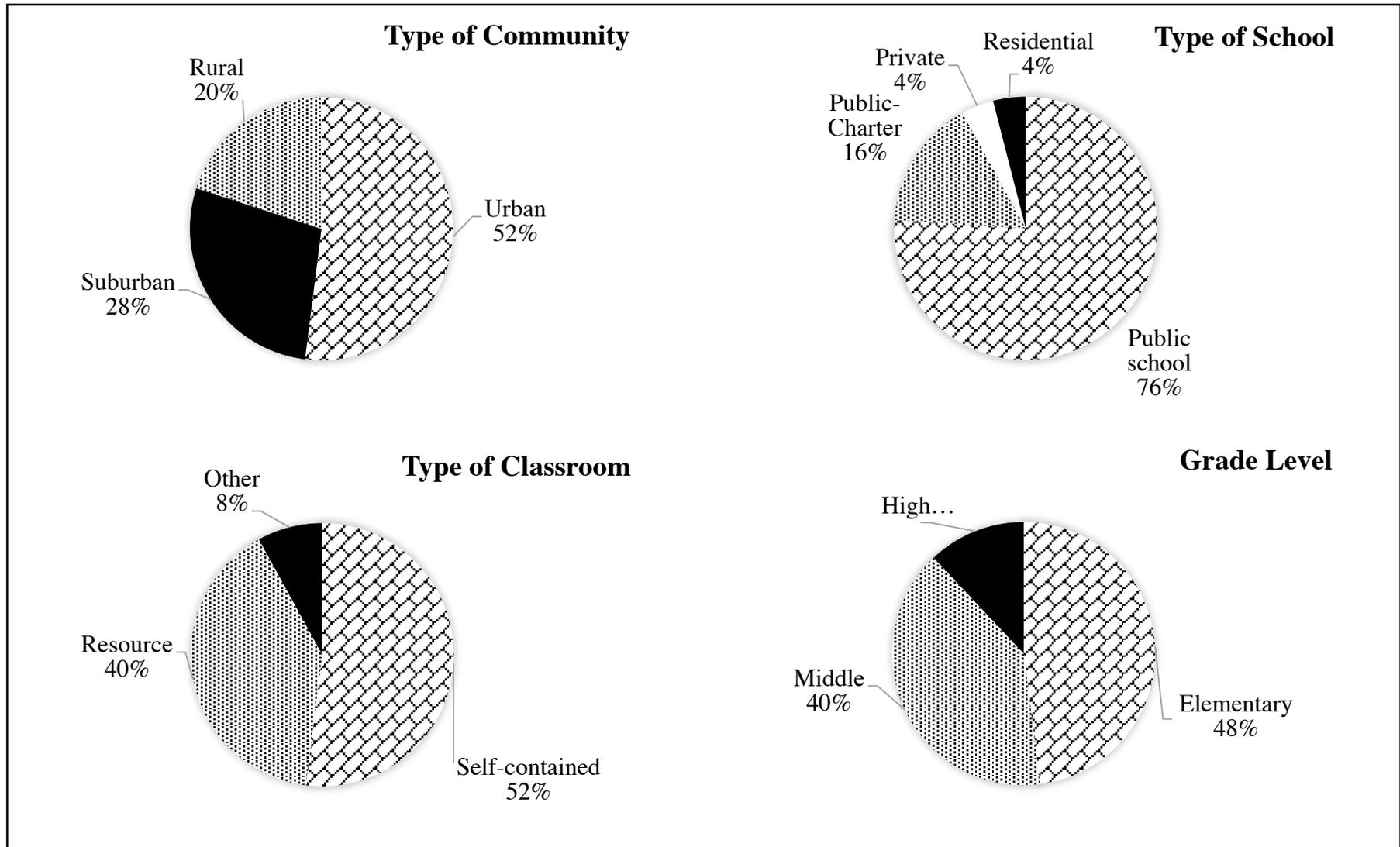


Figure 2
Participants' Work Setting Demographics



Teacher's Knowledge and Skills in AAC

Findings indicated that the majority of participants self-reported low levels of knowledge and skills in AAC (68%; $n = 17$). Results indicated that years of experience serving individuals with complex communication needs was an influencing factor on participants' perceived levels of knowledge and skills ($F = 4.767, p = .019, \eta^2 = 0.302$). Across all questions related to participants' self-reported knowledge and skills, the mean score was low (20.08) ranging from a possible score of 8 to 40. The criteria set for low levels of knowledge and skills was <24.99 and >25 for high. Participants' self-reported levels of knowledge and skills are comparable to national results indicating that special education teachers are not well-equipped to implement AAC practices (see Andzik et al., 2019; Da Fonte et al., in press).

Results indicated that participants' primary source of knowledge and skills in AAC was their personal experiences (40%; $n = 10$), followed by coursework (20%; $n = 5$), and professional development (16%; $n = 4$). Further, over half of the participants (56%; $n = 14$) reported having no pre-service field experiences, such as practicum, where AAC practices were implemented. Although 44% ($n = 11$) of the participants reported completing 1 to 2 field experiences during their preparation programs. However, for those who completed a field experience, 8% ($n = 2$) indicated completing 1 field experience where AAC practices were embedded as part of the practicum, and 4% ($n = 1$) indicated completing 2+ embedded field experiences. While 28% ($n = 7$) completed 1 field experience where the sole purpose was to implement AAC practices, and 4% ($n = 1$) completed 2 or more of these dedicated field experiences.

Based on the findings, it is likely that special education teachers are not receiving coursework or field experiences during their pre-service preparation programs to develop knowledge and skills in AAC. Similarly, based on self-report, data suggests that special education teachers are not receiving professional development in AAC to expand their professional knowledge and skills. As a result, special education teachers seem to be relying on on-the-job training and personal experiences. Findings align with previous research indicating there is a lack of AAC training for special education teachers at the pre-service level (e.g., Costigan & Light, 2010; Koul & Lloyd, 1994). To better support special education teachers and their students with complex communication needs, it is critical to create professional development training opportunities for special education teachers throughout their careers. The notion that professional development is a critical factor for special education teachers to provide AAC services has been well documented (Andzik et al., 2019; Sindelar et al., 2010). In fact, Sindelar et al. (2010) argued that professional development training should be implemented for all special education teachers, no matter their level or years of experience. By doing so, teachers will sustain their professional development and dispositions that were initiated during their pre-service preparation program, and these can be enhanced through induction opportunities (Sindelar et al., 2010).

Influencing Factors on Knowledge and Skills

Findings indicated that most factors were not influencing the participants' knowledge and skills in AAC. As illustrated in Tables 1 and 2, the highest level of education, the year when their highest degree was earned, the completion of field experiences during pre-service training, the type of community, school, classroom, or grade level where participants worked, and participants' years of teaching experience did not influence the special education teachers' abilities. However, as represented in Table 3, participants with 6 to 15 years of experience serving students with complex communication needs was a significant influencing factor to their knowledge and skills, given that they reported the highest level of knowledge and skills in AAC ($M = 27.38, SD = 8.03$). Intriguingly, participants who self-reported having 16+ years of overall teaching experience indicated having the lowest level of knowledge and skills in AAC ($M = 13.67, SD = 4.93$). Although years of experience serving students with complex communication was an influencing factor, it is important to acknowledge that the level of knowledge and skills in AAC remained low, with the most knowledge and skills in introductory-level concepts ($M = 2.76, SD = 1.234$) and the least in concepts related to AAC assessment ($M = 2.16, SD = 1.179$).

Table 1*Work Setting Demographics Compared to Participants' Knowledge and Skills in AAC*

Work setting	<i>n</i>	Mean scores			
		<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
Community Type				1.125	0.342
Urban	13	21.38	0.76		
Suburban	7	21.71	11.27		
Rural	5	14.40	4.22		
School Type				2.970	0.055
Public	19	21.00	8.45		
Public Charter	4	13.50	9.04		
Private	1	39.00	-		
Residential	1	10.00	-		
Grade Level				1.457	0.255
Elementary	12	17.08	6.11		
Middle	10	21.80	10.45		
High	3	26.33	16.26		
Classroom Type				1.739	0.199
Self-Contained	13	22.62	8.21		
Resource	10	15.90	8.10		
Other	2	24.50	22.92		

Note. AAC = augmentative and alternative communication.

