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Exploring Elementary Pre - Service Teachers Technological Knowledge for Teaching Literacy: a Phenomenological Study

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This dissertation has been read and approved as fulfilling the partial requirement for the Degree of Doctor of Education in Curriculum and Leadership.

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EXPLORING ELEMENTARY PRE-SERVICE TEACHERS' TECHNOLOGICAL KNOWLEDGE FOR TEACHING LITERACY: A PHENOMENOLOGICAL STUDY

By

Christy Nicole Grigsby

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DEDICATION

To my boys, Jp and Bray, who hung the moon,

To my future husband, Jeff, that keeps it lit,

And to my MawMaw whom I miss and love there and back again.

ACKNOWLEDGEMENTS

I am so thankful for the support and love my fiancé showed me during my dissertation. I would never be able to list all the things he did for me over the last 3 years. He was my biggest cheerleader and encouraged me to succeed even when I thought I was being selfish to dream this big. Whether it was watching my boys while I attended class, playing taxi for their numerous sporting events, providing me uninterrupted writing time, flowers to enjoy while writing or proofreading my dissertation, his contributions were endless.

I am so thankful for my boys, Jp and Bray. They have huge personalities and love big. They are amazing athletes and awesome young men. I pray that my dissertation inspires them to dream big.

My dissertation chair, Dr. Mark McCarthy. I cannot say enough about him. He provided me support and guidance through every step of the way. He was always available to help me and spent hours guiding me to truths by sharing articles and ideas. I am blessed to have a chair with such a strong work ethic and commitment to education. Thank you to Dr. Charlotte Henderson and Dr. Thomas McCormack for always providing me sound guidance throughout the dissertation process as my dissertation committee members. They responded quickly and efficiently to my progress to help me stay on the right track.

Finally, and most importantly, I recognize that I am nothing without my God who strengthens me. This has never been truer than the last three years of my life. They say that God works in mysterious ways. My adult life is a testament to that, and I am so thankful for all my blessings.

ABSTRACT

As a result of the fundamental changes to education due to COVID-19, this study focuses on the readiness of pre-service teachers to meet the literacy needs necessary in this technology mediated world by utilizing a theoretical framework that consists of a learning framework: Transformative Learning, a literacy framework: Multiliteracies, and a technological framework: Technological Pedagogical Content Knowledge (TPACK) to include the 2019 addition of another knowledge base: ConteXtual Knowledge (XK). It is this context component of TPACK that is so frequently overlooked that may encompass the cultural aspects of teaching and learning including the primary and secondary Discourses, the Frames of Reference, and the impact of culture on experiences was vital to the current study. This study focuses on the cultural component of each of these frameworks to provide contextual knowledge about pre-service teacher experiences with teaching literacy remotely.

Keywords: pre-service teachers, technology, literacy, multiliteracies, transformative learning theory, tpack, primary discourse, secondary discourse, frames of reference,

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PREFACE

It was Friday the 13th, a full moon, and the President of the United States had just declared a National Emergency in response to the COVID-19 outbreak. When my school district announced that each teacher had to prepare two weeks of plans to prepare for school closures with the autonomy to assign online work or packets, the school banded together to gather resources. We were fortunate. We had one-to-one Chromebook devices already assigned to every student. Still, the sound of every copier reverberated around the school as they labored to keep up with the demand as most teachers turned to the format they were most familiar with and made hardcopy packets to send home for the anticipated two weeks. We wouldn't stay home for just two weeks though. Two weeks turned into the last ten weeks of school, and, as education changed overnight, I witnessed education at its most stressed. Teachers weren't prepared. Many of the systems in place weren't prepared. I witnessed many educators across the district scrambling to become completely digital. In order to assist, our school held a Boot Camp for technology integration while our district provided professional development throughout the summer using technology about technology as the learning curve for in-service teachers was steep.

Through this struggle, though, I also witnessed education at its most innovative, and, it is with this struggle yielding those sparks of innovation that my dissertation began to take shape.

CHAPTER 1: INTRODUCTION

From chalkboards to whiteboards to Smartboards to one-to-one devices, classroom technology has evolved. With the onset of the Common Core State Standards (CCSS) in 2010, the standard requirement mandated technology integration throughout K-12 education. The language of the standards consisted of college and career readiness expectations including explicit requirements for the use of multimedia to teach literacy not just in English classrooms, but in all content areas. This need to address technology, specifically active use technology (AUT), in all content areas created a new challenge for existing teachers in the classroom as reflected in the steep learning curve (U.S. Department of Education, 2017).

With the historic closing of all public schools in 48 states in the Spring of 2020, the Centers for Disease Control and Prevention (CDC) released guidelines in July 2020 that placed a heavy emphasis on students coming back to school in person, forcing some schools to move from 100% online instruction (CNBC, 2020). The CDC recommended traditional classrooms implement guidelines for social distancing measures, changes to transitions, food delivery, contact tracing, and unique scheduling, along with teaching both traditional and virtual students in what was termed a hybrid learning model or concurrent teaching (CDC, 2020). With these guidelines in place, if students had symptoms, they stayed home and went to school virtually, providing a seamless transition for students, but a challenge for teachers to teach concurrently (CDC, 2020), especially since the student virtual/traditional status could change daily. By the end of the 2021 school year, many schools still offered remote or hybrid/concurrent learning opportunities. The Institute of Education Sciences survey results (Table 1) revealed the percentages of public schools as of March 2021 with fourth or eighth graders that offered remote, hybrid, and in-person instruction (Georgia Department of Education, 2021).

Table 1

Percentage of Students by Instructional Modes Offered

	Offered to All	Offered to Some	Not Offered
Remote	83%	10%	8%
Hybrid	36%	6%	58%
In-Person	55%	6%	38%

Background of the Problem

In March 2020, a worldwide pandemic led the world into a frenzy to reduce the spread of the virus: COVID-19. The United States was no exception, especially schools. Uscher-Pines and colleagues (2018) contend that schools across the country were not prepared to effectively implement measures during a pandemic. This was especially true for the implementation of technology for remote learning. In the preface, I share my own experiences that confirmed these findings.

When August 2020 arrived, many educators encountered a new normal that included required masks, sanitizing stations, social distancing, and a highly technology-focused hybrid teaching model, while others retired rather than embracing the changes (Reilly, 2020). Whether in-service teachers were teaching traditional students, virtual students, or a hybrid/concurrent model, technology still played a starring role (CNBC, 2020).

Research reveals that there has been an insufficiency of teacher preparation programs to prepare teachers to incorporate technology into instruction (Chelsey & Jordan, 2012; Kimmons, et al., 2015; Kleiner, et al., 2007; Lambert & Gong, 2010; Maddux & Cummings, 2004; Mishra & Kohler, 2009; Mouza & Karchmer-Klein, 2013; US Department of Education, 2017). In one study, beginning teachers and their mentors shared their dissatisfaction with what their teacher preparatory programs omitted from the program claiming that “training in how to integrate technology into lesson planning was virtually non-existent” (Chelsey & Jordan, 2012, p. 43).

Further research indicates that teacher education preparatory programs do provide pre-service teachers guidance on how to use technology itself, but do not provide instruction on how to effectively integrate the technology into content areas (Kimmons, et al., 2015; Maddux & Cummings, 2004). Traditionally, most teacher preparatory programs offer one technology course separate from the content course as part of the preservice teachers' professional program to meet the technology requirements (Kleiner, Thomas, Lewis, & Greene, 2007; Lambert & Gong, 2010; US Department of Education, 2017). Because of this, technology integration is, from the onset, disjointed (Mishra & Kohler, 2009; Mouza & Karchmer-Klein, 2013). Although these courses typically assist with increasing the confidence of pre-service teachers with using technology, they are sometimes insufficient in preparing for meaningful technology integration into preservice teachers' teaching practices (Wachira & Keengwa, 2011).

In the 2017 U.S. Department of Education Technology Plan, a digital use divide was noted reflecting a need to move from using technology to consume passive content to "using technology as a tool to engage in creative, productive, life-long learning" as seen in Figure 1 (p. 21).

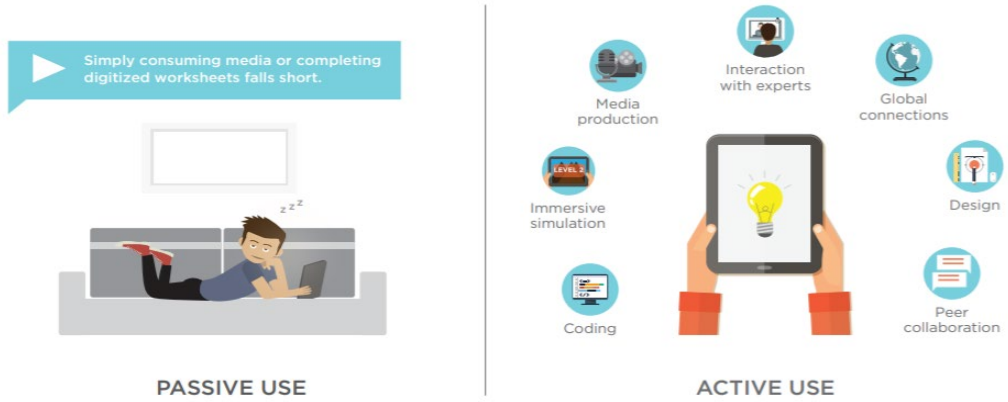

Figure 1. Digital Use Divide (US Department of Education, 2017, p. 21)

Statement of the Problem

With technology impacting the very definition of literacy (Sang, 2017) coupled with a history of teacher preparatory programs (TPP) not preparing pre-service teachers to integrate active use technology in the classroom (Kimmons, et al., 2015; Maddux & Cummings, 2004; US Department of Education, 2017), the new post-Covid-19, technology-mediated world may present new challenges for pre-service teachers.

Purpose of the Study

It is because technology is constantly changing that the focus of this study is on the "how" of technology rather than the "what". A TPP cannot be expected to prepare pre-service teachers to know the uses of every type of technology available, but understanding the ways in which pre-service teachers integrate technology regardless of the hardware or software used will provide invaluable insight into how programs can better prepare our future teachers. With the ever-changing technological advances and the fundamental changes in education as a result of COVID-19, there is a need to explore pre-service teachers' experiences with technology integration. The findings from this study could inform how TPPs, schools, and districts can help to better prepare pre-service teachers to teach literacy remotely.

As the integration of technology has changed education and the very definition of literacy has been broadened to keep up with these changes (Sang, 2017) coupled with the shift to near-total technology integration in schools, this study will provide an opportunity to determine pre-service teachers' preparedness. The purpose of this qualitative phenomenological study is to explore pre-service teachers' experiences with technology integration. The findings from this study could inform how teacher preparatory programs (TPPs), schools, and districts can help to better prepare pre-service teachers to teach literacy using technology, including teaching

remotely--using virtual instruction may have emerged from pandemic responses, but there are signs that some version of remote learning may permanently be a part of schools as the New York Times reported that not only are there plans for keeping some online schools after the pandemic, but remote learning days may be taking the place of weather days (2020 & 2021).

Research Questions

As the problem was so complex, it was important to better understand the issue by using theoretical frameworks to frame my understanding of the problem. This study is grounded in Transformative Learning Theory, and I drew upon two additional frameworks to support my understanding of the focal problem. Technological Pedagogical Content Knowledge (TPACK) to understand the role that technology would play when teaching literacy remotely and New Literacies to understand the evolved concept of literacy. (TPACK), a teaching framework, helped shed new insight into the role of technology in education including the interconnectedness between technology, content, pedagogy, and context. New Literacies involves redefining literacy to include new forms made possible by advances in technology, and was needed to better understand literacy in this technology-mediated world.

The three guiding research questions for this qualitative study are listed as follows:

1. How have pre-service teachers experienced technological pedagogical content knowledge (TPACK) in their teacher preparatory program (TPP)?
2. How is TPACK for New Literacies represented in pre-service teachers' instructional design?
3. What experiences have prepared pre-service teachers to be teachers of New Literacies in a technologically mediated world?

Theoretical Framework

Because this study focuses on pre-service teachers' experiences with teaching literacy remotely, the merging of three frameworks were used to support this study (See Figure 2). The

first framework addresses the evolution of literacy in today's society with the concept of Multiliteracies (The New London Group, 1996). The second framework used is an adult education knowledge theory, Transformative Learning Theory (Mezirow, 1991) with a focus on the cultural theoretical perspective to address the pre-service teacher role in this study as a learner. The final framework addresses the complex interconnectedness of the use of technology with the technology integration framework: TPACK, technological pedagogical content knowledge (Mishra & Koehler, 2019).

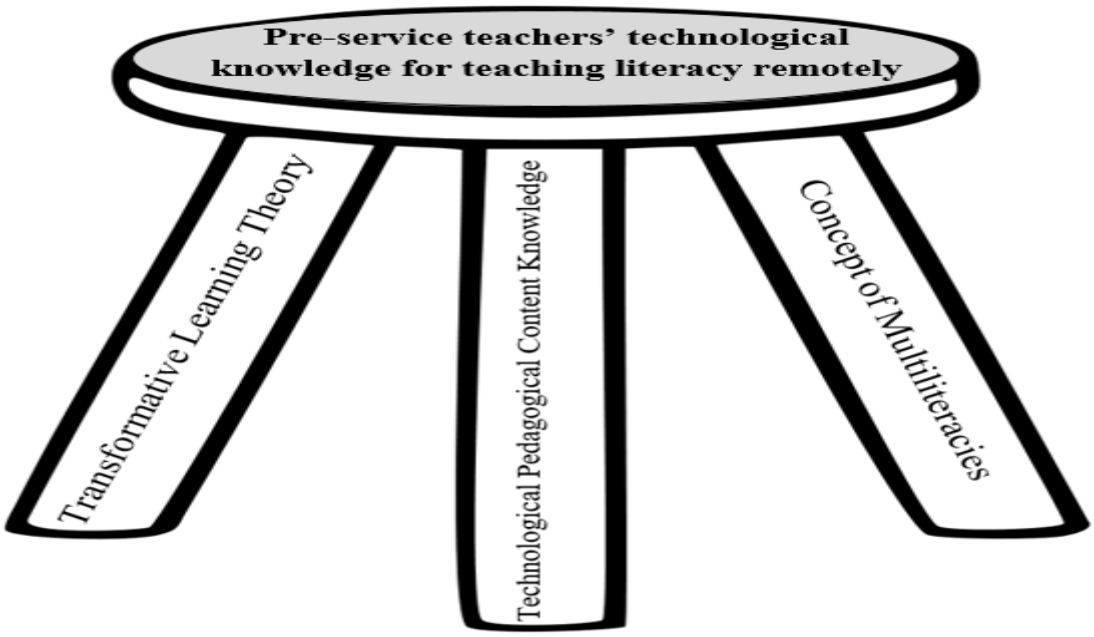

Figure 2: Theoretical Framework Graphic Organizer

Literacy Framework: Multiliteracies

The Multiliteracies framework was initially introduced by the New London Group (1996) to meet the evolving role of literacy in the world. This group of scholars from across the world met with a common interest in broadening the understanding of literacy and the teaching and learning about literacy. This framework stresses the importance of six design elements in the meaning-making process: Linguistic Meaning, Visual Meaning, Audio Meaning, and Gestural Meaning, Spatial Meaning, and Multimodal patterns of Meaning (New London Group, 1996).