Table 2*Comparison of Participants' Experiences and Their Knowledge and Skills in AAC*

Type of experience	<i>n</i>	Mean scores			
		<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
Personal Experience				1.972	0.149
Not at all	0	-	-		
Slightly	4	15.00	1.41		
Somewhat	4	12.75	7.54		
Very much	7	24.14	9.41		
Extensively	10	22.20	10.50		
Coursework				0.256	0.902
Not at all	3	17.33	10.21		
Slightly	9	19.00	9.68		
Somewhat	7	20.57	9.41		
Very much	1	17.00	-		
Extensively	5	23.60	12.05		
Field Experience				2.105	0.118
Not at all	14	17.14	8.65		
Slightly	7	21.86	7.29		
Somewhat	1	32.00	-		
Very much	2	19.00	15.56		
Extensively	1	39.00	-		
Professional Development				1.902	0.150
Not at all	3	21.00	16.09		
Slightly	5	14.00	2.55		
Somewhat	9	18.00	7.18		
Very much	4	22.25	10.78		
Extensively	4	29.50	9.54		
Other				0.761	0.563
Not at all	7	19.86	11.44		
Slightly	4	12.75	2.06		
Somewhat	5	22.40	4.72		
Very much	5	21.60	12.01		
Extensively	4	23.00	11.91		

Note. AAC = augmentative and alternative communication.

Table 3

Comparison Between Participants' Background and Knowledge and Skills in AAC

Background	<i>n</i>	Mean scores			
		<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
Highest Degree Earned				0.060	0.808
Bachelor's	13	20.54	9.04		
Master's	12	19.58	10.41		
Years of Teaching				1.274	0.300
0-5	9	19.78	9.69		
6-15	9	23.56	10.01		
16+	7	16.00	8.14		
Years Serving CCN				4.767	0.019†
0-5	14	17.29	8.85		
6-15	8	27.38	8.03		
16+	3	13.67	4.93		

Note. † = significance at the level of .005; AAC = augmentative and alternative communication

Interestingly, Texas findings do not align with the data from special education teachers across the U.S. For example, Da Fonte et al. (in press) found several influencing factors, such as the highest level of education, the completion of field experiences during pre-service training, and type of teacher preparation certification program, on special education teachers' knowledge and skills. It is possible that the knowledge and skills of Texas' special education teachers were somewhat similar to each other given that Texas requires a cross-categorical teaching certification. This may imply that, unfortunately, many teacher preparation programs across the state may not offer specific coursework or field experience in AAC due to the broad focus of the certification. The lack of or limited pre-service training in AAC is problematic as it will shift the responsibility of specialized training to school districts. Nevertheless, given that public school districts commonly have limited financial and personnel resources, the lack of specialized training will likely perpetuate the teachers' limited knowledge and skills in AAC; which in turn, may contribute to underserving students with complex communication needs and limiting the outcomes of these students.

Teachers' Reflections on AAC Training

A total of 14 participants (56%) responded to the open-ended questions and provided their views and recommendations on potential changes for future pre-service and professional development training. There were 13 themes that emerged from participants' responses, with 3 pertaining to their reflections on pre-service training, 4 themes relating to their reflections on professional development, and 6 discussing their recommendations for pre-service and novice special education teachers. A common theme highlighted by participants was that they did, in fact, receive adequate pre-service training in AAC (42.86%; $n = 6$). One participant captured this notion by stating, "I felt very adequately prepared to work with students with complex communication needs. I had an entire class devoted to AAC, as well as multiple practicum experiences where I got to see what I learned in class played out in the classroom" (Participant 216); however, interestingly, low levels of knowledge and skills were reported by most participants. While participants indicated some positive outcomes during their pre-service training, other participants (21.43%; $n = 3$) expressed not receiving any training related to AAC during their teacher preparation programs. For example, Participant 251 stated that "I've not been introduced to any [training]," while others expressed that when training was provided, it was only some introductory content (14.29%; $n = 2$). Participants' responses align with findings that indicate special education teachers are likely to graduate from their pre-service teacher preparation programs with "unacceptably low levels of AAC knowledge and competence" (Costigan & Light, 2010, p. 208) and feel unprepared and ill-equipped to incorporate AAC in their classrooms (Ruppar et al., 2016).

In terms of AAC training at the in-service level (professional development), some participants highlighted differences between their pre-service and in-service training. The notion that professional development training can help promote and foster knowledge and skills beyond their pre-service preparation program has been documented as essential to support students with disabilities (Sansoti et al., 2011). Participant 395 highlights this by indicating, *“I have received training while in college, but the most beneficial training has been through the district.”* However, most participants did not express these assertions; instead, many participants stressed a lack of AAC training across the pre-service and in-service levels (64.29%; $n = 9$). An example was outlined by Participant 216 who indicated that *“unfortunately, once you are out of pre-service, there are often limited opportunities to be trained in AAC or even collaborate with related service providers to learn how to effectively use them.”* Similarly, other participants (21.43%; $n = 3$) highlighted a lack of quality training, as one participant portrayed training in AAC as being *“in dire straits”* (Participant 460) and another that it was *“not good because I have not received any of it and didn't know it was a thing”* (Participant 81). Participants' responses continue to highlight that *“more training is needed if teachers are going to be able to adequately support students with complex communication needs”* (Participant 216).

Recommendations for Pre-Service and Novice Teachers

Participants highlighted how perspectives and mindset can impact service provision and that it may be helpful for novice teachers to consider their *“... aptitude and attitude towards AAC can go further than pre-service training”* (Participant 377). At the same time, participants indicated the need to be proactive (64.29%; $n = 9$), by *“read[ing] all you can on it [AAC] and seek PD pertaining to it [AAC]”* (Participant 460), *“get[ting] as much information on AAC and AT”* (Participant 349), and *“gain[ing] as much knowledge as you can”* (Participant 204). These statements exemplify the importance for special education teachers to be open to new information and willing to learn and implement new practices. Findings align with previous research, in which Lund and Light (2007) found that negative attitudes towards AAC to be barriers to positive outcomes and suggested that *“professionals need to be patient, open-minded, and willing to try new things”* (p. 333).

Practical Implications

Research has long established that special education teacher preparation programs are not adequately preparing special education teachers to serve students with complex communication needs (Andzik et al., 2019; Costigan & Light, 2010; Koul & Lloyd, 1994). Koul and Lloyd (1994) argued that special education teacher preparation programs should focus on embedding and enhancing AAC coursework to adequate levels. Similarly, Costigan and Light (2010) more recently reported that most special education teacher preparation programs *“offer minimal to no AAC content”* and *“do not require compulsory AAC training”* (p. 208).

Unfortunately, the current study mirrors previous findings, suggesting that teacher preparation programs are still not providing the AAC training special education teachers need to adequately serve students with complex communication needs. Furthermore, special education teachers in Texas have limited knowledge and skills in AAC and only their years of experience serving students with complex communication was a significant factor in their knowledge and skills. These results mirror national findings, yet the question that remains unanswered is *what can be done in Texas to ensure that special education teachers are highly equipped to serve all their students?*

The approach that Texas currently follows to training future special education teachers (i.e., requiring a cross-categorical special education teacher certification), may, in theory, prepare future teachers to gain the knowledge and skills needed to serve all students with disabilities. Yet, the lack of specialization in a specific concentration area or disability categories may make the process of training future educators challenging for teacher preparation programs, special education teachers who serve these students, and school districts. For example, in a nationwide view of special education teachers' knowledge and skills in AAC, Da Fonte et al. (in press) suggested that special education teachers who held a categorical teacher certification had higher levels of knowledge and skills than teachers who reported holding a cross-categorical teacher certification. More specifically, Da Fonte et al. (in press) indicated that special education teachers who completed a teacher certification preparation program in low incidence disabilities, such as in the areas of autism, intellectual disabilities, and multiple disabilities, self-reported higher levels of knowledge and skills than other concentration areas.

Collaboration between special education teachers and other related service providers, such as speech language pathologists and families, may also be an important element to take into account given that addressing the needs of students with complex communication needs requires a team approach. For example, Participant 337 indicated that *“it takes a team, just like the teacher is often the most knowledgeable about where a student struggles in math and what is needed to help them with math, in today's time teachers must also be nearly as knowledgeable about a students' communication skills and strategies.”* Only through collaborative teaming can effective AAC services be provided to students with complex communication needs to help close the current training gaps.

Limitations and Future Research

Although efforts were made to obtain a large, diverse sample size, results should be viewed with caution, as there were a small number of participants included in this study. Because data for this paper were taken from a larger dataset from a nationwide study, the end sample size was small and not fully representative of the number of special education teachers across Texas. Even though this was the case, it is important to highlight that national results mirror the findings for Texas special education teachers. A limitation that is worth noting is that only school administrators' information was collected to recruit participants. This method was employed because the administrators' emails were the only accessible, publicly available contact information that did not involve searching each school's website for teacher information for individual emails. At this same time, the implementation of snowball sampling may have also had an impact on the sample size. To address these limitations, future replications of the study should aim to recruit special education teachers in Texas directly, to gather a larger sample size, and, therefore, increase the response rate and obtain a more diverse sample group.

Conclusion

The purpose of this study was to provide a brief outlook into Texas special education teachers' self-reported knowledge and skills in AAC. Because communication skills are an essential milestone for literacy development, self-determination skills, and independence, it is essential that special education teachers have the knowledge and skills needed to effectively support these students. Unfortunately, based on the results, the majority of special education teachers *lack* knowledge and skills in AAC. These findings are concerning as such a lack of knowledge and skills may likely impact the service provided to students with complex communication. To support special education teachers and their students more effectively, it is important for state officials, teacher preparation programs, and school districts to consider how to enhance special education teachers' knowledge and skills to support *all* their students.

References

- Andzik, N. R., Chung, Y. C., Doneski-Nicol, J., & Dollarhide, C. T. (2019). AAC services in schools: A special educator's perspective. *International Journal of Developmental Disabilities, 65*(2), 89-97. <https://doi.org/10.1080/20473869.2017.1368909>
- Andzik, N. R., Schaefer, J. M., Nichols, R. T., & Chung, Y. C. (2018). National survey describing and quantifying students with communication needs. *Developmental Neurorehabilitation, 21*(1), 40-47. <https://doi.org/10.1080/17518423.2017.1339133>
- Brown, T. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). Guilford Press.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Erlbaum.
- Conway, J. M., & Lance, C. E. (2010). What reviewers should expect from authors regarding common method bias in organizational research. *Journal of Business and Psychology, 25*, 325-334. <http://doi.org/10.1007/s10869-010-9181-6>.
- Costigan, F. A., & Light, J. (2010). A review of preservice training in augmentative and alternative communication for speech language pathologists, special education teachers, and occupational therapists. *Assistive Technology: The Official Journal of Rehabilitation Engineering and Assistive Technology Society of North America (RESNA), 22*(4), 200-212. <https://doi.org/10.1080/10400435.2010.492774>
- Creswell, J. W., & Creswell, J. D. (2021). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE.
- Da Fonte, M. A., & Boesch, M. C. (2019). *Effective augmentative and alternative communication practices: A handbook for school-based practitioners*. Routledge.
- Da Fonte, M. B., DeLuca, E. R., Papp, S. K., Mohler, A. E., Holmes, E. E., Clouse, K. A., Young, R. D., & Urbano, R. (in press). Current preparation status in augmentative and alternative communication: A perspective of special education teachers in the United States. *Augmentative and Alternative Communication*.
- Durlak, J. A. (2009). How to select, calculate, and interpret effect sizes. *Journal of Pediatric Psychology, 34*, 917-928. <https://doi.org/10.1093/jpepsy/jsp004>
- Individuals with Disabilities Education Improvement Act of 2004, 20 U.S.C. §§ 662, 1462 et seq. (2004). <https://ies.ed.gov/ncser/pdf/pl108-446.pdf>
- Koul, R. K., & Lloyd, L. L. (1994). Survey of professional preparation in augmentative and alternative Communication (AAC) in speech-language pathology and special education programs. *American Journal of Speech Language Pathology, 3*(3), 13-22. <https://doi.org/10.1044/1058-0360.0303.13>
- Page, C. A., & Quattlebaum, P. D. (2012). Severe communication disorders. In D. Hollar (Ed.), *Handbook of children with special health care needs*. (pp. 23-46). Springer.
- Ruppar, A. L., Neeper, L. S., & Dalsen, J. (2016). Special education teachers' perceptions of preparedness to teach students with severe disabilities. *Research and Practice for Persons with Severe Disabilities, 41*(4), 273-286. <https://doi.org/10.1177/1540796916672843>
- Sansoti, F. J., Goss, S., & Noltemeyer, A. (2011). Perspectives of special education directors on response to intervention in secondary schools. *Contemporary School Psychology, 15*, 9-20.
- Sindelar, P. T., Brownell, M. T., & Billingsley, B. (2010). Special education teacher education research: Current status and future directions. *Teacher Education and Special Education, 33*(1), 8-24. <https://doi.org/10.1177/1058406409358593>
- U.S. Bureau of Labor Statistics (2020). *Occupational employment statistics query system*. <https://data.bls.gov/oes/#/home>
- Westling, D. L., Carter, E. W., Da Fonte, M. A., & Kurth, J. A. (2020). *Teaching students with severe disabilities* (6th ed.). Pearson.

CONTRIBUTING FACTORS FOR PASSING HIGH-STAKES EXAMS

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Abstract

The Texas Accountability System for Educator Preparation (ASEP) is aimed to raise standards for educator preparation programs (EPPs) in Texas. Accountability is inevitable, but when met with upgraded curriculum requirements and continuously increasing program standards, the growing rigor of pass rate calculations and TExES exams creates additional challenges for university educator preparation programs. In due service to teacher preparation program candidates and ultimately school districts across the state of Texas, test preparation activities must be of paramount focus. A pilot study was conducted to explore methods and strategies for preparing pre-student teaching candidates for a TExES content exam. Pre-Student Teaching students (N=61) were surveyed from a small regional institution in south Texas. Students were enrolled in a Physical Education Teacher Education (PETE) program. Using a focus group format, students discussed taking the exam and shared feelings towards taking such a high-stakes test. Uncertainty of content, anxiety, self-confidence, and motivation were the four most common feelings shared by the students. Student feedback provided the framework for tutoring that was constructed to assist students with test preparation. Results for the format was determined by student input and feedback. The resulting program implemented offered practical, sustainable strategies adopted and proven that successfully moved one educator preparation program from struggling to thriving at a Hispanic-serving institution in South Texas with TExES pass rates now at 100% for six out of the past seven years.

Keywords: high-stakes exams, teacher certification, TExES, test preparation

Contributing Factors for Passing High-Stakes Exams

The recent emphasis on accountability has required an upgrading of curriculum, adherence to academic standards, and increased use of *high-stakes* tests to qualify individuals for employment. Education in Texas has witnessed such tests by creating the mandatory Texas Examination of Educator Standards (TExES) exams for the employment of incoming teachers, thus making the obligation of university programs to provide test preparation activities paramount. Texas law now requires that educators pass appropriate tests to become certified. The appropriate examination(s) required for certification are specified in the Texas Administrative Code, §230.21(e) (TEA, 2021). University-approved educator preparation programs (EPPs) annually provide the Texas Education Agency (TEA) and the State Board for Educator Certification (SBEC) information about their programs as mandated in Texas Education Code Section 21.045 and 21.0452. This data is used to calculate the indicators in the Accountability System for Educator Preparation (ASEP).

The purpose of these examinations is to ensure that each educator has the prerequisite content and professional knowledge necessary for an entry-level position in Texas public schools (TEA, 2021). . All TExES exams are criterion-referenced examinations designed to measure a preservice teacher candidate's knowledge in relation to an established standard of competence (a criterion) rather than in relation to the performance of other candidates. The exams are coded, assigned a number, and arranged by content area. Each exam is laid out by specific domains and competencies ascribed by the content area. The exams assess the content area proficiency and professional knowledge/skills of the preservice teacher. The exams follow the same format of multiple-choice question (MCQ) format and require an 80% pass rate.