With the ever-changing, interconnected world in which educators now find themselves, the Multiliteracies Framework provides a lens by which literacy will be focused in this study of pre-service teachers which will be shared in more detail in chapter 3 and used as part of my analysis of findings in chapter 4.

Adult Learning Framework: Transformative Learning Theory

Transformative Learning Theory is an adult education knowledge construct that "explains the process of using our own experiences, rather than the values we have uncritically assimilated from others, to make sense of the world around us" (Casebeer & Mann, 2017, p. 233). By focusing on our experiences to determine why we think, feel, and believe what we do, transformative learning takes place. Brooks contends that the transformational process is achieved through conversation, and, by listening and sharing personal experiences with one another, we develop a better understanding of our own experiences (2000). It is the belief that our understandings of the world are historically and culturally situated and that transformational learning occurs through participation in the social process of co-creating new narratives (Brooks, 2000; Casebeer & Mann, 2017). It is this understanding that no story perfectly evokes all that is true, but that all experiences regardless of the differences of the persons having the experience contribute to the way we make meaning of our own experiences; therefore, the more voices and narratives we listen, the more abundantly we experience our own lives (Brooks, 2000). There have been numerous alternate conceptions of transformative learning, but the perspective chosen for this study was this cultural-spiritual view of transformative learning in order to best understand the pre-service teacher experience with teaching literacy remotely.

Technology Framework: TPACK

The TPACK framework is a technological framework that evolved from Shulman's (1986) theory of pedagogical content knowledge (PCK) and focuses on the need to incorporate technology skills within the constructs of content and pedagogical domains (Mishra & Koehler, 2006).TPACK serves as a framework for thinking, analyzing, and evaluating successful technology integration. The TPACK Model reflects an equal importance of teachers' technological knowledge as the content knowledge and pedagogical knowledge in modern classroom settings (Magana, 2017). By focusing on the four components: Technological Pedagogical Knowledge, Technological Content Knowledge, Pedagogical Content Knowledge, and Contextual Knowledge, the teacher can more adequately meet the needs of the students (Mishra, 2019). The TPACK framework focuses on the types of knowledge necessary for pre-service teachers to be successful with the implementation of technology in the classroom. Pre-service teachers need to have the technological knowledge, the pedagogical knowledge, the content knowledge, and the contextual knowledge to successfully integrate technology. Furthermore, the interconnectedness of these components is essential to understanding the implementation of teaching literacy remotely (Koehler & Mishra, 2009). A more in depth explanation of this framework will be provided in Chapter 3.

Methodology Overview

The methodological framework used to guide this study is phenomenology, a qualitative type of research that studies a subjective experience. Phenomenology, developed by Edmund Husserl (1970), is a qualitative approach that resists methodological codification, while still adhering to a common approach to data analysis (Shudak, 2018). Phenomenology was used to study the essence of pre-service teacher experiences with technology integration as it relates to

literacy instruction as phenomenology focuses on mining lived experiences which includes thoughts, perceptions, ideas, memories, emotions, actions, and linguistic activity (Shudak, 2018). Phenomenology is an appropriate method for studying experiences with technology as it seeks to capture the individual experience without presuming knowledge of the experience. (Converse, 2012).

> Because phenomenology is concerned with uncovering and describing the essence of human experiences, it has the potential to offer valuable insights about the use of technology in teaching and learning; its increased application to study experiences with technology has the potential to both expand existing areas of research at the core of educational technology as well as to help create new lines of inquiry
> (Cilesiz, p. 506, 2010).

Because of this unbiased focus on the study of a phenomenon, phenomenology was well suited to explore the experiences of pre-service teachers regarding their preparedness to teach literacy remotely as it helped to bring a better understanding by providing an outlet for pre-service teachers' thoughts, perceptions, ideas, memories, emotions, actions, and linguistic activities (Shudak, 2018). Through the integration of these components, a much deeper understanding of the pre-service teacher experience was acquired as they explained their experience and journey with integrating technology while teaching literacy skills to students. By using qualitative research that enables the researcher to obtain a much richer understanding of the subject's experience, this study focused on what Husserl termed intentionality, the characteristic of consciousness or directedness towards an object. For this study, the intentionality is the directedness experiences with technology of pre-service teachers and a consciousness of the impact on their classroom practices. This phenomenological approach aims

to come to a deeper level of understanding of an individual's common or shared experiences of the phenomenon (Creswell, 2007). Through the use of this methodological research approach that includes previous experiences and assumptions, the study will be guided by a focus on the rationale for experiences with the phenomenon of teaching literacy remotely.

Data was collected from semi-structured interviews, lesson plans, and reflections with the primary form of data collected being the semi-structured interviews with supporting data from lesson plans and reflections. The appendix includes the initial interview protocol (Appendix A), the lesson plan interview protocol (Appendix B), the summative interview protocol (Appendix C), the recruitment email (Appendix D), the recruitment script (Appendix E), and the lesson plan template (Appendix F). A detailed explanation of data collection is discussed in Chapter 3.

Delimitations and Limitations

There were some delimitations and limitations to the study. The first limitation was the resource and time constraints indicative of performing a study to meet the requirements for a doctoral degree. Additional delimitations and limitations are as follows:

- Purposeful sampling was done on one section of students from one university of pre-service teachers that were enrolled in one of their last classes before becoming a teacher. These classes encourage students to gradually acquire responsibilities in the classroom under the guidance of a mentor cooperating teacher.
- The pre-service teachers were undergraduate students at one university and may have been influenced by the beliefs of the instructors at the institution.
- Because of restrictions due to COVID 19, all interviews were completed utilizing an online video conferencing software, Google Meets. The lack of in-person presence for the interview could be a possible limitation.

- Because each pre-service teacher will be paired with a different cooperating teacher, there will be a difference in experiences based on the latitude the cooperating teacher gives the pre-service teacher to make instructional choices.

Definition of Terms

For the purposes of this study, the following terms are defined:

- Active Use Technology is defined as "the use of technology [that] allows for greater interaction with technology by students and teachers. Examples of active use in the classroom include peer-to-peer collaboration, the production by students of published content (such as blogs and videos), real-time interaction with experts, and connecting with other learners across the globe" (US Department of Education, 2013, p. 10).
- Digital Use Divide is defined as a divide that "separates many students who use technology in ways that transform their learning from those who use the tools to complete the same activities but now with an electronic device (e.g., digital worksheets, online multiple-choice tests)" (US Department of Education, 2017, p. 7).
- Encoded texts are defined as texts that have been captured/frozen in ways that free them from their immediate context so that they are transportable (Lankshear & Knobel, 2006).
- Essence is defined as a commonality of experience (Johnson & Christensen, 2017)
- Literacy is defined as "Socially recognized ways of generating, communicating and negotiating meaningful content through the medium of encoded texts within contexts of participation in Discourse" (Lankshear & Knobel, 2006, p. 64).
- Modes are defined as "regularized sets of resources for meaning-making (e.g., image, sound, gesture, movement, and text)" (Rowsell & Walsh, 2011, p. 54-55)

- Multimodality refers to “how individuals make meaning with different kinds of modes” (Rowsell & Walsh, 2011, p. 56).
- Multiliteracies is defined as “a pedagogy [that] simultaneously accounts for linguistic diversity and the use of multimodalities in communication” (Rowsell & Walsh, 2011, p. 56).
- New Literacies are described as having four characteristics:
    1. New technologies offer a way to envision new literacy practices
    2. New literacies are essential to economic, civic, and personal participation in a world community
    3. New literacies change, remix, converge as defining technologies change
    4. New literacies are multimodal and multifaceted

    (Rowsell & Walsh, 2011, p. 56).
- Passive Use Technology “involves activities in which students have very little interaction. Examples of passive use in the classroom include digitized worksheets and activities that only require students to consume content produced by others” (US Department of Education, 2013, p. 10).
- Pre-Service Teachers are defined for this study as undergraduate or graduate students who are entering a time period of guided, supervised teaching whereby the students will be introduced to the role of teaching by a mentor or cooperating teacher (Koellner & Greenblatt, 2018).
- Pre-Service Teacher Preparation Program (TPP) is defined as “A sequential set of coursework and field experience, most often at institutions of higher education, that

prepare teacher candidates to become in-service teachers" (US Department of Education, p. 8, 2016).

- Pre-Service Teaching is defined as a "Period in which teachers are matriculating through traditional teacher preparation program and teaching regularly in classrooms under the direction of a mentor teacher, but are not yet in an official teacher capacity in P-12" (US Department of Education, 2016, p. 8).
- Phenomenology is defined as "the study of structures of consciousness as experienced from the first point of view. The central structure of an experience is its intentionality, its being directed toward something, as it is an experience of or about some object" (Smith, 2013).
- Phenomenon is defined as "the object of a conscious subject's experience as it presents itself; phenomena are the building blocks of human science and the basis for all knowledge" (Cilesiz, 2010, p. 493).
- Intentionality is defined as "the essential relationship between conscious subjects and their objects" (Cilesiz, 2010, p. 296).
- TPACK is defined as "a framework that describes the kinds of knowledge required by teachers for successful integration of technology in teaching" (Mishra, 2019, p. 76).
- Technology integration is defined as "a complex interaction among three bodies of knowledge (content, pedagogy, and technology) where learning is enhanced through teachers' meaningful and purposeful adoption of educational technologies" (Koehler & Mishra, 2009, p. 60).

Significance of the Study

Technology is ever-changing. How universities prepare pre-service teachers to adapt to these ever-changing technologies will be essential to the success of teachers coming into classrooms during a post-COVID-19 world. Understanding pre-service teacher experiences in this new school culture and their preparedness to meet the literacy needs of 21st-century learners will provide invaluable insight into what can be done to better prepare teachers for this fundamental shift in teaching. According to the US Department of Education, "it is important that all programs responsible for pre-service teacher training prepare all graduates to effectively select, evaluate, and use appropriate technologies and resources to create experiences that advance student engagement and learning" (p. 4, 2017). There have only been a few studies conducted with the focus on the gap in the integrative technology preparatory skills for pre-service teachers as the focus has been more on whether teachers are using technology and not necessarily how the technology is being used. (Gray, et al., 2010; Leu & Kinzer, 2000; Singer & Maher, 2007). This study will add to the existing studies and provide a foundation for further research in the field.

One key historical factor constraining technology integration has been having access to technology. According to the US Department of Education, only 81% of school districts in the United States had high-speed broadband internet in 2016. (2016). In the 2019 State of States report by Education Superhighway, it was announced that "the classroom connectivity gap has been closed" with 99% of school districts in the United States having high-speed broadband internet (p. 3). With nearly 1/5 of the school districts in the country not having basic internet service four years before COVID-19 with the focus on simply acquiring technology in the schools, it stands to reason that the technology preparedness of teachers is now more important

than ever. Schools now have the technology to embrace 21st-century learning and, with the COVID-19 pandemic, the catalyst for doing so.

Summary

This dissertation is comprised of five chapters, a reference list, and appendices. The purpose of this chapter has been to provide the reader with the purpose of this study to include the research questions and theoretical frameworks that will guide it. Chapter Two will present an overview of the literature to include an overview of technology in education and the ISTE standards along with a comprehensive review of the literature related to technology integration by pre-service teachers. This chapter also includes a review of the three theoretical frameworks to include Technological Pedagogical Content Knowledge (TPACK), the Transformative Learning Theory with a focus on the cultural theoretical perspective, and Multiliteracies Theory.

The qualitative research design is detailed in Chapter Three to outline and elaborate on the study's research methodology, while also including a brief biography and demographics of the pre-service teachers that participated in the study. Chapter Four will present the study's findings to include the themes that emerged from the data from interviews, lesson plans, and reflections. The discussion of the findings as they relate to the research questions, the limitations and implications of the findings, and recommendations for future research are included in Chapter Five.

CHAPTER II: REVIEW OF LITERATURE

The purpose of this qualitative phenomenological study is to explore pre-service teachers' experiences with technology integration to understand how teacher preparatory programs (TPPs), schools, and districts can help to better prepare pre-service teachers to teach literacy using technology, including teaching remotely.

In order to do this, it is important to share in the literature review what we know about the evolution of technology in education, what we know about preservice teacher implementation of AUT and teaching multiliteracies, as well as the theoretical framework of the study to include the three frameworks used: the literacy framework: multiliteracies, the adult learning framework: Transformative Learning, and the Technology Framework: TPACK. After the discussion on the theoretical frameworks, the following topics/ideas will be explored: a. Overview of technology in education, b. ISTE standards, c. Teacher education and technology preparation, d. Pre-Service teacher technology integration, e. Technology integration and Literacy.