The state of Texas now requires preservice teachers to successfully pass an exam in their designated content area before entering a full-time teaching position. The test is constructed to assess a candidate's knowledge in his/her field.

The TExES exam #158 for physical educators is divided into three major areas (domains): Movement Skills and Knowledge, Health-related Physical Fitness, and the Physical Education program with approximately 100 test questions from those domains. Passing this exam requires a score of 240 (80% or higher).

For many students, taking a high-stakes test such as the TExES exam #158 for EC-12 physical educators can cause stress and anxiety and affect students' test performance. Research has demonstrated numerous factors that researchers have explored to attribute to successful student performance on such exams; however, for the purpose of the pilot study, four major factors were utilized to boost student test-taking performance: 1) anxiety, stress, and fatigue, 2) self-confidence and self-efficacy, 3) motivation and morale, and 4) test-taking strategies.

Many students have difficulty with stress and anxiety when it comes to high-stakes test-taking. Studies have raised concerns about the impact these tests have on students. Jones et al. (1999) found increased levels of anxiety, stress, and fatigue are often seen in high-stakes testing and all three factors have detrimental effects on student performance. Test anxiety can be the primary determinant of a student's potential for success on a high-stakes test and students with high levels of test anxiety are often the least successful on high-stakes tests. Therefore, reducing test anxiety is a priority (Stenlund et al., 2018).

The second factor to consider is self-confidence and self-efficacy. von der Embse et al. (2015) in trying to maximize student scores on exams found only self-efficacy to be significant in contributing to positive beliefs. Smith (2002) examined college students' perceptions of their test-taking skills and reported a relationship between self-confidence and test performance. In addition, Bayram (2013) reported good test-taking strategies are not enough and students' self-confidence has an important role in their test performance. Morse and Morse (1993) noted self-efficacy judgments of test-taking ability do correspond to academic test performance. Finally, Gebiril and Eid (2017) found only self-efficacy to be significant in contributing to positive beliefs.

The third factor considered was motivation and morale. Kellaghan et al. (1996) found that if students do not believe that an opportunity for success exists, then the motivating factors will have a minimal effect. If students view passing the test as an insurmountable barrier, they may give up. Successful test-taking involves not only useful test-taking strategies but managing emotional and motivational concerns as well (Stenlund, et al., 2017). Beghetto (2005), when examining preservice teachers, found those who held positive self-judgments of their test-taking ability demonstrated higher test-taking abilities than those who held negative self-judgment of their test-taking ability.

The final factor examined was test-taking strategies. Teaching preservice teachers actual strategies for test-taking improves student performance. Dodeen (2002) found using appropriate test-taking strategies improved students' attitudes towards a test and reduced test anxiety. Bond and Harman (1994) reported appropriate test-taking strategies improved students' attitudes towards a test and reduced test anxiety. test-taking strategies used for multiple-choice structured tests. Cohen (2006) found "*looking for markers in a passage*" such as a keyword a beneficial strategy.

Bond and Harman (1994) suggested students practice with actual questions that are similar to those on the exam as a reinforcing strategy, and Janes et al., (2018) suggested guided study sessions to learn the test material. There is also evidence to support multiple sessions as an effective approach to information retention and improvements in test-taking skills (Rawson & Dunlosky, 2013). Finally, Dunlosky et. al., (2013) found multiple sessions and distributed practice to boost performance across all educational contexts.

In addition to the factors previously discussed, a concern often arises is that of reading ability and grade point average (GPA) when examining student test-taking strategies. Reading is a fundamental skill for being an accurate test taker and achieving success and serves as an essential skill necessary for success when taking tests. The students must be able to comprehend and decipher the information presented to them to formulate correct question responses. It is interesting; however, to note findings by Maddox and Reglin (2019) revealed GPA did not significantly predict the outcome of test scores.

Students register for and take a computer-administered test (CAT). Students are given a five-hour time frame for completion. A passing score is 240. The test is designed to assess whether a test taker has the required knowledge and skills that an entry-level educator in the field of Physical Education in Texas public schools must possess. The 100 multiple-choice questions (MCQ) are based on the Physical Education EC–12 test framework, and range from grades EC through 12 (TEA, 2021). The exam is divided into three domains: *Domain I* – Movement Skills and Knowledge (38% of exam), *Domain II* – Health-Related Fitness (31% of exam), and *Domain III* – The Physical Education Program (31% of

exam). Many students have fear and anxiety of taking such high-stakes tests and often feel the pressures of not only taking the exam but passing as well. Passing is imperative as it is now a Texas Education Agency (TEA) requirement for employment in Texas public schools.

Purpose of the Present Study

Although testing and accountability are intended to improve achievement and motivate students, often preservice teachers do not fully understand the nature of the test itself. Many students are confused about what content material is actually on the test and are anxious about taking a test of that magnitude, or worse, they know someone who has failed it. Helping students overcome the unknown and feelings of anxiety is where the researchers started. In higher education, many Educator Preparation Programs (EPPs) are facing the challenge of understanding how to best help teacher candidates prepare for and achieve passing TExES scores for one or more of the required state exams. Students may have attained course content knowledge proficiency, yet they are lacking in applying strategies necessary to exhibit test-taking proficiency.

Because passing a content test of high-stakes magnitude can be stressful, a pilot study was conducted to examine student concerns and utilize their feedback to construct an intervention providing structured tutoring to assist in preparation for the exam. The four factors found in the research: 1) anxiety, stress, and fatigue, 2) self-confidence and self-efficacy, 3) motivation and morale, and 4) test-taking strategies were utilized in designing a program to assist preservice students in preparing to take the TExES #158 exam. The success rate of passing scores for TExES #158 at a regional institution in south Texas has steadily increased over the past decade since its conception. The purpose of this study was to examine methods and strategies for assisting pre-student teaching candidates in preparation for a TExES content area exam. The researchers will conclude by offering practical suggestions that highlight strategies and procedures adopted to produce not only passing scores but provide quality teachers to deserving school districts in south Texas.

Method

A convenience sample ($N=61$) was utilized to conduct the study. Students in a teacher preparation program who were enrolled in an Elementary Physical Education methods course were part of a focus group designed to ask questions, address concerns, and collect comments and feedback regarding the upcoming TExES #158 (EC-12 Physical Education) state exam they were required to take. From the student feedback provided to one of the researchers who are the EC-12 Physical Education Program Coordinator in the university Department of Health & Kinesiology. The feedback provided by the students would be categorized and analyzed to design an intervention for assisting students in taking this high-stakes exam. Feedback was analyzed in qualitative methods to determine merging categories of student concerns. The following steps were utilized: Collect the data/feedback, determine categories that emerged, label categories, code the content, and analyze the results.

Results

When analyzing the feedback, five themes emerged: 1) anxiety, 2) fear of the exam itself, 3) lack of self-confidence, 4) lack of understanding of the test content and format, and 5) lack of test-taking strategies. The most prevalent concern expressed by student respondents regarding the TExES #158 exam was *anxiety*. Students described their anxiety as a result of fear of failure combined with the pressure of passing the exam and not only to qualify for progress in the educator preparation program. The sample group of students was enrolled in an educator preparation program that requires passing scores on TExES exams to qualify for the clinical experience (student teaching). As student teaching is a requirement of the degree plan, this inherently meant the exams would serve as a requirement (or a barrier) to graduation. This clearly was at the forefront of student concerns causing a great deal of anxiety as a result of pressure to succeed, and timely so. Students also detailed their anxiety was the result of concern for their professional futures. Without a passing score on the TExES #158 exam, they would not be eligible for the Standard Classroom Teacher Certificate. The combination of pressures to succeed contributed to their test anxiety.

Student participants also detailed fear of the exam itself. Student participants described the task of preparing for the TExES #158 exam as daunting, intimidating, and stressful primarily because just the thought of having to take the test at all was overwhelming. Generally, students attributed their fear of the TExES #158 to prior experiences with poor exam performance. It became quite evident that student participants almost resented the need to responsibly anticipate the reality of the exam. The researchers believed this also to be a result of the combined pressures for success (anxiety).