Theoretical Framework

For this study, I am combining three distinct frameworks to provide a unique lens from which to view the study. New Literacies to understand the evolved concept of literacy, Transformative Learning Theory to understand how adults learn, and Technological Pedagogical Content Knowledge (TPACK) to understand the interconnectedness between technology, pedagogy, content, and context of teaching literacy with technology.

Literacy Framework: Multiliteracies

The theory of New Literacies emerged from the need to ensure that through the teaching and learning of literacy, students are equipped with the skills necessary to participate in the

social and cultural arenas of the modern world. As the world changes and the confines of physical space dissipate, the very definition of literacy should be expanded to meet these demands (Lankshear & Knobel, 2017; New London Group, 1996; Sang, 2017). According to Gee, the acquisition of knowledge occurs through two types of discourses, a primary Discourse and a secondary Discourse. The primary Discourse consists of how a person learns how to function in the culture and society in which they were raised, how to talk, and be. This primary Discourse is presented by the family unit as what 'people like us' do, think, and value (Lankshear & Knobel, 2017). The secondary Discourse is obtained through participation in outside groups and organizations. The more distinct the differences between the primary and secondary discourse, the more difficult it is to assimilate; therefore, literacy is defined as "a mastery (or, fluent performance) of a secondary Discourse" (Gee, 1996). Because the context of all language is social, being literate is being able to enter into a Discourse and be able to competently perform in that Discourse (Lankshear & Knobel, 2017). These social and cultural contexts are necessary to competently function in secondary Discourses. As the physical restrictions of the world have changed, the literacy complexities of the 21st century require the expansion of literacy to include cultural contexts (Street, 2008; Gee, 1996; Lankshear & Knobel, 2017).

The concept of multiliteracies was founded by the New London Group, a group of ten authors from around the world that shared a vision of the evolution of literacy based on the increasing saliency of cultural and linguistic diversity (1996). This group of scholars introduced six design elements in the meaning-making process of literacy: Linguistic Meaning, Visual Meaning, Audio Meaning, Gestural Meaning, Spatial Meaning, and Multimodal patterns of Meaning (1996). These design elements address the complex nature and inter-relationship of the

various modes of meaning (New London Group, 1996). Whereby multimodality informs how we make meaning, multiliteracies gives us pedagogical tools for doing so (Roswell & Walsh, 2011). The New London Group proposed that teaching and learning literacy should include four pedagogical components as presented in Figure 3.

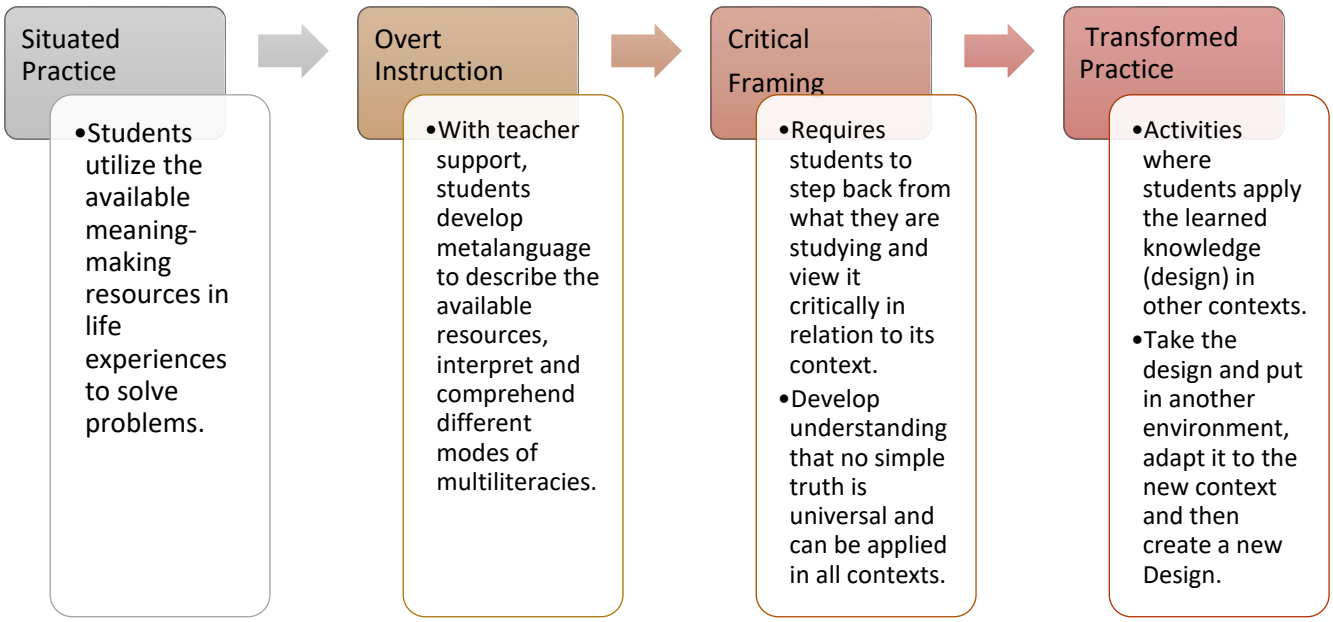

Figure 3. Four dimensions of Multiliteracies Pedagogy

By establishing a contemporary, culturally sustaining definition of literacy, establishing an understanding of how knowledge is constructed, and providing design elements for literacy, this framework will guide and structure the current study. It is then, imperative in the discussion of literacy that I also focus on cultural diversity. The term culturally sustaining pedagogy was established to allow us to focus on resisting the "…age-old American saga of [students] being asked to lose their heritage and community ways with language, literacy and culture in order to achieve in US schools" (Paris, 2012, p. 96). The current research trends support the

interconnectedness of literacy and cultures and the call to action for teachers to use culturally sustaining pedagogy (Beneke & Cheatman, 2020; Kelly et al., 2021).

Literacy cannot be defined by one single experience (Lankshear & Knobel, 2017), and, because human knowledge is embedded in social and cultural contexts, (The New London Group, 1996), through primary and secondary Discourses (Gee, 1996; Lankshear & Knobel, 2017), the transformative learning theory was selected to better understand these contexts by providing a way to think about how knowledge changes.

Adult Learning Theory: Transformative Learning

Transformative Learning Theory was first introduced by Mezirow in 1978 and is now the most actively studied adult learning theory, even replacing andragogy as the dominant educational adult education philosophy (Taylor, 2008). Transformative Learning Theory is defined as an adult education knowledge construct that explains the process of using our own experiences instead of the values that we have unintentionally garnered from others to make sense of our world (Casebeer & Mann, 2017). According to the theory, adults have attained a set of frames of reference that define their world that includes all of their experience associations, values, feelings, and conditioned responses (Mezirow, 1997). These frames of reference provide the foundation for transformative learning as transformative learning is the process of effecting change in a frame of reference. By focusing on our experiences to determine why we think, feel, and believe what we do, transformative learning takes place. Since the development of Mezirow's theory, light has been shed by researchers on theoretical conceptions of transformative learning to include cultural/spiritual that focuses on the connections between people and how these interconnections and social structures impact the narratives we construct during transformation. (Casebeer & Mann, 2017).

Interestingly, in terms of understanding the interconnectedness between the multiliteracies framework and transformative learning framework is the relationship between the types of Discourse in multiliteracies and the frames of reference in the transformative learning theory. Gee defines primary Discourse as, "how we learn to do and be (including speaking and expressing) within our family (or face to face intimate) group during our early life" (Lankshear & Knobel, 2006, p. 3), while, Mezirow defines frames of references as "primarily the result of cultural assimilation and the idiosyncratic influences of primary caregivers" (1997, p. 6); therefore, the foundation of both of these theories resonates with the family unit experiences that shape understanding of the culture in which learners take part. In fact, it is the revision of a frame of reference coupled with reflection on experience (Taylor, 2008) that is essential for learners and educators to acknowledge to become critically reflective or their own frames of references. (Mezirow, 1997). Through an acknowledgment of this culturally relevant, reflective approach to teaching and learning, this study aims to provide a better understanding of the interconnectedness of preparing teachers to teach literacy using technology. These theories will provide the foundation in which we seek to understand how knowledge changes in regards to teaching literacy, as well as the use of technology to do so. To understand the categories of teacher knowledge, the TPACK framework was selected to explore this relationship between content, pedagogy, and knowledge within the context of literacy instruction using technology.

Technology Framework: TPACK

The TPACK framework is a way to consider the categories of teacher knowledge required to successfully integrate technology into teaching. The framework is a modification to a previous framework developed by Shulman (1986) that combined two knowledge bases: Content and Pedagogy instead of viewing them as only separate entities. This overlap of these two

knowledge bases resulted in Pedagogical Content Knowledge. The TPACK framework expands on this idea by adding a third knowledge base: Technology. This knowledge base overlaps the content and pedagogy knowledge base to create two new pairs and one new triad. Not only is it important to look at content, pedagogy, and technology components exclusively, but to look at them in pairs: pedagogical content knowledge (PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK) and all three together as technological pedagogical content knowledge (TPCK) (Mishra & Koehler, 2006).

These knowledge bases provide the foundation for understanding what knowledge teachers must possess to effectively implement technology into the classroom. This TPCK Framework was then renamed TPACK in the article, "Breaking News: TPCK Becomes TPACK" because the initial acronym was consonant heavy. (Thompson & Mishra, 2007-2008).

The TPACK framework is widely used and studied. In the decade following the introduction of the TPACK framework, there have been over 1200 journal articles and book chapters, 315 dissertations, and 28 books that use TPACK as the central construct (Mishra, 2019). Although the TPACK framework diagram included a dotted line with 'context' labeled surrounding the three knowledge bases of content, pedagogy, and technology, most studies have omitted this component of the framework altogether. In fact, in a study of 193 empirical journal articles, it was found that only 36% of the studies used context as part of the TPACK framework (Rosenburg & Koehler, 2015). In the original 2006 introduction of TPACK, the authors note that technology use in the classroom is context bound and dependent on hardware and software available as well as grade and subject and student backgrounds (Mishra & Koehler). Numerous studies have attempted to update TPACK to include an additional cultural component including a study in the Maldives that removes the content knowledge component completely and replaces it

with a 'cultural habitus' (Adam, 2017). In 2019, The TPACK Framework diagram was revised (Figure 4) to add another knowledge base: ConteXtual Knowledge (XK) (Mishra, 2019).

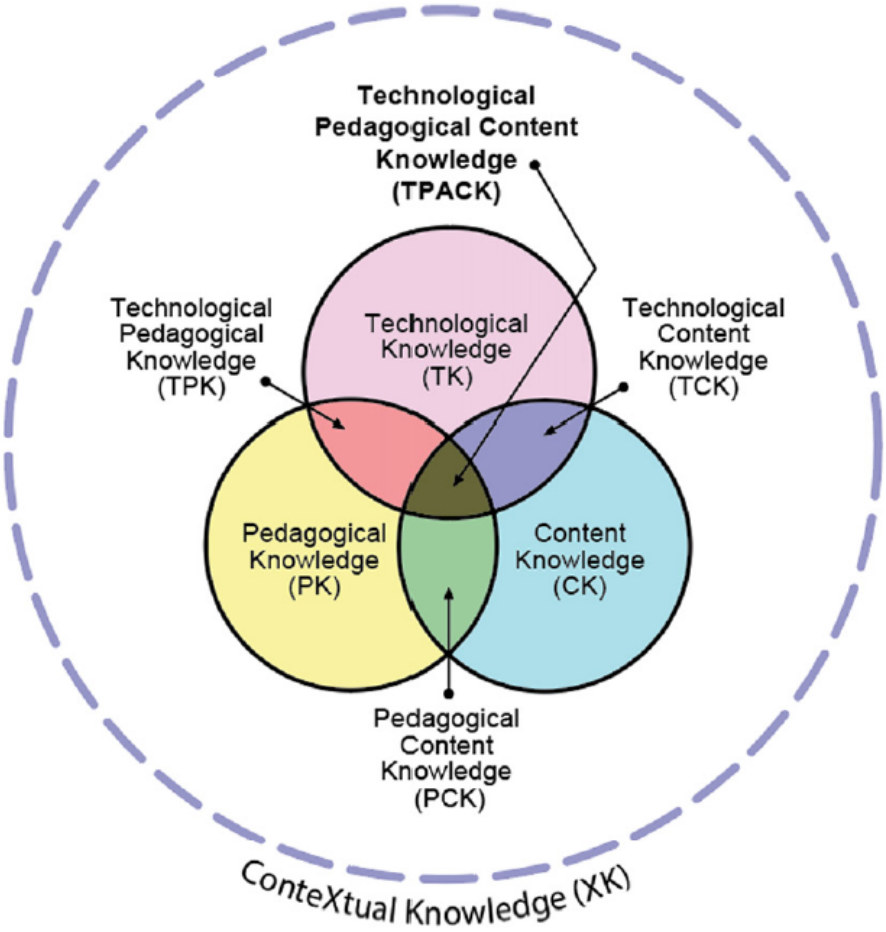

Figure 4. Revised version of TPACK image (Mishra, 2019)

It is this context component of TPACK that is so frequently overlooked that encompasses the cultural aspects of teaching and learning including the primary and secondary Discourses, the Frames of Reference, and the impact of culture on experiences that will be vital to the current study. Research supports culturally sustaining pedagogy that honors and extends the languages and literacies of students (Beneke & Cheatman, 2020; Chang & Lee, 2012; Irizarry, 2011; Kelly

et al., 2021; Winn, 2011; Wynter-Hoyte & Smith, 2020). It is this XK component of TPACK that will be essential to understanding when exploring literacy instruction.

Overview of Technology in Education

The first national technology plan was published in 1996 and titled "Getting America's Students Ready for the 21st Century: Meeting the Technology Literacy Challenge" (U.S. Department of Education). The Secretary of Education, Richard Riley, declared that "Computers are the 'new basic' of American education, and the Internet is the blackboard of the future…I strongly believe that if we help all of our children to become technologically literate, we will give a generation of young people the skills they need to enter this new knowledge- and information-driven economy" (1996, p. 5). This first technology plan focuses on the need for improving technological literacy and resources since only 9% of schools were connected to the internet at the time (US Department of Education, 1996). Subsequently, the US Department of Education created a plan with four goals:

> (1) all teachers in the nation will have the training and support necessary to help students learn to use computers and the information superhighway; (2) all teachers and students will have modern multimedia computers in their classrooms; (3) every classroom will be connected to the information superhighway; and (4) effective software and on-line learning resources will be an integral part of every school's curriculum. (US Department of Education, 1996, p. 7).

The US Department of Education published four more technology plans: 2000, 2004, 2010, and 2016/2017. The second national technology plan was titled "E-Learning: Putting a World-Class Education at the Fingertips of All Children" and the Secretary of Education, Richard Riley, shared the progress towards the four initial goals and established five additional goals:

> Goal 1: All students and teachers will have access to information technology in their classrooms, schools, communities and homes. Goal 2: All teachers will use technology effectively to help students achieve high academic standards. Goal 3: All students will

> have technology and information literacy skills. Goal 4: Research and evaluation will improve the next generation of technology applications for teaching and learning. Goal 5: Digital content and networked applications will transform teaching and learning. (US Department of Education,2000, p. 6).

After four years of working towards the first four goals established, the 2000 plan shifted the focus to information literacy skills and the research and evaluation of next-generation technology integration for teaching and learning. Four years later, in 2004, another plan was established, "Toward a New Golden Age in American Education: How the Internet, the Law, and Today's Students are Revolutionizing Expectations" which shares that, " Teachers and students are transforming what can be done in schools by using technology to access primary sources, expose our students to a variety of perspectives, and enhance the overall learning experience through multimedia, simulations and interactive software" (US Department of Education, 2004, p. 5). This report focused on the shortcomings of the previous plans noting that the plans succeeded in "providing the hardware without adequate training in its use" and that, because of this, computers were "shunted to a 'computer room'" instead of used to meet the lofty goals established (p. 10).

The fourth national technology plan was published in 2010, "Transforming American Education: Learning Powered by Technology" and addressed teacher preparatory programs (TPPs) advising that, "These transformations must begin in the places where our education system is preparing new professionals: colleges of education and other teacher preparation institutions and organizations" (p. 60). The plan calls to action TPPs to promote and enable technology use in ways that improve learning, assessment, and instructional practices (p. 13).

The latest national technology plan was published in 2016 and later revised in 2017, titled "Reimagining the Role of Technology in Education" and again has a strong focus on teacher

preparation programs, even providing four guiding principles for advancing educational technology in teacher preparation:

> 1. Focus on the active use of technology to enable learning and teaching through creation, production, and problem-solving. 2. Build sustainable, program-wide systems of professional learning and teaching. 3. Ensure pre-service teachers' experiences with educational technology are program-deep and program-wide, rather than one-off courses separate from their methods courses. 4. Align efforts with research-based standards, frameworks, and credentials recognized across the field (p. 35).

The plan asks that TPPs rethink their programs as "effective use of technology is not an optional add-on or skill that we simply can expect teachers to pick up once they get into the classroom" (US Department of Education, 2017, p.35). The plan goes on to make note of the college and career-ready standards adopted by most states that include technology skills as additional reasoning for the need for change. Furthermore, the call to action notes that school districts should not have to remediate new teachers, rather new teachers on day one should, "be prepared to model how to select and use the most appropriate apps and tools to support learning and evaluate these tools against basic privacy and security standards" (p. 36). Finally, the plan belittles the common practice of TPPs of including one educational technology class separate from other courses and calls for an inclusion of experience with educational technology in every teacher preparation course.

ISTE Standards

With the National Technology Plans established by the United States Department of Education, a framework was created to establish the skills and knowledge teachers would need to integrate technology effectively to prepare 21st-century learners for college and career readiness. The International Society for Technology in Education (ISTE)'s mission is to "inspires educators worldwide to use technology to innovate teaching and learning, accelerate good practice and solve tough problems in education by providing community, knowledge and the ISTE Standards,

a framework for rethinking education and empowering learners" (ISTE, 2007). The ISTE was formed in 1998 and provided technology standards to help guide school systems and TPPs across the country. Due to the growing advancements of technology, these standards have been frequently updated to meet the ever-changing demands of technology integration. There are separate standards for teachers, administrators, coaches, and computer science teachers. In 2016, the most recent standards were released after obtaining feedback from 2200 educators and administrators across the world (ISTE, 2016). Seven educator standards reflect the roles of educators: 1. Learner, 2. Leader, 3. Citizen, 4. Collaborator, 5. Designer, 6. Facilitator, 7. Analyst. According to ISTE, these standards are updated every 7-10 years to maintain relevance.

National Testing

Literacy in the United States has been less than optimal over the years according to standardized testing. The measure used to determine this level of "proficiency" in literacy consists of standardized testing such as NAEP, the National Assessment of Educational Progress. According to NAEP, since 2000, over 60% of the population is not reading on a "proficient" reading level, and the most recent 2019 report shows a continual decline.

The reading scores in 4th and 8th grades from 2017 to 2019 also showed a decrease (NAEP). In fact, since the first reading assessment in 1992, the average reading level of students has only increased by three points (NAEP, 2020). "To address the increased role of technology in classrooms, the National Center for Education Statistics (NCES) is transitioning the National Assessment of Educational Progress (NAEP) from paper and pencil to digitally based assessments" (NAEP). In 2011, the 8th and 12th-grade writing exams for the National Assessment of Educational Progress were assessed using technology; students took the exam on computers or tablets. The NAEP cited with the results of this writing assessment, its first online writing exam,

that the average score for grade 8 students on a writing scale from 0 to 300 was a 150, with 80% of students scoring below the "proficient" level for writing, while 79% of high school seniors also score below "proficient" in writing (NAEP, 2017). These results, as they are presented, appear to be dismal with only 20% of students scoring at a "proficient" level for writing.

Although the NAEP writing assessment was administered in 2017 to students, the results have not yet been published as NAEP acknowledges that during a preliminary analysis of the results, it revealed "potentially confounding factors" forcing NAEP to conduct additional analyses that were set to be released Summer 2020, but were not released (NAEP, 2020). The technical summary of the 2017 writing assessment, only the second online writing assessment done by NAEP, found students scored lower than preceding years for all major reporting groups (NAEP). NAEP acknowledges that the device students used was different from the prior year and that "existing literature did not suggest that the transition from one form of digital device to another would affect students' assessment performance" (NAEP, 2017). NAEP acknowledges that this technology change may have impacted performance on the assessment as there was a strong relationship between how fast a student could type and how well they scored.

According to National Center for Education Statistics, to reach the NAEP "proficient" level for literacy is to possess the following abilities: "reading lengthy, complex, abstract prose texts as well as synthesizing information and making complex inferences and integrating, synthesizing, and analyzing multiple pieces of information located in complex documents" (NCES, 2020).

Pre-Service Teacher Education and Technology Preparation

The United States Department of Education has created plans that explicitly call to action TPPs to prepare pre-service teachers to incorporate meaningful technology integration into the

classrooms, the common core state standards have embedded technology requirements throughout and has been adopted in some form by most states, and the ISTE Standards have been adopted to define the specific skills teachers need to effectively teach with technology, even including documentation of these standards as part of the accreditation process for schools.

Research shows that the quality and quantity of technology integration in pre-service teachers' educational experiences is a crucial determining factor for new teachers' technology integration (Hasse, 2017; Instefjord & Munthe, 2016; Skophammer & Reed, 2014). Teacher preparation programs have shifted from focusing on teachers' computer literacy skills to basic technology skills and still typically provide one single, stand-alone technology course for pre-service teachers that inadequately prepares teachers for technology integration. (Bakir, 2015; Tondeur et al., 2012; US Department of Education, 2017). A Meta-ethnography of 144 qualitative studies on pre-service teacher technology integration resulted in twelve themes that TPPs need to consider to prepare teachers for technology integration: 1. Aligning theory and practice: pre-service teachers need to be able to apply theory of technology integration to actual practice; 2. Using teacher educators as role models: pre-service teachers observing the modeling of effective technology use is vital; 3.Attitude about the role of technology in education: pre-service teachers need to know the importance of technology and buy into the need; 4. Learning technology by design: pre-service teachers need additional support with planning lessons that incorporate technology; 5. Collaborating with Peers: pre-service teachers need to collaborate and share new technology integration ideas with peers; 6. Scaffolding authentic technology experiences: pre-service teachers need to observe technology integration, but more so than that, need to do it themselves; 7. Moving from traditional assessment to continuous feedback: teacher preparation programs could get a better understanding of the growth of pre-service teachers with

a technology integration portfolio to document their journey with implementing technology in the classroom; 8.Technology planning and leadership: All TPPs need to include requirements for technology integration by pre-service teachers; 9. Co-operation within and between institutions: TPPs need an effective partnership with school systems to support technology integration; 10. Staff development: pre-service teacher educators do not have the technology knowledge and skills to effectively prepare pre-service teachers; 11. Access to resources: access to the resources available at the school is necessary for successful technology integration; 12. Systematic and systemic change efforts: Providing the technology course as one of the first teaching classes and then having all the classes build upon that course material was found to be an effective method for systemic change (Tondeur et al., 2012).

A recent meta-analysis of 126 randomized evaluations of the use of technology to improve learning-related outcomes focused on four categories: access to computers and the internet, educational software, technology-based communications, and online courses. (J-Pal, 2019). The results found that access to computers and the internet alone "generally do not improve students' academic outcomes, but do increase computer usage and improve computer proficiency" (p. 4). Although the study focuses on technology to improve student outcomes, it also sheds light on the type of technology use in the classroom as inadequate.

Pre-Service Teachers and Technology Integration

In the summer of 2020, a study shared on CNBC noted that 52% of students in the country would be attending school virtually, 25% would be attending school daily, and 19% attending a hybrid model of virtual and traditional schooling beginning fall of 2020. This is reaffirmed in Table 1 as the US Department of Education released the percentage of students by instructional mode as of March of 2021. With this shift to virtual learning, pre-service teachers

need to be prepared to teach virtually using technology. In a recent study on TPACK integration by pre-service teachers, of the 173 pre-service teacher participants, 37 did not incorporate technology in planning, 90 included only teacher technology use, while 46 planned for student use of technology. (Schmid et al., 2021). A 2014 study of technological literacy courses of 697 K-12 education programs found that "there is very little exposure to technological literacy courses for prospective K-12 teachers", but that 100% of the TPPs required that pre-service teachers acquire skills in computer use (Skophammer & Reed, 2014). This reflects the trends of the more recent studies that the majority of pre-service teachers are not incorporating technology in the classroom. A study of 150 pre-service teachers found through observations at schools that there was "a good deal of 'dusty technology' which had been abandoned because the teachers gave up figuring out how to make sense of it" (Hasse, 2017). Too often teachers choose not to use the technological tools in their classrooms (US Department of Education, 2017; Smith & Green, 2013). There is a presumption uncovered in the literature that there is an expectation that pre-service teachers will be able to integrate technology into the classroom simply due to their age, but that is not the case (Schmid et al., 2021; Skophammer & Reed, 2014).

Pre-Service Teacher Attitudes toward Technology

A 2018 study of 688 pre-service teachers regarding the importance of attitudes towards technology for pre-service teachers' technological, pedagogical, and content knowledge found that positive attitudes towards information and communications technology resulted in a significantly positive correlation to TPACK dimensions (Scherer, et al., 2018) The increasing number of studies done on this topic had the same results. In a meta-analysis of 15,189 participating pre (56.86%) and in-service (43.14%) teachers, attitude was found to be a

significant predictor for teachers' intentions towards the use of technology (Scherer & Teo, 2019).

Pre-Service Teachers and Transformative Learning

According to Mezirow (2003), transformative learning is how adults learn to think for themselves instead of simply accepting the views of others. Transformative learning theory explains the process of reflecting on our own experiences to make sense of the world around us (Casebeer & Mann, 2017). Mezirow (2010) defined the transformative learning process as a changing of a frame of reference (a person's body of experiences that define their understanding of the world) by critically reflecting upon assumptions, validating beliefs, taking action on the reflection, and then critically assessing it. Much research has been done on pre-service teachers and transformative learning. In a meta-analysis of 324 studies of pre-service teacher attitudes, Transformative Learning Theory had the highest effect size of all applications studied. The study concluded that because adult learning research shows that adults need practicality in learning, it is vital that teacher education programs provide "appropriate selection of teaching methods within their social and cultural context" for teachers "to develop and refine the process of learning to teach" (Elaldi & Batdi, 2016). In a study on reflective practice on teacher candidates' learning, it was noted that although pre-service teachers are typically required to complete reflection assignments, few received direct instruction on reflective thinking techniques to promote reflections that result in transformative learning as 25% of the participants completed the reflections without attempting to understand the questions asked (Slade et al., 2019).

Pre-Service Teachers and New Literacies

Technological advances have shifted the literacy landscape suggesting that new approaches to literacy instruction be realized to expand the concept of literacy beyond simply the

reading and writing of print materials (Ajayi, 2011; Ulu et al., 2018; West, 2019). These New Literacies focus on the incorporation of the advances in technology to provide a broader understanding of the functionality of literacy (Lankshear & Knobel, 2006). This focus on the "new" acknowledges that literacy now requires that students use digital technology, create meaning by using various elements, complete tasks using online resources, and create multimodal products (Ulu et al., 2017). The term multimodal refers to the modes of meaning-making (i.e. visual, linguistic, gestural, spatial, audio) that are integrated into multimedia texts. (West, 2019).

According to the research, it is assumed that pre-service teachers can integrate technology into the classroom and will embrace its uses to teach literacy. In studies conducted on pre-service teachers' view of multiliteracies and technology use, the literature supports that pre-service teachers self-perceptions indicate that they are comfortable with technology integration to teach literacies (Alhazza & Lucking, 2017; Ulu et al., 2017; West, 2019); however, some studies suggest that there is a correlation between heavy use of technology by pre-service teachers and a "rosy view" of technology uses (Alhazza & Lucking, 2017). Although pre-service teacher research supports the advances of reading using technology to include multimodalities, pre-service teachers seem to struggle with teaching the strategic knowledge necessary to produce writing (Ulu et al., 2017; West, 2019). This data supports prior research on literacy instruction for print-based media as studies on pre-service teacher writing instruction shows low self-efficacy for writing instruction compared to reading instruction (Bostock & Boon, 2012; Helfrich & Clark, 2016; MacPhee & Sanden, 2016).