Another theme that emerged from the data was with lack of *self-confidence*. Students expressed that because of the pressures to succeed and as a result of the fear of the exam itself, students held negative perceptions about their potential for success. This lack of confidence was defined as a result of an overemphasis on the potential for negative results. Recognizing educator preparation program deadlines, students would make statements like, “if I take the test by this date, I have two more tries before the deadline.” This mentality was proof that students already anticipated a failure of the exam or possibly more than one failed attempt.

During the data collection period, the researchers also identified that a lack of understanding of the test content and format as another prominent theme. Students had very little understanding of what to expect on the TExES #158, not only in terms of content (domains, competencies, knowledge and skills) but also in terms of structure (the number of questions, how much time was allowed, how the scoring was calculated, etc.). Although there are materials available for students to review and gain some level of understanding about the test itself, there was no initiative to do so. The researchers observed that as a result of test anxiety, fear of the exam, and a lack of confidence in their potential for success, students almost shut off any intention or mild desire to pursue information about the exam. There was no drive or motivation to research and understand what the test contained.

The researchers also noted that students lacked *test-taking strategies*. Student participants lacked any type of strategic method in preparing for a high-stakes test. In fact, student participants were heard saying they “wished for a review sheet,” a style of test preparation to which they have become accustomed. In this preparation method, students are provided with a review sheet that details all that can be expected on an upcoming exam and in some cases, word-for-word questions and the correct answers. Student participants were not prepared with strategies, techniques, and approaches to succeed in test content, format, and in the administration environment.

Discussion

The purpose of this study was to examine methods and strategies for assisting pre-student teaching candidates in preparation for a TExES content area exam. Upon analyzing data collected from students, the researchers identified five themes that detailed student concerns about exam preparation: 1) anxiety, 2) fear of the exam itself, 3) lack of self-confidence, 4) lack of understanding of the test content and format, and 5) lack of test-taking strategies. The results provide important insight for educator preparation programs about the student experience, especially as it pertains to exam preparation and the teacher certification process.

Educator preparation programs are charged with the responsibility of preparing high-quality teachers for tomorrow’s classrooms. To do that effectively, program leadership and staff must be prepared and willing to recognize areas of opportunity, particularly those that encourage program improvement. One way is to seek out student voice and to incorporate those voices as forms of data-driven decision-making (Varela et al., 2020). This study afforded researchers the opportunity to understand the student’s position. The results offer insight into what internal and mental barriers were in existence before a test preparation strategy could be developed. It is the concept of meeting students where they are (Schouten, 2017); a commitment that requires systems of education to reconfigure antiquated practices that are universally applied and focus instead on the individual learner and individual learning needs.

A perfect score for the exam is 300. Students must achieve 80% or a score of 240 to pass the exam. The pressures students experience for criteria of this magnitude can cause stress and anxiety for many preservice teachers. Achieving a passing score is not only important to the student test-taker but the Educator Preparation Program (EPP) as well. The Texas Education Agency (TEA) reports each student’s score to the student and to the EPP. The regional institution had previously reported such totals as a 76% rate for the exam. The researchers involved in the testing designed a plan to improve those scores.

From the emerging themes found in this data, the Program Coordinator used the information to begin the construction of a student tutoring program to assist students in test preparation. The individualized tutoring program is intentionally designed to target not only student content deficiencies but more importantly to address the points of text anxiety found in the themes. The program seeks to help build student confidence, provide an in-depth review of test format and administration structure, and to address negative perceptions of ability and capacity to succeed. Implementation is underway and longitudinal data (including TExES exam scores) is being collected for future reporting. The Program Coordinator is designing strategies and techniques to use with students as they tutor for TExES #158.

Students provide additional feedback regarding what strategies and techniques implemented worked best for them upon completion of tutoring sessions conducted and passing the actual TExES #158 exam.

Limitations

The sample consisted of 61 students at a regional institution in south Texas. Any generalizations regarding our findings are limited. Students were asked about fears, anxieties, and issues they had for the upcoming high-stakes TExES exam. Readers should use caution in interpreting results. What worked for this institution may not be generalizable for others. For methodology purposes, this was a small sample size, a larger sample could yield additional factors to examine. In addition, the feedback was self-reported data given by students preparing to take a high-stakes exam. A possible limitation to the researchers is having access to students. The university is a small regional institution with a predominantly Latino population and the teacher preparation program has a small number of preservice teachers. In addition, longitudinal effects are warranted for future investigation.

Suggestions for Future Research

Further investigation and additional intervention programs are needed to better address this growing issue of high-stakes test-taking. Results provide necessary insight into the need to train future teachers, and university administrators how to better recognize, understand, and respond to test-taking strategies for certification testing.

References

- Bayram, B. (2013). Scale for test-preparation and test taking strategies. *Educational Sciences: Theory & Practice*, 13(1), Winter 279-289. Retrieved from <https://eric.ed.gov/?id=EJ1016653>
- Beghetto, R. (2005). Preservice teachers' self-judgments of test taking. *The Journal of Educational Research*, 98(6), 376-380. <https://doi.org/10.3200/JOER.98.6.376-380>
- Bond, L., & Harman, A. (1994). The effects of special preparation on measures of scholastic ability. In R. L. Linn (Ed.), *Educational Measurement* (3rd ed., pp. 429-444). New York, NY: American Council on Education/Macmillan.
- Cohen, A. (2006). The coming of age of research on test-taking strategies. *Language Assessment Quarterly*, 3(4), 307-331. <https://doi.org/10.1080/15434300701333129>
- Dodeen, H. (2002). Assessing test taking strategies of university students: Developing a scale and estimating its psychometric indices. *Assessment and Evaluation in Higher Education*, 33(4), 409-419. <https://doi.org/10.1080/02602930701562874>
- Dunlosky, J., Rawson, K., Marsh, E., Nathan, M., & Willingham, D. (2013). Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. *Psychological Science in the Public Interest*, 14(1), 4-58. <https://doi.org/10.1177/1529100612453266>
- Gebriel, A., & Eid, M. (2017). Test preparation beliefs and practices in a high-stakes context: A teacher's perspective. *Language Assessment Quarterly*, 14(4), 360-379. <https://doi.org/10.1080/15434303.2017.1353607>
- Janes, J., Dunlosky, J., & Rawson, K. (2018). How do students use self-testing across multiple study sessions when preparing for a high-stakes exam? *Journal of Applied Research in Memory and Cognition*, 7(2), 230-240. <https://doi.org/10.1016/j.jarmac.2017.11.003>
- Jones, G., Jones, B., Hardin, B., Champman, L., Yarbrough, T., & Davis, M. (1999). The impacts of high-stakes testing on teachers and students in North Carolina. *Phi Delta Kappan*, 81(3), 199-203. Retrieved from <https://www.jstor.org/stable/20439620>
- Kellaghan, T., Madaus, G., & Raczek, A. (1996). *The use of external examinations to improve student motivation*. Washington, D.C.: American Educational Research Association.
- Maddox, A., & Reglin, G. (2019). Teacher preparation tests and grade point average as a predictor of teacher licensure high-stakes tests. *College Student Journal*, 53(2), 229-242. Database: SPORTDiscus. Retrieved from <https://www.ingentaconnect.com/content/prin/csj/2019/00000053/00000002/art00009>
- Morse, D. T., & Morse, L. W. (1993, November). *An exploratory study of the relationship of test-wiseness, answer-changing, and test performance*. Paper presented at the annual conference of the Mid-South Educational Research Association, New Orleans, LA.
- Rawson, K. & Dunlosky, J. (2013). Relearning attenuates the benefits and costs of spacing. *Journal of Experimental Psychology: General*, 142(4), 1113-1129. <https://0-doi-org.oasis.lib.tamuk.edu/10.1037/a0030498>
- Smith, L. (2002). The effects of confidence and perception of test-taking skills on performance. *North American Journal of Psychology*, 4(1), 37-50. Retrieved from <https://ourarchive.otago.ac.nz/handle/10523/6962>
- Stenlund, T., Lyrén, P. E., & Eklöf, H. (2018). The successful test taker: exploring test-taking behavior profiles through cluster analysis. *European Journal of Psychology of Education*, 33(2), 403-417. Retrieved from <https://link.springer.com/article/10.1007/s10212-017-0332-2>
- Stenlund, T., Eklöf, H., & Lyren, P. (2017). Group differences in test-taking behavior: An example from a high-stakes testing program. *Assessment in Education: Principles, Policy & Practice*, 24(1), 4-20. <https://doi.org/10.1080/0969594X.2016.1142935>
- Texas Education Agency. (2021). *Educator Testing*. <https://tea.texas.gov/texas-educators/certification/educator-testing>

von der Embse, N., Schultz, B. & Draughn, J. (2015). Readyng students to test: The influence of fear and efficacy appeals on anxiety and test performance. *School Psychology International*, 36(6), 620-6.
<https://doi.org/10.1177/0143034315609094>