Summary

This chapter provided a review of the literature to address the problem. This review consisted of the theoretical framework that will guide this study: the literacy framework: Multiliteracies, the adult learning framework: Transformative Learning, and the technology framework TPACK. Through the literature review, it was noted that the context component of TPACK will encompass the cultural aspects of teaching and learning including the primary and secondary Discourses of Multiliteracies, the Frames of Reference of Transformative Learning, and the impact of culture on experiences that permeates each of these frameworks. The review of literature goes on to provide an overview of technology in education including National Technology plans over the years, the implementation of ISTE standards, and the resulting technology-based national testing for literacy that include a concerning definition of proficiency in literacy and unreleased writing scores due to the dismal nature of the findings. This summary concludes with a review of literature on pre-service teacher implementation of technology, the impacts of transformative learning on pre-service teachers, and pre-service teacher implementation of New Literacies.

There is a presumption uncovered in the literature that there is an expectation that pre-service teachers will be able to integrate technology into the classroom simply due to their age, but that is not the case. The research does support that pre-service teachers perceive themselves as comfortable with implementing technology to teach literacy, though, but may have unrealistic expectations for student use of technology with multiliteracies indicating that in the same way universities expect pre-service teachers to integrate technology into multiliteracies instruction without providing instruction for how to do so, pre-service teachers then expect students to do

the same. The research posits that knowing how to use technology does not result in active use of said technology.

CHAPTER III: METHODOLOGY

When considering the type of methodological study to undertake with the research questions and theoretical frameworks for this study, phenomenology was a natural choice. Phenomenology was used to study the essence of pre-service teacher experiences with technology integration as it relates to literacy instruction as phenomenology focuses on mining lived experiences which includes thoughts, perceptions, ideas, memories, emotions, actions, and linguistic activity (Shudak, 2018). Since transformative learning takes place when we focus on our experiences to determine why we think, feel, and believe what we do (Mezirow, 1997), transformative learning can best be understood through phenomenology since phenomenology is the study of phenomenon or experiences. In addition to how seamlessly phenomenology addresses the transformative learning theoretical framework of the study, it also is most fitting for TPACK and multiliteracies since pre-service teachers need to have the technological knowledge, the pedagogical knowledge, the content knowledge, and the contextual knowledge to successfully integrate technology (Koehler & Mishra, 2009). It is the interconnectedness of these components coupled with an understanding of multiliteracies that is essential to understanding the implementation of teaching literacy with technology, and, by using an interpretative phenomenological analysis (IPA), this study sheds light on the essence of the phenomenon for all stakeholders (Shudak, 2018).

The purpose of this qualitative phenomenological study is to explore pre-service teachers' experiences with technology integration. The findings from this study could inform how teacher preparatory programs (TPPs), schools, and districts can help to better prepare pre-service teachers to teach literacy using technology, including teaching remotely. This chapter includes a discussion of the research design and the role of the researcher in the study, the

teacher education participants who volunteered for the study, and an explanation of the data collection used to include instruments. Chapter 3 concludes with how this data was then analyzed.

Research Design

In order to understand the experiences of pre-service teachers with technology integration to teach literacy, qualitative research is best suited for this study as the product of qualitative inquiry is descriptive as words and images are used to portray what the researcher has learner rather than numbers (Creswell & Guetterman, 2019; Merriam & Tisdell, 2016). Qualitative research was chosen to address the research study as qualitative researchers are, "interested in understanding how people interpret their experiences, how they construct their worlds, and what meaning they attribute to their experiences" (Merriam & Tisdell, 2016, p.6). It will be my intention to make the experiences of these pre-service teachers visible so that teacher preparation programs, as well as schools and districts, can better understand the phenomenon of teaching literacy remotely during these unprecedented times.

Phenomenology is one of the three major approaches to qualitative research and focuses on the description of one or more person's experience with a phenomenon by seeking to understand a commonality of experience or essence of shared experience (Johnson & Christensen, 2017). Through the process of 'epoche', phenomenology requires the researcher, if he/she has had experience with the phenomenon, to explore their own experiences in order to examine the dimensions of the experience and, in part, to better understand one's own biases, viewpoints, and assumptions (Moustakas, 1994; Merriam & Tisdell, 2016). It is this element of phenomenology that has influenced all qualitative research as it is now common in qualitative research to examine biases and assumptions about the phenomenon of interest before

undertaking the study (Merriam & Tisdell, 2016). Through this intentionality, or consciousness, the researcher acknowledges with phenomenological research that "self and world are inseparable components of meaning" (Moustakas, 1994, p. 27). Before the researcher can truly understand others' thoughts and understandings about a topic, the researcher must first understand their own thoughts and understandings (Merriam & Tisdell, 2016; Moustakas, 1994).

In contrast to traditional phenomenology that includes bracketing or removing the demographic, cultural, and personal characteristics of the participant and the researcher, IPA focuses on "situated, interpreted, and particular lived experiences" (Johnson & Christenson, 2017, p. 446). In essence, IPA is more concerned with the individual experience at a particular place and time than the transcendental experience. Considering this study is undertaken during a pandemic at a time when education changed literally overnight, phenomenology, using IPA, was the best research method for this study.

As this study will be an exploration of the experiences of pre-service teachers, a qualitative phenomenological study was the most logical choice for collecting, organizing, and analyzing the data. This choice was further supported by how well this methodology fit with the research questions.

Role of Researcher

I have always been fascinated by opportunities that spring from change. I began teaching high school English in 2008, the year before Common Core State Standards (CCSS) was introduced. This change afforded me the opportunity to team with amazing educators to lead our district to meet these new expectations. You see, the changes to literacy were so significant that as I sat through numerous CCSS trainings, I realized that most English teachers felt like first year teachers again. I became a teacher leader in my district to help these teachers of literacy find

their footing again and was recognized for these efforts with awards spanning from school level to national level. These awards do not make me an expert, but they do show that I am passionate about helping teachers of literacy.

As I was considering my dissertation topic, I was sitting in yet another training, this time via a zoom session, on how to host a zoom session and, much like with the adoption of CCSS, I saw that Covid-19 had left teachers feeling like first year teachers again. I see this dissertation as my opportunity to again help teachers of literacy during times of change, but, since I am no longer in the classroom, I need to better understand the phenomenon. I think the best way to do so is by seeing the world through the eyes of pre-service teachers as they are, probably for the first time, experiencing teaching literacy remotely. By better understanding the complex circumstances involved with teaching literacy remotely, I hope to be an advocate for all teachers of literacy.

I am a product of my experiences. My mom earned her GED after dropping out of school because pregnant girls were not allowed to attend school in 1980. As a first generation high school graduate, I am a product of public education. Without a strong support system at home, I relied on educators, and they showed me that I could change my circumstances with education. I believe that technology is vital to education. I bought my first computer at a yard sale in 1996. I have seen technology evolve first in the business world and then in the school system. From 2008-2014, I went from borrowing a rolling TV with a VCR once a week for my class to a SMARTboard in my classroom with a half dozen iPads for my students. Technology changes. Fast. I acknowledge that I have little tolerance for people that are not open to change when it is in a child's best interest. I have a tendency to see every child as a kid without support at home and the teacher as their lifeline. I understand that this tendency can bias me in this study as I truly

believe that, for most students, teachers are their gateway to bettering their lives and rising above their current circumstances. This belief has been grounded in my work in six Title I schools across the district. During this world-wide pandemic, this feeling is ten-fold. I want to help these students by being an advocate for literacy teachers as I empathize with their struggles as this is unchartered territory for everyone. I have seen too many classrooms with long-term substitutes all year because there are no teachers to be found to fill the positions. I am passionate about understanding what pre-service teachers are experiencing so that we can better prepare and support teachers to be the foundation for our students, especially the students, like me, that relied on teachers to be that lifeline to a better life. In addition to my role as researcher, both my professional and personal identities will play an important role as I approach this study.

Participants

Phenomenology focuses on deep understanding of how people make sense of their experiences. As such I focus on a small group of PSTs to get to the essence of their experience of learning to teach with technology.

Participant Sampling

The participants for this study were pre-service teachers studying at a racially diverse southeastern university with over 8,000 enrolled students. In order to explore the research questions for this study, a purposeful sampling, specifically purposeful typical sampling was done of Chattahoochee University teacher education students (the name of the school has been changed for anonymity) who were enrolled in their third semester of teacher education courses (Block 3) that include a field experience component with required hours in an area school. Purposeful typical sampling is used when the participants are selected "to reflect the average person, situation, or instance of the phenomenon of interest" (Merriam & Tisdell, 2016, p. 97).

Pre-service teachers at Chattahoochee University are required to have over 120 hours in area schools and are required to do a minimum of nine lesson plans during Block 3. Since pre-service teachers were the focus of this study, purposeful typical sampling of pre-service teachers enrolled in coursework at the university was the most appropriate choice as the sampling method. Four of the five pre-service teachers that signed consents responded to requests to set up a time for the first interview, while three of the four whom signed consents completed the study. One participant participated in the initial interview and failed to respond to communications to set up the subsequent interviews. All of the Block 3 pre-service teachers enrolled at Chattahoochee University majoring in Elementary Education were female. Figure 5 includes the demographics of the pre-service teachers from the fall of 2021 graduating class of pre-service teachers.

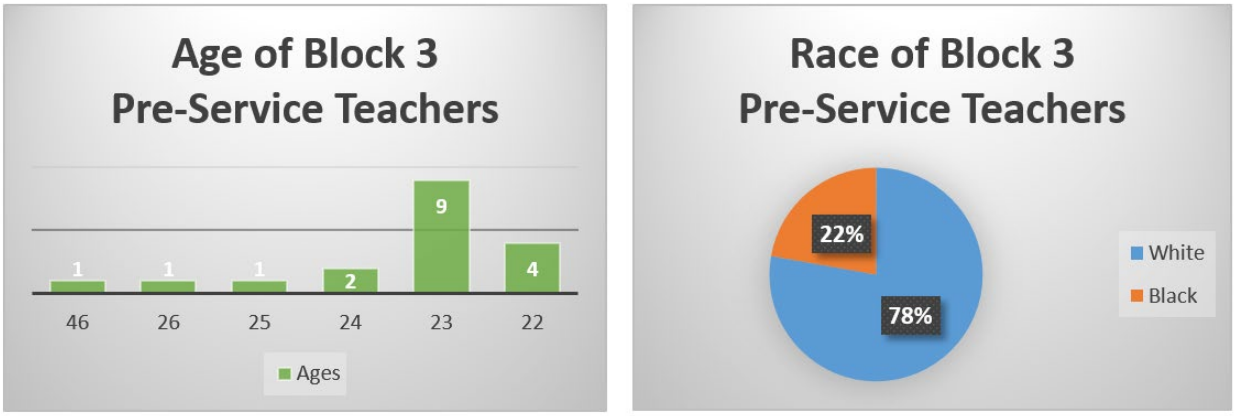

Figure 5. Block 3 Pre-Service Teacher Age and Race

A smaller sampling allowed for greater depth in the study as the rich description in qualitative research allows readers to make decisions regarding transferability; therefore, my target sampling was 3-4 pre-service teachers (Creswell & Guetterman, 2019). It is typical for few individuals to be studied in qualitative research because "the overall ability of the researcher to provide an in-depth picture diminishes with the addition of each new individual" (Creswell &

Guetterman, 2019, p. 209). In qualitative research, the sample size should be reflective of the minimum sample size necessary to provide insight into the phenomenon (Merriam & Tisdell, 2016). For this study, exploring the lived experiences of three to four participants was a reflective sample size to provide insight into the phenomenon.

Pre-Service Teacher Participants

After seeking Institutional Review Board (IRB) permission, in February 2021, I emailed a Block 3 professor requesting an audience with the class and shared the purpose of the research project (Appendix D). I visited the classroom and read the informed consent to the class (Appendix E). After providing contact information to the class of 18 females pursing a degree in Elementary Education. I thanked the pre-service teachers for their interest and shared a copy of the informed consent to sign. I left to find that 16 pre-service teachers had emailed me expressing interest, although my target participants was 3-5. Fortunately, of the 16 that showed initial interest, five pre-service teachers signed and emailed back the informed consent. Once consents were signed, I reached out to the confirmed pre-service teachers via the contact method provided to request a date and time for the initial interview. During the initial interview, I asked that the pre-service teachers self-identify with the demographic characteristics that they felt were the most meaningful to them. This allowed the participants to co-construct the way in which they were identified and, thereby, how readers may view them in this phenomenological study.

Instrumentation

To address the research questions and to assure that suitable data was obtained for this study, the primary method of data collection was semi-structured interviews with open-ended questions to pre-service teachers. Utilizing semi-structured in-depth interviews with open-ended questioning is most suitable for phenomenological research as it provides the depth necessary for

phenomenology (Cilesiz, 2010). This choice allowed me to explore specific topics with the participants that emerged to include new ideas on the topic while still covering the same general topics with each of the interviewees (Johnson & Christenson, 2017; Merriam & Tisdell, 2016). Through the use of empathetic interviewing, a human centered approach to interviewing that feels more like a conversation, I acknowledge that an interview is not a neutral exchange of asking questions and getting answers (Fontana & Frey, 2008). This will allow me to focus on understanding the topic so that positive change can be made. This type of interviewing will allow me to share personal, relevant situations to the interview to encourage openness so that the pre-service teacher will be encouraged "…to reveal more and be more honest in his or her responses" (Fontana & Frey, 2008, p. 116). The interviews were conducted using Google Meet and transcribed initially using Google Meet Transcripts, but later refined through listening to the audio and cross referencing the Google Meet Transcripts.

Teacher education participants' lesson plans and personal reflections on the teaching experience was also used to strengthen the study by providing an added dimension. By triangulating the data using three different data sources: interviews, lesson plans, and personal reflections along with providing a foundation of three theoretical frameworks: multiliteracies, TPACK, and Transformative Learning, I was able to address validity through the use of convergent and divergent findings (Johnson & Christenson, 2017).

Data Collection

Several methods were utilized to capture the lived experiences of pre-service teachers integrating technology in literacy instruction including document analysis of lesson plans for TPACK components and New Literacies integration, strategic planning of interviews to coincide with lesson plan delivery, and reflections of experiences by pre-service teachers. For this study,

there were three different types of data that were collected: interviews (one at the beginning of the pre-service teacher lab experience, two after a lesson was taught, and one near the end of the pre-service teacher lab experience), all of the lesson plans written for the lab experience regardless of subject since literacy is a standard for all subjects, and the personal written reflections of the lessons taught during the experience. As social distancing is recommended by the Centers for Disease Control at this time, each interview was held using Google Meets.

Interviews

The four interviews were semi-structured interviews with pre-service teachers. Using a phenomenological approach, I shared personal teaching situations with the pre-service teachers in order for my openness to "persuade the interviewee to reveal more and be more honest in his or her responses" (Fontana & Frey, 2008, p. 116). This approach allowed the interview to be what Kong and colleagues call a "methodology of friendship" (p. 254). For this reason, there was not be a set time limit for the interviews so that it felt more like a conversation between colleagues. I was sure to respect the time of the pre-service teachers, though. The interviews ended up lasting 30-60 minutes each. The research questions I addressed with the four interviews were:

1. How have pre-service teachers experienced technological pedagogical content knowledge (TPACK) in their teacher preparatory program (TPP)?
2. What experiences have prepared pre-service teachers to be teachers of New Literacies in a technologically mediated world?

In order to have effective interviews, I used a list of commonly used interview probes to gain clarity and depth of responses to questions, while also providing pre-service teachers ample time to respond and share their experiences (Johnson & Christenson, 2017). The appendix

includes the initial interview protocol (Appendix A), the lesson plan interview protocol (Appendix B), and the summative interview protocol (Appendix C).

The Initial Interview. The purpose of the initial interview was to have preservice teachers co-construct how they would be identified by indicating the self-identifying characteristics in which they would like to be used. It was explained that this information will be used by the reader to better understand their experiences and expectations with teaching literacy remotely. Because interviews are an interpersonal encounter where establishing rapport is an important component (Moustakas, 1994), having preservice teachers co-construct their identifying factors helped me to establish a rapport with the participants while remaining respectful of how they personally identify. The first interview allowed me to explain the reasons for conducting the research and to share that their stories will be anonymous and confidential as it is important in an interview that the interviewee trusts you to increase the chances of obtaining unbiased data (Johnson & Christenson, 2017). Each of the three initial interview lasted approximately 30 minutes with each participant and took place via Google Meets the week before the pre-service teachers began their school observation experiences in March of 2021. For each individual google meet interview, once the pre-service teacher joined and was comfortable, she was pre-briefed to establish the norms of the interview and provided with the initial interview questions (Appendix A) before beginning the interview. The initial interview questions were used to provide background information on the pre-service teachers. During the pre-service teacher Block 3 field experience, each was required to teach nine lessons with three in Science, three in Math, and three in Reading. After the initial interview questions, I requested that the pre-service teachers email all of their lesson plans to my email and to provide two dates they would be teaching lessons that incorporated literacy as soon as it was determined after coordinating

with the assigned cooperating teacher so that an interviews could be scheduled. This first conversational interview helped me begin to understand the preservice teachers' past experiences with technology and literacy including expectations for teaching literacy using technology during the pandemic.

The Lesson Plan Reflection Interviews. The goal of the lesson plan reflection interviews was to provide a forum for the pre-service teachers to share specific experiences as they were remembered from the lesson plan taught. "For research participants to explore their experience, they must be able to relive it in their minds" (Merriam & Tisdell, 2016). For this research, it was important that the pre-service teachers provide very specific details so that I could feel as though I was there with them during their teaching experience. In order to do so, I utilized strategies found in phenomenological research, such as having participants recall an experience, think about it carefully, and then to describe the experience in detail (Merriam & Tisdell, 2016). Before having them share their experience, I modeled this strategy by explain one of my own experiences in the classroom. Once the teachers shared their teaching experience in as much detail as possible, I used the lesson plans and reflections along with a conversational format to probe for details and understanding of the teaching experience.

For the lesson plan reflection interviews, I used the lesson plan interview protocol (Appendix B). These interviews lasted 45-60 minutes. Though I had initially thought that the participants would focus on only the same day they taught for the interview, I found that the pre-service teachers treated the three lesson plans per subject as one lesson. For example, when a pre-service teacher discussed their day 2 lesson plan for science, they also discussed their day 1 lesson and plans for day 3. With this information, instead of treating the plans as nine lesson plans taught, I treated it as three subject lesson plans taught. I asked the pre-service teachers to

provide two dates that reflected literacy instruction to set up our lesson plan interviews, and to not interview them on the same day that their course professor debriefed with them after their course observation as I wanted their interview with me to be free from the bias of their course professor. Each of these six interviews took place the end of March 2021 through April of 2021 and consisted of one math lesson, two ELA lessons, and three science lessons. These lessons were the chosen by the pre-service teachers as lessons that exhibited literacy instruction based on their understanding.

Table 2

Interview Dates with Subjects

	Initial	Post Lesson 1	Post Lesson 2	Summative
Madison	3/3/21	4/7/21(Math)	4/14/21 (Science)	4/26/21
Amanda	3/6/21	3/24/21 (ELA)	4/20/21 (Science)	4/27/21
Auzzie	3/6/21	4/1/21 (Science)	4/20/21 (ELA)	4/26/21

The Summative Interview. The purpose of the summative interview, which occurred near the end of the field experience in April 2021, was to revisit the questions from the initial interview to see if expectations expressed at the beginning of the experience matched perceptions at the end. At the end of the field experience, the summative interview was scheduled to reflect on the initial interview questions, to share the units of meaning and ensure clarity of understanding. Through the use of the transcripts from the initial interview and lesson plan reflection interviews, written lesson plans, and reflections, I was more knowledgeable about each pre-service teacher's experience and used this information as a catalyst to evoke conversation in order to add depth and have open, honest communication about the experiences (Merriam & Tisdell, 2016). Using the significant statement and meaning chart created from the first three interviews coupled with the review of the lesson plans and reflections, I conducted a summative interview to pursue topics relevant to the participants' experiences. A sample of one of the pre-

service teachers' meaning chart updated during the summative interview is included in Appendix G.

By returning to the research participant with a summary and themes of the study, I was able to engage in a conversation fitting for phenomenological research. According to Hycner (1999), there are two goals for this: 1. To ensure the essence of the first interview has been accurately captured, 2. To see if the research participant agrees with the themes derived from the data. This information is important as it helped to ensure the validity of the findings while also clarifying any misconceptions and providing more depth of experiences.

The Lesson Plans

The next source of data acquired was lesson plans. During the student teaching experience, it is common for pre-service teachers to create detailed plans for the lessons that they will be responsible for teaching in the classroom. The lesson plan format (Appendix F) was provided to the pre-service teachers to be used for planning the nine lessons required for the Block 3 field experience. The purpose of using the lessons plans was to analyze the ways in which technology was incorporated into the planning process to teach literacy in order to answer the research questions:

1. How is TPACK for New Literacies represented in pre-service teachers' instructional design?
2. How have pre-service teachers experienced technological pedagogical content knowledge (TPACK) in their teacher preparatory program (TPP)?

All nine of the lesson plans (ELA, Math, and Science) were reviewed for TPACK and New Literacies components as well as to inform the lesson plan interviews. The lesson plans provided concrete examples of lessons that were referenced in the follow-up interviews to gather in depth stories of the experience. This is important for phenomenology as the purpose is to "focus on the

unique characteristics of an individual's experience" (Johnson & Christenson, 2017, p. 445). This data allowed me to better understand the experiences by providing me with information to discuss in the subsequent interviews to obtain the depth necessary to determine the essences of the phenomenon studied.

The Reflections

The next source of data acquired was reflections. During the student teaching experience, it is also common for pre-service teachers to reflect on their student teaching experience. The purpose of analyzing these reflections was to better understand the situation the pre-service teachers found themselves in and to provide more detailed information to allow me to tailor questioning based on the data to determine the essence of the experience. (Groenewald, 2004; Johnson & Christenson, 2017). Reflection is an effective strategy in transformative learning and the reflections were used to better understand the phenomenon (Mezirow, 1990). Once the pre-service teacher taught the subject area lessons, the reflections were emailed to the researcher. Though measures were taken to ensure that the lesson plan interviews took place before the pre-service teacher meeting with the course professor to avoid influence by the professor, the lesson plan reflections seemed to be greatly influenced by the lesson plan interviews.

Data Analysis

Data analysis is the process of making sense from the data. In qualitative research, analysis of data and the collection of data should occur simultaneously as a "complex procedure that involves moving back and forth between concrete bits of data and abstract concepts, between inductive and deductive reasoning, between description and interpretation" (Merriam & Tisdell, 2016, p. 202). Although there is not one single method of data analysis that can be

arbitrarily imposed on a phenomenon, for the purposes of this study, I used a simplified, five step phenomenological process, based on Hycner's (1999) and Groenewald (2004).

In line with interpretative phenomenological analysis, the analysis was concurrent with data collection (Merriam & Tisdell, 2016).

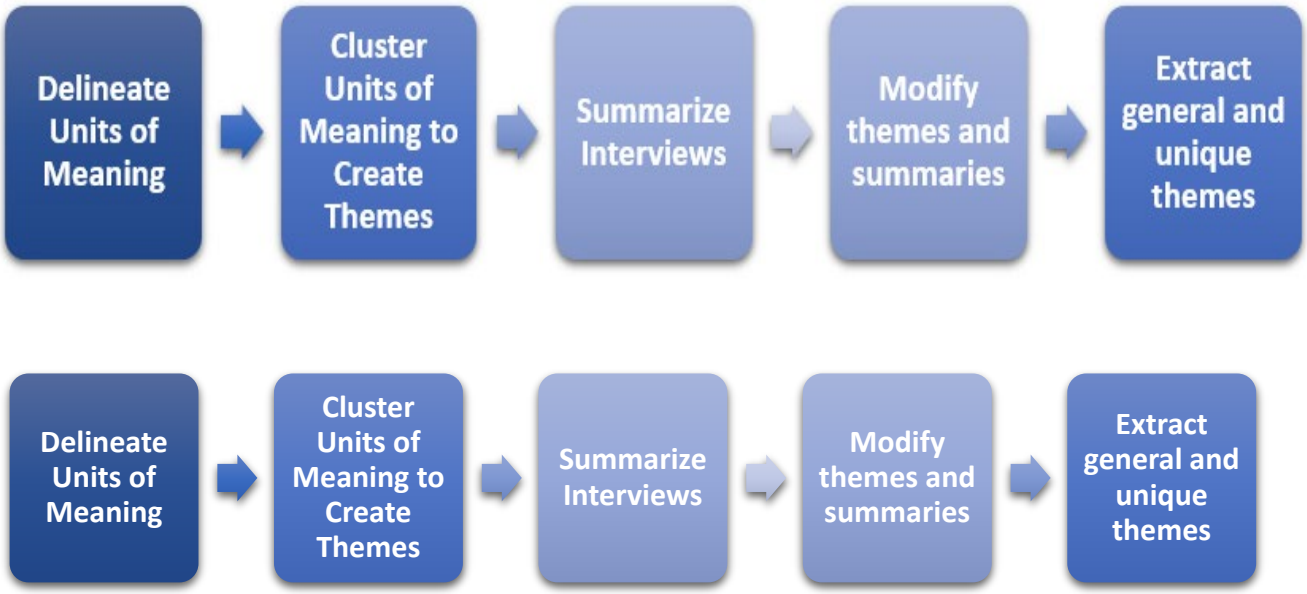

Figure 6. Interpretative Phenomenological Analysis

Delineating Units of Meaning

During this phase, I read back over the transcripts of the interviews three times and extracted statements that seemed to illuminate the phenomenon (Groenewald, 2004; Hycner, 1999; Johnson & Christenson; 2016). I included all statements that held substance, seemed interesting or that occurred repeatedly. I then made a list of "significant statements" that can be a few words, a phrase, a sentence or a few sentences (Johnson & Christenson; 2016, p. 448). These significant statements were recorded verbatim and a table was made to include meanings of the

statements (Johnson & Christenson; 2016). An example of the units of meaning table is included as Appendix G.

Clustering of Units of Meaning to Form Themes

During this phase, I went back and forth between the interviews, the lesson plans and the reflections to identify significant topics and derive clusters of appropriate meaning (Groenewald, 2004). I reviewed the significant statement and meaning table and compared to the lesson plan and reflection documents to determine themes. (Johnson & Christenson, 2016). I created meanings chart that include all essential quotes from the pre-service teachers with an explanation of the meaning for each. I highlighted all of participant meaning charts for each pre-service teacher a separate color and printed them out. Once I had done this, I had three meaning charts (updated during the summative interview) color coded for each participant. I then cut the meaning charts out into strips for each of the quotes and notated a theme on each of them. I put the themes in piles and made allowances for similar themes that could be compiled. In order to determine general themes, I reviewed piles of themes for the three colors indicating that the theme was reflective of all three participants. I then created a color-coded essence statement chart by theme (Appendix H) that included all of the color coded quotes in one document associated with the theme they represented.

Phenomenological themes emerged from conducting three sets of four virtual interviews with pre-service teachers enrolled in their Block 3 courses in a mid-sized public college in the southeast during spring semester, 2021.

Summarizing Each Interview and Validating its Accuracy

This phase consisted of summarizing the interview in a highly descriptive fashion so that the report elicits in the reader a “vicarious experience” whereby they “understand what it would

be like to experience the phenomenon themselves" (Johnson & Christenson, 2016, p. 449). I had the pre-service teachers review the summaries for corrections to ensure that there were no misunderstandings or corrections to be made (Hycner, 1999). An example of a summary can be found in the comparative case in this chapter.