CULTIVATING A UNIVERSITY-COMMUNITY PARTNERSHIP THROUGH AN INNOVATIVE AFTER-SCHOOL ACADEMIC PROGRAM

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Abstract

A large body of literature suggests that service-learning, or experiential learning, is an effective approach for preparing classroom-ready teachers. While a great deal of emphasis has been placed on preparing teachers to enter their first classroom academically and pedagogically sound, there has been less emphasis on preparing teachers who understand and are equipped for community engagement as a component of teaching. This paper will describe the approach taken by one educator preparation program housed in a college of education at a regionally accredited state university, in the hopes that other teacher preparation programs can glean information to inform their own efforts at preparing teachers who are both classroom and community ready. The collaboration between the college, the community, and the local school district resulted in an academic after-school program that engaged teacher candidates in experiential service learning, leveraged the expertise of university faculty and school and community partners in a program that provided valuable learning to both the schoolchildren and the teacher candidates. The paper concludes with a description of subsequent initiatives that were developed as an outgrowth from the after-school program.

Keywords: teacher preparation, community partnerships, classroom-ready, community ready, service-learning, experiential learning, after-school programs, tutoring

Introduction

In 2011, Jentleson claimed, “As major social institutions, which cannot readily move, university campuses must deal with the issues of the decaying physical environments, growing poverty and crime rates, and the failing public schools of their surrounding neighborhoods and communities” (p.5). It is also the responsibility of institutions of higher education to develop both knowledge and character in the next generation of professional leadership. In fact, the goal of higher education is not only to prepare students for productive careers but also to help students develop a sense of a heightened responsibility to others both locally and globally. This article reports how one College of Education aligned its curriculum with the university’s motto, “The Measure of Life is its Service.” It tells the story of how an after-school academic program supported by the college nurtured the development of classroom readiness and community readiness in its undergraduate students seeking certification to teach in K-12 public schools. The article also tells the story of how an after-school academic program led to opportunities for productive collaboration between the college, the community, and the local schools.

To tell the story, we asked, “How can we create a university-community partnership (UCP) that will mutually benefit K-12 students and their families as well as the teacher candidates?” The term university-community partnership is used variably to describe any effort in which academic institutions and their local communities are reciprocally engaged and involved (Lewis et al., 2016; Zygmunt & Clark, 2015). The value of reciprocal collaborations is profound and yet, the question of how to structure and organize such work remains confounding (Bowers, 2017). This article calls for teacher education programs (TEPs) to remain culturally and community responsive while preparing teacher candidates to become “the best our society has to offer our children” (Guillen & Zeichner, 2018, p.151). We first provide a brief review of the literature to define a classroom-ready and a community-ready teacher. Next, we provide a brief literature review on after-school academic programs, introduce the Huntsville Immersion Partnership After-school Academic Program (HIP) with an overview, and discuss the structure and organization of the program in the hope that it could serve as a model for universities and schools/communities who wish to initiate a similar program and alliance. This article ends with reflections from teacher candidates who served as instructional coaches and a conclusion on how critical service-learning projects enable teacher candidates to become classroom-ready and community-ready teachers.

Literature Review

A Classroom-Ready and Community-Ready Teacher

Tindall-Ford et al. (2017) describe a “classroom ready” teacher as someone who has “a sound understanding of the complex context that constitutes the ‘classroom’ in which they are expected to teach” (p. 193). In fact, Tindall-Ford et al. (2017) declared that immersion programs within initial teacher education provided authentic learning experiences for teacher candidates. While Tindall-Ford et al. (2017) placed emphasis on professional experience in classroom contexts, Salter and Halbert (2019) called for teacher preparation programs to equip teacher candidates to be “community ready” through critical service-learning projects (p.5). Salter and Halbert (2019) argued that balancing classroom readiness with community readiness in a critical service-learning project teaches teacher candidates how to teach in context as “...engaged global citizens” (p.5). In this context, Zeichner (2019) argued that when teachers got to know the families and communities in which their students lived and used the knowledge and the connections in ways that supported student learning, both students and teachers had a better chance to succeed. Tindall-Ford et al. (2017) described this type of teacher as someone who had the “know-how, know-what, know-why and know-when” (p. 208). In collaboration with school and community stakeholders, we established a weekly immersive after-school academic program to provide opportunities for teacher candidates to engage with the students beyond the brick-and-mortar walls of the classroom and to develop relational understandings and skills about the lived experiences of the students, and their wider community contexts (Salter & Halbert, 2019). To provide an opportunity for teacher candidates to learn how to balance classroom readiness with community readiness was one of the main goals of the program.

After-School Academic Programs

There is extensive literature regarding service-learning (Bringle & Hatcher, 1996; Hildenbrand & Schultz, 2015) and university-community partnerships in the field of education (Guillen & Zeichner, 2018), yet the incorporation of after-school programs in teacher education-community partnerships remains underexamined. According to the Afterschool Alliance (2016), after-school programs have a critical place especially in rural, underserved and socio-economically disadvantaged communities. Jentleson (2011) noted, “...middle- and upper-income families seem to be putting together a workable patchwork of after-school care, lessons, and extracurricular activities that minimize the need for daily structured afterschool programs” (pp. 25-26). Jentleson found “low-income children who are shown most able to benefit from after-school programs often have the least access to this [afterschool programming and recreational facilities] valuable resource. Recreational resources are often fewer and less appealing in lower-income neighborhoods” (p. 26). Jentleson further acknowledged:

Of critical importance is the afterschool program’s ability to serve as an intermediary social setting where low-income students and families are physically, psychologically, and culturally comfortable. A second benefit is

that structured after-school programs are able to support the school's academic mission by providing academic support and an intermediary role between school and community youth. (p. 26)

Program Overview

In this case, the after-school academic program was intentional and involved multiple stakeholders. In 2015, we embarked on a journey with a local community partnership to create an after-school academic program for youth, held on the university's campus, in hopes of propelling down the pipeline from school to prison for these students. At the time, the purpose of the program was to help students from the community envision a future beyond their immediate circumstances. In the beginning, the after-school program's name was associated with the local community partner. In 2017, we decided to expand the program and change the name to be more representative of this expansion. We agreed upon the program title Huntsville Immersion After-school Academic Program, or HIP, to represent the community and to emphasize the academic nature of the program.

In addition to supporting student academic success, HIP is designed to recruit and prepare teacher candidates to become engaged community teachers. For the targeted grades of HIP, student performance on state testing standards typically fell below state and regional averages in every category and for every student sub-population. In some areas, performance had been almost 50% below the state average, with passing rates below 15% (Texas Education Agency, 2016-2017). The need to prepare, engage, and retain teachers in the local community who can work with these students is beyond critical, and HIP is designed to meet these needs while also offering direct instruction and support to students. In other words, the primary goal of HIP is to directly increase academic performance among students needing support while simultaneously providing teacher candidates with opportunities to become classroom-ready community teachers as they volunteer as instructional coaches in this program. HIP after-school academic program is a united vision between the community, the university, and school partners.

Participation by teacher candidates in this program was voluntary. Most of them were enrolled in field experience courses and specialized in grades 4 through 8 (4-8) English Language Arts (ELAR) and Social Studies, 4-8 Mathematics, and Early Childhood-6 grade Bilingual. Each semester the faculty involved in HIP visited undergraduate courses, especially those with a field component to introduce the mission of the program and the responsibilities of the role of "instructional coaches". At the beginning of each semester, we held a retreat for instructional coaches to welcome them, to go over the expectations of the program, and to get to know the other coaches and participating faculty. During the retreat, each instructional coach also received a journal to record their weekly reflections.