Modifying Themes and Summary

Allowing the pre-service teachers the opportunity to go over their summaries to make corrections may result in modifying themes for the study. With the new data from the second interview, the themes and summaries were updated and instances whereby the data converged and diverged was noted. Once the summaries were updated, the themes were reconsidered to ensure that the changes did not result in a needed change to the themes.

Extracting General and Unique Themes from all the Data

Once the themes and summaries from each participant's interviews, lesson plans, and reflections were analyzed, I stepped back and viewed the data holistically to determine general and unique themes. According to Hycner (1999), the first step is to determine if there are themes present in all or most of the interviews to cluster together, while the second step is to determine if there are themes present that are unique to individuals to serve as counterpoints to the general theme.

Summary

The purpose of this qualitative phenomenological study is to explore pre-service teachers' experiences with technology integration to understand how teacher preparatory programs (TPPs), schools, and districts can help to better prepare pre-service teachers to teach literacy using technology, including teaching remotely. In this chapter, the research methodology used to guide the study was provided along with the research to support the data analysis choices

made. A qualitative phenomenological research design was chosen for this study because it is the most appropriate design to explore the experiences of pre-service teachers to teach literacy remotely. The types of data collected was shared in this chapter to include the steps, following the research design, used to analyze the data. Furthermore, the chapter included the role of the researcher to include a focus on subjectivity, preservice teachers in the study, instrumentation, and data collection and analysis procedures.

CHAPTER IV: RESULTS

The purpose of this qualitative phenomenological study is to explore pre-service teachers' experiences with technology integration to understand how teacher preparatory programs (TPPs), schools, and districts can help to better prepare pre-service teachers to teach literacy using technology, including teaching remotely. Three pre-service teachers shared their experiences with teaching both traditionally and remotely, and provided their insights regarding this unique time in education.

The research questions that guided this phenomenological study were the following: (1) How have pre-service teachers experienced technological pedagogical content knowledge (TPACK) in their teacher preparatory program (TPP)? (2) How is TPACK for New Literacies represented in pre-service teachers' instructional design? (3) What experiences have prepared pre-service teachers to be teachers of New Literacies in a technologically mediated world?

Chapter 4 is organized into the following sections: a biography of pre-service teachers, the phenomenological themes which emerged from clustering the units of meaning, a findings section to include each research question with the corresponding theoretical framework and themes associated with each, a comparative case, and a summary of the chapter.

Participants

To obtain a teaching degree with Chattahoochee University, pre-service teachers are required to take four blocks of elementary education coursework that include a field experience at a local school during their junior and senior year. For each of the blocks of field experiences, pre-service teachers are assigned a cooperating teacher at an area school to observe and gradually begin teaching lessons. The participants for this study were in their Block 3 courses with their final block, Block 4 or student teaching, to be taken in Fall of 2021 for graduation. Two of the

three pre-service teacher participants were assigned to a class that was being taught concurrently, with traditional and virtual students.

Table 3 includes the demographics of the pre-service teachers from the Fall of 2021 graduating class that participated in the study. For the study, all of the pre-service teacher names have been given pseudonyms for anonymity.

Table 3

Pre-Service Teacher Participant Demographics

Characteristic	*n*	*%*
Gender		
Female	3	100%
Race		
White	3	100%
Education Level		
Senior working towards Bachelor's Degree	3	100%
Major		
Early Childhood Education	3	100%
Age		
22 years old	3	100%

Madison

Madison, a 22 year-old White female, describes herself as a laid back person and free spirit. When asked how people would describe her, Madison shared, "I'm, I don't know. I'm just a very laid back person, so whatever people see me as and as long as it, they don't see me as bad. I really don't care either way. I just, I'm just here, living life" She was homeschooled until the ninth grade and boasts of her mom's teaching skills. During her summers, she served as a counselor for summer camps and was a para-professional at the same high school she graduated

from. Her major was originally wildlife biology, but, the multiple teaching roles she held throughout her life led her to choose teaching. She feels that she has been working towards a teaching career her entire life. During her time homeschooling until high school, she was a part of a homeschool group that learned through traveling. She participated in athletics with the neighborhood public school throughout the years so her transition to public school was smooth since she already knew so many people. Her only real struggle was time. She was used to being finished with school by noon and being able to work at her own pace to complete all of her assignments. She says that she had to really deal with her impatience with having to follow the same pace as the other students in the class. Madison is also very busy with school and the National Guard. She has PT every morning and gets up at 4AM before going into school, JROTC four hour seminars each week, drill on the weekends, and she works an additional job. Madison struggles to find time to relax.

Regarding technology, Madison admits that she is not very good with technology. She found that the second graders in her class during previous observations knew more about technology than she did. She shared that she prefers physical books to electronic books and prefers everything on hardcopy paper in front of her. “I'm very, very old soul in that way, where I like my things hard copies paper in front of me, I think it partially is because I need hands on everything and if my textbook is in front of me on the computer on my phone or so I just get too distracted.” She admits that she even needs her textbooks in front of her because if it is on here computer or phone, she gets too distracted.

For Block 3, Madison was assigned to a diverse suburban elementary school with 494 students including 50.2% Black, 31.6% White, and 10.1% Hispanic.

Amanda

Amanda, a 22 year-old White female and a former competitive cheerleader, shared that she loves to work out and to serve people. She is working to become a teacher because she had so many teachers that impacted her growing up. During her senior year in high school, her father passed away. His death was extremely hard on her, and, if it were not for the amazing teachers that she had during that time, she would never have graduated high school. She hopes to one day influence and impact people's lives the way that those teachers did for her. Amanda chose early childhood education because she feels that she can have a large impact on their future. When asked to share something about herself, Amanda admits "I'm the most blunt human being! I don't have a whole lot about myself at the moment though because all I do is go to school really. I don't work right now."

Regarding technology, Amanda acknowledges that her generation is technologically advanced, but not nearly as advanced as the current generation in school. She shared that she grew up on a computer and has had a cell phone since the 3rd grade, but does not love technology. Though Amanda claims that technology has some benefits in the educational world, she finds herself a bit scared about teaching with technology, especially remote teaching.

Amanda shared the cause of her fears. During her Block 1 observation in the Spring of 2020, she only taught one lesson before everything shut down from Covid-19. During her Block 2 observation in Fall of 2020, she was assigned to a traditional class with 100% traditional kindergarten students, so she did not get to experience remote or concurrent teaching (teaching both traditional and virtual students).

For Block 3, Amanda was assigned to a suburban elementary school with 405 students including 84.7% Black, 8.6% two or more races, and 3.7% Hispanic.

Auzzie

Auzzie, a 22 year old White female, identifies herself as a Christian cat mom. She is a former nursing major and had wanted to be a nurse her entire life until she started working in a preschool. While working with a kid learning the letter "A", she felt his pure joy and excitement when he could recognize the letter. That moment gave her more joy that anything in nursing ever did. Auzzie became a teacher for these moments as she enjoys seeing kids achieve things that they did not think they could. Auzzie is very busy with school, planning a big barn wedding for summer of 2021, and has lots of cats that liked to make their appearance during interviews.

Regarding technology, Auzzie acknowledges that her generation has been surrounded by technology. She admitted that she has had a personal technology device since she was in middle school, but prefers hands-on learning. Auzzie understands the importance of technology though and realizes that technology has become even more important with the pandemic. She expressed her apprehension of going into this observation since her Block 1 took place during spring 2020 and was only 2 weeks long before schools were closed. During that time, Auzzie shared that everyone was just trying to figure everything out, so she did not get any time to teach. For her Block 2, in Fall of 2020, she was assigned a class with 100% traditional students. Auzzie expressed that she felt lucky that all of her students were traditional, but was nervously excited about the upcoming observation because of the virtual component; however, she was again assigned a class with 100% traditional students.

For Block 3, Auzzie was assigned to a suburban elementary school with 405 students including 84.7% Black, 8.6% two or more races, and 3.7% Hispanic.

Themes and Subthemes

Table 4

Frequencies of Phenomenological Themes and Essence Statements

	Madison	Amanda	Auzzie
Anxiety/Apprehension			
Planning	5	7	3
Relationships	3	9	2
Group work	3	2	16
Confidence-Teacher Controlled	1	1	1
Constraints of Time	2	4	2
Cultural Diversity	6	1	4
Hindering/Equity	4	6	1
Impact of Covid on Preparation	1	5	3
Literacy			
Technology	2	3	0
Non-Technology	4	2	6
Below grade level	1	2	15
Lack of Preparation in Blocks	1	5	3
Technology Confidence			
Lack of Confidence	4	8	2
Technology Issues	4	3	0
Technology Uses			
Engagement	5	4	4
Non-Engagement	1	1	1

Once the summaries from each participant's interviews, lesson plans, and reflections were analyzed, I stepped back and viewed the data holistically to determine general and unique themes and gathered essence statements that reflected these themes. For this phenomenological study, 10 themes were found in the data and the number of essential essence statements for each theme and each participant are included in Table 4. One pre-service teacher, Auzzie, did not have virtual students which accounted for her lack of quotes from two technology themes. Otherwise, the themes were relevant across the experiences of all the pre-service teachers.

Findings

The findings from the study were used to address the three research questions posed, though, as with qualitative studies, themes also emerged that were not necessarily related to the

research questions. These research questions were explored using the themes of the study and framed with the theoretical frameworks associated with each.

Research Question 1

The first research question for this study: "How have pre-service teachers experienced technological pedagogical content knowledge (TPACK) in their teacher preparatory program (TPP)?" was addressed with four themes that emerged from the data: lack of preparation due to Covid and Blocks, technology uses, cultural diversity and constraints of time. The TPACK framework is a way to consider the categories of teacher knowledge required to successfully integrate technology into teaching. TPACK consists of pedagogical content knowledge (PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK) all three together as technological pedagogical content knowledge (TPCK) and ConteXtual Knowledge (XK) ((Mishra & Koehler, 2019).

Impact of Covid on Preparation and Blocks. One theme that presented itself during the initial interviews was the theme of a lack of preparation as it related to the impact Covid had on the normally scheduled four blocks of courses for the pre-service teachers. In the Spring of 2020, the pre-service teachers for this study were enrolled in their Block 1 courses: Creative Activities for Young Children, Technology 21st Century, Cognitive Language Development, Teaching Children to Read, and Developing Movement Skills. This block of courses was impacted due to COVID-19 as the field experience at schools ended with school closings on March 13, 2020 as shared by Amanda, "So Block 1 was when the pandemic hit. So I spent about half of my hours [observing]…other 30 like, over the computer, just like watching videos and stuff like that and I only got to teach one lesson. Some of my classmates didn't get to teach any lessons to students. So that was absolutely terrifying for us." Auzzie's experience mirrored Amanda's, "Whenever

everything shut down last year we were in our first block and so we had only been in the school like actually doing field experience for two weeks. And then, I mean ended up not even doing anything with the students for the rest of the semester because it was just everybody was trying to figure out, you know, all the things." This environment of everyone trying to figure out, "all the things" permeated the next semester for the Block 2 courses, as well.

The Block 2 courses were slightly impeded due to the schools opening later than normal. Auzzie shared this impact, "…our first block, we didn't get any field experience basically and for a second block, we ended up starting a lot later because the schools went back later." In addition, each of the pre-service teachers were assigned a teacher and class with 100% traditional students and 0% virtual students. Amanda shared, "They had to find teachers that would accept us. And because there weren't many. So block two was very hard for us. It was like a slap in the face, kind of, because we were asked to teach nine lessons, three segments."

For this study, the pre-service teachers were in their Block 3 teaching courses. Two of the three pre-service teacher participants were assigned to a class that was being taught concurrently, with traditional and virtual students. Auzzie shared how the changes made due to Covid have impacted their field experiences, "We just kind of have [had] like a crazy field experience." Amanda summed up the experience of this cohort of pre-service teachers so far.

> It's been wild. Our experience in the program has been all over the place. Some of these teachers that we have which they're nice like nothing against them but like they expect us to like have experienced more in our blocks than we have and they don't realize that like our blocks have been so messed up from the pandemic, the way that it just worked out. So we just wish that there was a way for us to, like, have been able to have, I guess, you know, the normal blocks. But you know, you take what you can get.

This theme of feelings of a lack of preparation for the Block 3 field experience remained consistent throughout the interviews with Auzzie adding in the summative interview that, “I’ve gotten more experience than I have any other semester just because they were all in person and we were like there the whole time.” This was not true for the other participants that taught concurrently, though. This theme of a lack of preparation seemed to greatly impact technological and pedagogical knowledge.

Technology Uses-Engagement and Non-Engagement. The TPACK framework is important as it shows the relationship between technology, content, and pedagogy and how the purposeful blending of these components enhances learning and engagement. In a pandemic world with many teachers teaching both traditional and virtual students, implementing technology was necessary for most pre-service teachers. One participant shared, “So what I’ve done is I’ve made my lessons to where the students in class and on Zoom are accessing the same document through the exact same process.” Instead of planning separate lessons for traditional and virtual students, for two of the three pre-service teachers, all lessons were created to be used virtually. Madison shared how she creatively included the virtual students in lessons, “So there is an iPad set up right in front of the smartboard so they can see everything that I’m teaching and I include them like I include the other students.” This proved successful for Madison with only three-five students learning remotely during her time teaching. Amanda, though, with nearly one-half of her students learning remotely shared that including the virtual students was not always as easy. “I'm trying my best to, you know, [to] be 50/50 because it's very hard. It really is hard too. Sometimes you'll forget that the zoom friends are there because they're so quiet because they mute themselves and I'm like, oh gosh, look back at them.

Amanda reflected on how, though she was required to use technology in all of her lessons since she had so many students learning remotely, her lessons were still traditional.