All teacher candidates who volunteered from 2015-2018 sought Texas teacher certification in EC-6 or 4-8 content areas. In 2018, we decided to move HIP from the university's campus to the local Boys & Girls Club with the goal of making the program accessible to more students. In spring 2019, HIP began meeting at the new Boys & Girls Club building every Tuesday from 4 pm-6 pm. During this time, 18 teacher candidates served as coaches. As a coach, one of the responsibilities was to tutor students in the content area in which the teacher candidate sought certification. The coaches tutored 45 students. Of the 45 students, 24 students attended the academic tutoring sessions regularly. Due to limited after-school academic support for older students, we decided students in the upper grades would be the ones selected to receive assistance. In 2018, we sought teacher candidates from the Bilingual Course Block to serve as coaches also. All teacher candidates committed to serve as a coach for at least one semester.

For the spring 2019 semester, the students, the teacher candidates, and the organizing faculty from the College of Education met at the Boys & Girls Club. All students arrived at the Boys & Girls Club by 4:00 pm and the tutoring began at 4:30 pm. Both the lead faculty and Boys & Girls Club administration/staff spoke with parents and legal guardians about the expectations and details of the program. In one of the meetings, for example, parents were asked if they would allow their child to stay until 6:00 pm. If their schedules permitted, almost all of them agreed with this instruction time frame. The 24 who attended regularly exhibited a commitment to the program, as they were also the students who stayed until 6:00 pm.

We spent the spring 2019 semester adjusting to the Boys & Girls Club procedures and guidelines. During that period, small operational issues surfaced; however, by fall 2019, we learned how to organize the after-school academic program to operate more effectively and efficiently. In fall 2019, we had 20 regularly participating students in grades 6-11 and 12 volunteer teacher candidates. In spring 2020, it became necessary to suspend the program due to the COVID-19 pandemic. In fall 2020, we offered an online activity for students and teacher candidates to maintain momentum. We discuss the online activity in the “Engagement Beyond Academics” section of this paper.

Academic Engagement

Grade Level Assessment

Before the program started, the teacher candidates (referenced as “coaches” hereafter) either administered the STAAR *Ready-Reading 5th Grade*, Rasinski’s *Three Minute Reading Assessments for Grades 5-8*, or *Texas Middle School Fluency Assessment (TMSFA)* for grades 6-8 to determine the student’s reading fluency and comprehension. The *Ready-Reading 5th Grade* assessment was also available in Spanish for students who preferred to read it in Spanish. In addition, the teacher candidates administered the *Student Math Survey* and the *Adolescent Motivations for School Reading Questionnaire (AMSRQ)*. The survey and questionnaire provided opportunities for students to express their opinions about mathematics and reading. After conducting the assessments and analyzing the data, the coaches used one of the following books as the primary textbook to tutor in the content area: *Everything You Need to Know to Ace Math in One Big Fat Notebook* or *Everything You Need to Know to Ace English in One Big Fat Notebook*. The primary textbooks are written in student-friendly language. We believed regularly participating students would meet the target passing grade of C for each content area of reading and mathematics. In spring 2019, of the 24 students who participated regularly, 15 were tutored in mathematics and 9 were tutored in ELAR.

Academic Outcomes: School Exam and STAAR Test Results

A guidance counselor from one of the partner schools collected data for the HIP program. Data consisted of grades on the students’ report card. We learned of the 15 who received tutoring in mathematics, 93% met the target passing grade of C or higher in the 4th nine weeks. All 8 students who received tutoring in ELAR met the target passing grade of C or higher. In addition, we hypothesized that tutoring the regularly participating students would increase STAAR test results in the content areas from the previous year. Of the 15 regularly attending students who received tutoring in mathematics in spring 2019, 80% passed the math section of the STAAR test. Of the 8 students who received tutoring in ELAR, we noticed 63% passed the reading section of the STAAR test. Some factors that may have had an effect on the ELAR results included: reading fluency and difficulty comprehending. Other factors that may have had an effect were that some students qualified as a student with special needs or were on a Texas 504 Plan for Accommodations. According to the guidance counselor, other factors such as socioeconomic status and attendance in school may have also contributed to the STAAR results.

Engagement Beyond Academics

Meet the Author

HIP provided opportunities for students to engage beyond academics. According to Jentleson (2011), after-school programs can support positive youth development by providing academic tutoring, social skills, and exposure to cultural enrichment activities. As such, the HIP program offered academic support and several cultural enrichment activities, such as a “Meet the Author” event. Due to the popularity of the movie, *Black Panther*, many students wanted to meet the Coretta Scott King/John Steptoe Award winning children’s book author, Ronald L. Smith who is the author of Marvel’s book, *Black Panther: The Young Prince* (2018). The book captured the young protagonist T’Challa in his early years, and many of the students were interested in this character. In spring 2019, the students had the opportunity to Skype and interact with the author. We learned from the regularly participating students that this was the first time any of

them communicated with a children's book author. In fact, for many, it was their first time meeting an author. In fall 2019, award winning juvenile fiction author Ben Mikaelson was invited to visit the town. Mikaelson is the recipient of the International Literacy Association Award and the Western Writer's Golden Spur Award. His novels have been nominated and have won many State Readers' Choice awards. He is the author of *Touching Spirit Bear*, which is a book about bullying, the juvenile justice system, forgiveness, and healing. We partnered with a local middle school to do a book study on *Touching Spirit Bear* (2001).

We also partnered with a surrounding school district for this book study. The local middle school invited the author to the campus to speak to 191 students. All students who participated in the book study at the middle school received an autographed copy of the book. Additionally, the school district brought 200 students in grades 4-5 to the university's campus for an afternoon conversation with the author. The author also presented at the Boys & Girls Club. All participating students in grades 5-9 at the Club received an autographed copy of the book. A faculty member demonstrated for the students and the coaches at the Boys & Girls Club how to write their own readers' theater script about *Touching Spirit Bear*. Two groups volunteered to perform their script when the author visited, and coaches shared the "I Am" poems that they wrote capturing a character, object, or thing found in the book.

Due to the popularity of the movie, *The Hate U Give*, in fall 2020, we invited award-winning author of the #1 *New York Times* bestseller by the same title (2017), Angie Thomas to Zoom with the students at the Boys & Girls Club. The students were highly engaged in the conversation about her process and the topics presented in the book. The discussion between the students and Thomas was open and friendly, so much so that one student asked Angie Thomas to rap, and she freestyled for the students. She shared with the group how much the students energized and inspired her. All students received a copy of Thomas' book.

Arts and Science

During the spring 2019 and fall 2019 semesters, we invited a professor from the Department of Art at the local university to host an Arts Day with the students at the Boys & Girls Club. In addition, we had Science Day in fall 2019. We invited a science professor from the School of Teaching and Learning at the local university to lead a workshop on the solar system. The professor is the NASA JPL Solar System Ambassador and the NASA Goddard Earth SYSTEM Ambassador. In response, one teacher candidate shared, "Today, I had so much fun at the HIP program...I also enjoyed the seminar we've had in science about the moons. I also got a NASA sticker. Great day."

Reflections

After each tutoring session, the instructional coaches wrote their weekly reflections in the journal that we provided to them. Each page in the journal had the following template (a) Today, I intend to... (b) Today, I will be mindful of... (c) Today, I am grateful for and (d) Today, I learned. One tutor from the EC-6 Bilingual Block wrote in her weekly reflection that she intended to "Be ready; be available; be alive to make a difference and teach." Her statement was the theme that permeated the tutors' weekly reflections. In support of this, one instructional coach from the grades 4-8 literacy methods block in her final weekly reflection wrote:

This program has shown me how to have patience when children get tired and has given me the opportunity to get to know children's hearts. I have seen the good days and bad and have come to love this program and everyone in it.

Other instructional coaches wrote in their weekly journals that they learned "how to tutor on the spot" and how to be "mindful of chaos." Due to the noise level at the Boys & Girls Club, tutoring was not an easy task. In the beginning, the instructional coaches complained about the noise level and considered it a distraction. Over time, several wrote in their weekly reflections that the chaos taught them how to ignore distractions and still teach.

It was evident in their reflections that volunteering to serve as instructional coaches prepared them to be culturally responsive teachers. The teacher candidates knew their content well, so they were classroom-ready. However, serving as an instructional coach taught them how to become community ready by making themselves available to get to know the students and the community in which the students lived. Throughout the semester, the instructional coaches also wrote reflection statements to detail what they learned. In her reflection, one 4-8 ELAR instructional coach wrote:

All my life, I have observed the challenges that Hispanic students like myself are faced with in my mom's very own bilingual kindergarten classroom. Working with the middle schoolers in the tutoring program this semester reminded me that those same challenges are prevalent in students of all ages and family backgrounds, specifically minorities who come from low-income households.

In another reflection, a 4-8 mathematics instructional coach noted:

Everything we do as a coach in HIP is helping us. We are getting hands-on experience with different types of students and even behavior issues, which a lot of future teachers don't see until they are in their own room. As the students learn, I am learning every time too.

In addition, a 4-8 mathematics instructional coach expressed:

Volunteering as a coach in HIP is a great opportunity for me as a future teacher. I enjoy helping students and seeing them succeed in their education. I hope each student learns a lot from us by the end of the semester.

One 4-8 ELAR/SS instructional coach captured the impact that volunteering as a coach had on her. She wrote:

I definitely believe that volunteering as a coach in HIP is preparing me as a future teacher because I have had little experience working with actual students. Even on the second day, it has been a huge eye-opener for me. The students are beginning to open up a bit more and are gradually becoming more comfortable with their coaches.

The overarching theme that emerged from the reflections was: it takes both classroom readiness and community readiness to become culturally responsive teachers.

Discussion and Conclusion

The Powell Foundation awarded the College of Education \$47,000 to support the Huntsville Immersion Partnership (HIP) After-School Academic Program for the 2018-2019 academic year. We received notification from the Powell Foundation that they would fund HIP for another \$47,000 for the 2019-2020 academic year. The HIP program had a ripple effect, demonstrated by the 3 instructional coaches seeking certification in grades 4-8 ELAR/SS further developing their passion and writing a grant with faculty to receive funding to implement a social studies summer camp for youth in need of extra academic support at the Boys & Girls Club. In 2019, the students received \$8,000 to fund the camp and to present at a state-wide conference. Overall, interest in HIP at the university led to partnering with the university's Office of Equity and Inclusion to create a Diversity Certificate Program for undergraduate teacher candidates. This certificate program began fall 2019 with over 100 future teachers enrolled. We had 68 teacher candidates successfully complete the certificate program.

In sum, we share the story about the HIP after-school academic program and subsequent results, hoping it will inspire other Colleges of Education to find their own innovative ways to prepare teacher candidates to work in diverse and different school settings. We know the call for teacher preparation programs in the United States (Tinkler et al., 2013) and elsewhere (Mergler, et al., 2017) to better prepare teacher candidates is growing increasingly louder due to the possibility of students from underrepresented communities experiencing a deficit view (Muhammad, 2020), implicit bias (Sparks, 2020), exclusionary discipline encompassing a school-to-prison pipeline (Riddle & Sinclair, 2019) or a disproportionate assignment to special education (Thomas et al, 2020). We took this call to heart and felt compelled to tell our story about the HIP after-school academic program and its impact on nurturing the development of classroom-readiness and community-readiness in our undergraduate students.

References

- Afterschool Alliance (2016). America after 3PM special report: Afterschool in communities of concentrated poverty. Retrieved June 24, 2021 from the http://www.afterschoolalliance.org/aa3pm/concentrated_poverty.pdf
- Bowers, A. M. (2017). University–community partnership models: Employing organizational management theories of paradox and strategic contradiction. *Journal of Higher Education Outreach and Engagement*, 21(2), 37-64. Retrieved from <https://tme.journals.galib.uga.edu/jheoe/article/view/1330>
- Bringle, R. G. & Hatcher, J. A. (1996). Implementing service learning in higher education. *The Journal of Higher Education*, 67(2), 221-239. <https://doi.org/10.1080/00221546.1996.11780257>
- Guillen, L. & Zeichner, K. (2018). A university-community partnership in teacher education from the perspectives of community-based teacher educators. *Journal of Teacher Education*, 69(2), 140-153. <https://doi.org/10.1177/0022487117751133>
- Hildenbrand, S. M. & Schultz, S. M. (2015). Implementing service-learning in pre-service teacher coursework. *Journal of Experiential Education*, 38(3), 262-279. <https://doi.org/10.1177/1053825915571748>
- Jentleson, B.C. (2011). Better together: A model university-community partnership for urban youth. New York, NY: Teachers College Press.
- Lewis, L. A., Kusmaul, N., Elze, D., & Butler, L. (2016). The role of field education in a university-community partnership aimed at curriculum transformation. *Journal of Social Work Education*, 52(2), 186-197. <https://doi.org/10.1080/10437797.2016.1151274>
- Mergler, A., Carrington, S. B., Kimber, M. P., Bland, D., & Boman, P. (2017). Exploring the Value of Service-Learning on Preservice Teachers. *Australian Journal of Teacher Education*, 42(6), 69-80. Retrieved from <https://search.informit.org/doi/abs/10.3316/ielapa.952497301507861>
- Muhammad, G. (2020). *Cultivating genius: An equity framework for culturally and historically responsive literacy*. Scholastic.
- Riddle, T. & Sinclair, S. (2019). Racial disparities in school-based disciplinary actions are associated with county-level rates of racial bias. *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*, 116(17), 8255-8260. <https://doi.org/10.1073/pnas.1808307116>
- Salter, P. & Halbert, K. (2019). Balancing classroom ready with community ready: Enabling agency to engage with community through critical service learning. *Asia-Pacific Journal of Teacher Education*, 47(1), 5-13. <https://doi.org/10.1080/1359866X.2018.1497771>
- Schaffer, C., Gleich-Bope, D., & Copich, C. B. (2014). Urban immersion: Changing pre-service teachers' perceptions of urban schools. *The Nebraska Educator: A Student-Led Journal*, 19, 4-31. Retrieved from <https://digitalcommons.unl.edu/nebeducator/19/>
- Sparks, S.D. (2020). Training bias out of teachers: Research shows little promise so far. *Education Week*. Retrieved May 4, 2021 from the <https://www.edweek.org/leadership/training-bias-out-of-teachers-research-shows-little-promise-so-far/2020/11>
- Texas Education Agency (2016-2017). *2016-2017 Texas Academic Performance Report: Huntsville ISD*. Retrieved June 24, 2018 from <https://www.huntsvilleisd.org/cms/lib/TX02215447/Centricity/Domain/836/HHS%20TAPR%202017.pdf>
- Tindall-Ford, S., Ledger, S., Williams, J., & Ambrosetti, A. (2017). Immersion programs in Australia: Four models for developing classroom-ready teachers. In J. Kriewaldt, A. Ambrosetti, D. Rorrison, and R. Capaness (Eds.), *Educating future teachers: Innovative perspectives in professional experience*(pp.193-216). Singapore: Springer Nature.

Tinkler, A. S., Erickson, J. A., & Jagla, V. M. (2013). *Transforming Teacher Education Through Service-learning*. Charlotte, N.C.: Information Age Publishing.

Thomas, C. L., Tancock, S. M., Zygmunt, E. M., & Sutter, N. (2020). Effects of a community-engaged teacher preparation program on the culturally relevant teaching self-efficacy of preservice teachers. *Journal of Negro Education, 89*(2), 122–135. Retrieved from <https://www.jstor.org/stable/10.7709/jnegroeducation.89.2.0122>

Zeichner, K. (2019). Preparing teachers as democratic professionals. *Action in Teacher Education (Routledge), 42*(1), 38–48. <https://doi.org/10.1080/10626620.2018.1700847>

Zygmunt, E. & Clark, P. (2015). *Transforming teacher education for social justice*. Teachers College Press.