> It was still super traditional though. I just used things such as a Kami page and Canvas and I used Epic for them to have a book to read. I had to upload a book for them instead of them having it in their hands, but, even though I was using those things and through zoom, the lessons were still very traditional and in a way they were done the same that they would have been done if they could have a book. Instead of having a paper and pencil and crayons, they colored cause and effect of the book on the Kami page with virtual markers.

Even though technology was used daily by the pre-service teachers in classrooms where students were learning remotely, it does not mean that it was used in a way to enhance engagement or learning. The technological knowledge was present as the pre-service teachers implemented various types of technology; however, the technological pedagogical knowledge (TPK) was not ideal as acknowledged by Amanda's reflection of her use of passive use technology (PAT) instead of AUT.

With regards to pedagogical knowledge (PK), the majority of the lessons were taught whole group with the Smartboard used as a projector/whiteboard. Madison shared when describing her lesson, "We just went through the Powerpoints; it had a ton of example questions on there." Auzzie reflected, "I used technology when I was teaching lessons. I used the Smartboard and like they would put stuff up there for them to read and then I played videos for them. We haven't had to use that much technology just because we don't have any virtual students." The technological knowledge varied by pre-service teacher. One participant shared that she had found a program that converted the Smartboard to a whiteboard, a feature already

embedded into the design of the Smartboard, "I used a program called Envision…I just found it. It makes a smartboard look like a whiteboard so you just write on it with the pen or whatever." The content knowledge of the three 1st grade pre-service teachers was adequate; however, when it comes to the TPACK of the pre-service teachers, there were opportunities for growth. "When I was planning this lesson, I was struggling a little bit because magnets isn't exactly the best thing to teach online on the zoom platform because you really want them to be able to have it in their hand and be able to manipulate it." This was the case for all three of the pre-service teachers. Auzzie reflected on a reason for the current lack of TPACK, "I feel like our teachers have done a really good job of sharing different like ways that we can use technology when teaching…teachers right now are so overwhelmed…trying to basically play catch up…they haven't even gotten to the point where they can try to start using that because they feel like they're just trying to stay afloat…" The problem, then, may be not in the TCK, but in the TPACK or how that technology can be used to present the content in a way that is engaging.

Besides using the Smartboard to work problems on a Powerpoint, show videos, or to project words to be read in class, there were moments where the TPACK of the pre-service teacher was present, though, for the two pre-service teachers that taught both traditional and virtual students. Some examples include the use of Google slides to create a sorting game that allowed students to drag and drop for understanding, the use of magnet boom cards to virtually assess student understanding, and a Google jamboard to collaborate with traditional and virtual students to close a lesson. It is important to note, though, that the pre-service teacher that was not required to implement technology as she did not have any students learning virtually, did not use technology with the exception of using the Smartboard as a whiteboard or a projector.

Cultural Diversity. In 2019, The TPACK Framework diagram was revised to add another knowledge base: ConteXtual Knowledge (XK) (Mishra, 2019). It is this context component of TPACK that is so frequently overlooked that includes the cultural aspects of teaching and learning. The lesson plan format used by the pre-service teachers contained a section titled supports for students with a sub heading of differentiation that included planning for cultural diversity. During the post lesson plan interviews, this aspect of the lesson plan was discussed with the participants. Each of the participants taught a 1st grade science lesson on magnets and had a post lesson interview on the lesson. Madison reflected on her planning for this lesson, "I was like, what am I gonna do for cultural diversity? We're just talking about magnets. And so he [the science professor] suggested that I just talked about magnets in their homes because each of them has their own home culture or whatever…" Amanda reflected, "Cultural diversity doesn't mean that we have to use a specific culture or one that matches the class. It can also mean that you're just talking about their everyday lives…connecting the lesson to their everyday life." When asked about the cultural diversity in the classroom, Madison shared, "I don't have a lot of diversity in my classroom" and when asked to elaborate on this, she reflected,

> I have maybe half the class are African-American students and then I think I have one Asian American student and then the rest are just White students but all of them come from kind of the same background…I got profiles of them…interest surveys at the beginning of the year. And ask them about like what do you do at home? Do you like to read at home, stuff like that. So there wasn't a lot of like diversity in the way that they are at home if that makes sense.

As we discussed her planning for cultural diversity, Madison reflected, "Most of the time the students don't realize that they're having like a cultural diverse step thrown at them. It's just

another part of the lesson." In the TPACK framework the ConteXtual Knowledge, which includes knowledge of the context in which a teacher teaches including the culture of the students, encompasses all of the other knowledges: content, pedagogy, technology, pedagogical content knowledge (PCK), technological content knowledge (TCK), and technological pedagogical content knowledge (TPCK) for planning lessons.

Constraints of Time. Each of the pre-service teachers expressed dismay over the impact of time on planning lessons. Amanda shared that with her lesson on magnets, she would have liked to have done more with cultural diversity, but time is a constraint. "If I had just all the time in the world, a cool way…would have been talking about…China…it's like hover trains that use magnet field…but I did have 30 minutes so I tried to do something that was quick." Without sufficient time to teach the lessons, it seems that some elements were not included in the lessons that may have been important.

Research Question 2

The second research question for this study: "How is TPACK for New Literacies represented in pre-service teachers' instructional design?" was addressed with the lesson plan analysis to include lesson plan reflections. Each pre-service teacher was required to write nine lesson plans with three lesson plans for each subject: ELA, Math, and Science. Table 5 reflects the uses of technology.

Table 5

TPACK examined through active and passive use technology uses

Characteristic	Active Use Technology	Passive Use Technology
Pre-Service Teacher		
Auzzie	N/A	"I pulled up a slideshow on the Smartboard of vocabulary words that contributed to the lesson and the students' knowledge of the learning target. Before going through and explaining all of these Vocabulary words to the class, I passed out a paper to all of the students with all of the vocabulary words and pictures on it for the students to keep in their 'Investigating Magnets' Journal."
Amanda	"I will explain to the zoom students that they need to open the link that is being sent in the chat to go to abcya.com to play the tangrams game. I will explain that there are three levels and they need to start at 1"	"The students will be assessed on day one by using a graphic organizer to fill out the cause and effect."
Madison	"Open the 1st simulation link on the board. Go through the simulation (the second one if you scroll down) as a class. As we go through the simulation have different students come up to interact and place the materials."	"Release online to work on McGraw Hill, and in class will also work on McGraw Hill." "Hand out the sheets for the thank you note and let them get to work" "Watch the video below to broaden their knowledge on magnets"

Active Use Technology is defined as "the use of technology [that] allows for greater interaction with technology by students and teachers. Examples of active use in the classroom include peer-to-peer collaboration, the production by students of published content (such as blogs and videos), real-time interaction with experts, and connecting with other learners across the globe" (US Department of Education, 2013, p. 10). Passive Use Technology "involves activities in which students have very little interaction. Examples of passive use in the classroom include digitized

worksheets and activities that only require students to consume content produced by others" (US Department of Education, 2013, p. 10).

Auzzie's students were 100% in person, traditional students. In her lesson plans for ELA, the only use of technology was when the Smartboard was used to play a read-aloud of a story. For the math lesson plans, a Powerpoint was shown on the Smartboard each day and the students were able to come to the Smartboard to write on the board. For the Science lesson, a Brainpop Magnet video was played in one lesson for students.

Amanda's students included 10 traditional students and seven virtual students; therefore, Zoom was used each day to bring the virtual students into the classroom. For the ELA lesson plans, Kami, an online electronic worksheet software, was used to create a digital cause and effect graphic organizer worksheet, and the Smartboard to project the story read to the class. For the Science lesson, Kami was again used to create a digital graphic organizer worksheet. For the body of the lesson, Amanda planned two different tasks, one for the virtual students and one for the traditional students. The virtual students completed an interactive magnet lesson using Boom cards, an interactive, self-grading software, to virtually predict whether objects were magnetic or not and get immediate feedback to explore the characteristics of magnets. The traditional students were provided bags of items and magnets to test if the items and the bag were magnetic. After the body of the lesson, all students then collaborated on a Google jamboard to share their experiences with the magnet lessons with their classmates using virtual sticky notes. For the Math lesson, the Smartboard was used to show the shape slide show. During the body of the lesson, the virtual and traditional students were again given separate tasks to complete. The virtual students worked on tangrams using a website: abcya.com to go through the three levels interacting with the content and technology; however, the traditional students were provided

tangrams and worksheets to manipulate the tangrams though the pre-service teacher modeled the lesson only using the website. In the lesson plan, Amanda reflected on how the two types of assignments. For the virtual students, Amanda noted, "My zoom students got to play with tangrams on a website called ABCya.com and they thoroughly enjoyed this," while, sharing a less positive experience of the traditional students. "The tangrams were brand new for them so they were hard for them to fit in the pictures because it is a hard concept and they have not developed that spatial awareness to do so quickly." Upon reflection of the lesson as a whole, Amanda noted, "In the future when I teach this, I will model the tangrams for both of the ways they were assigned." The results of the two separate lessons did not lead this pre-service teacher to consider having the traditional students use the technology that proved successful, rather, she reflected on keeping the body of the lesson separate once again and spending more class time modeling two different assignment types.

Madison's students included 19 traditional students and three virtual students; therefore, Zoom was used each day to bring the virtual students into the classroom. For the ELA lessons, Madison used technology with the Smartboard to show a Powerpoint and had students complete an assignment online on McGraw Hill that included answering questions. For the Math lessons, Madison shared a youtube video using the Smartboard and had students work through a Powerpoint of problems. For the Science lessons, Madison showed a video on magnets to the class and completed interactive virtual magnet simulations through two separate websites with both the virtual and traditional students. Madison touched back on the theme of time constraints with her reflection of the science lesson, "I would have liked to have more time to talk about what a hypothesis is, but with only 30 minutes for science, I had to touch and go when talking about it." Madison further shared in her lesson reflection, "I do want to continue learning about

the resources we can use online for the virtual students. This is the part of the teaching I am least confident in." Much like Amanda, the fact that Madison reflects on needing online resources for virtual students instead of technology resources for all students in dictates that she may associate technology integration with remote instruction instead of as a part of both traditional and remote instruction.

Literacy Defined. For this study, literacy, or being literate, is defined as being able to enter into a Discourse and to be able to competently perform in that Discourse. (Lankshear & Knobel, 2017). During the initial interview each of the pre-service teachers were asked to define literacy and then again in the summative they were asked to revise their response if they no longer felt the same way about a response. The responses to the question are found in Table 6. Though they were given the opportunity, none of the definitions to literacy were altered during the summative interview.

Table 6

How Pre-service teachers define literacy

Pre-Service Teacher	*Literacy Definition*
Amanda	"As most people would think is the ability to fluently read and write. However, I personally look at the word literacy as…You can be literate in just about anything. It's just something that you are passionate about and you're very fluent in."
Auzzie	"Literacy is more of not just students begin able to read words from a paper but that they can understand what those words mean and connect them to their everyday life."
Madison	"We focus on the understanding…so literacy to me is just a general understanding of the concepts that you're working with and that you can understand the things that you need to work with and have the ability to read them if you need to."

In the initial interview, the participants were asked to describe a lesson that they had observed or taught using technology to teach literacy, then in the summative reflection interview, they were asked to verify that their response still rung true. In the initial interview Amanda

shared, “I cannot at the moment because I had, like I said, I haven’t been in. Haven’t observed very much of that” and added in the summative “I don’t have anything.” Auzzie shared, “I can’t think of any lessons that I have been able to teach or like that I’ve really seen that involved that much technology that came to literacy.” While Madison shared, “A lot of word sorting games were on the Smartboard. A lot of our reading passages were on the Smartboard. It had the ability to click on the words and it would read it. An automated voice would read it and then you would pause to ask students questions.” It is important to note that there was an inability to recall even one lesson that taught literacy with technology before the observation and again after teaching nine lessons themselves by two of the three pre-service teachers.

TPACK. Though the definitions of literacy provided by the pre-service teachers was reflective of New Literacies, the pre-service teacher inability to recall even one lesson that had used technology and literacy in two of the three pre-service teachers may suggest that there is an opportunity here for growth. Regarding the Technological Pedagogical Content Knowledge, the data reflects that the class with 100% in-person students was not given any opportunities to engage in technology in a meaningful way with active use technology, while, interestingly, the pre-service teachers with virtual students explored interactive, engaging resources for virtual students. It is worth noting that this sharing of interactive, engaging resources was only provided to the virtual students in one of the classes while the other class did separate activities that included the virtual students being provided online resources and the traditional students provided hands on resources.

Research Question 3

The third research question for this study: “What experiences have prepared pre-service teachers to be teachers of New Literacies in a technologically mediated world?” was addressed

with the lesson plan reflections and three themes that emerged from the data that can best be viewed through the lens of transformative learning: confidence-teacher controlled, technology confidence, anxiety/apprehension, literacy, and hindering/equity.

Transformative Learning Theory. Transformative Learning Theory is defined as an adult education knowledge construct that explains the process of using our own experiences instead of the values that we have unintentionally garnered from others to make sense of our world (Casebeer & Mann, 2017). According to the theory, adults have attained a set of frames of reference that define their world that includes all of their experience associations, values, feelings, and conditioned responses (Mezirow, 1997). By focusing on our experiences to determine why we think, feel, believe what we do, transformative learning takes place (Mezirow, 1997). In fact, it is the revision of a frame of reference coupled with reflection on experience (Taylor, 2008) that is essential for learners and educators to acknowledge to become critically reflective or their own frames of references. (Mezirow, 1997).

Confidence-Teacher Controlled. When asked what aspect of the lesson pre-service teachers felt the most confident with, each of the participants shared that they were most confident when the lesson was teacher controlled. Madison shared she is most confident when she is leading classroom discussions. Amanda shared that she is most confident, "Anytime I'm speaking I feel pretty confident because I know I'm in control." Auzzie reiterated these sentiments with whole group instruction, "I already knew how that was going to go, that was more like with responsibility on me."

Anxiety/Apprehension and Technology Confidence. Two of the participants, Madison and Amanda, taught con-currently, and both expressed their lack of confidence with technology initially. Madison shared she was, "least confident with technology in general" and added, "I'm

a very, very old soul in that way, where I like my things hard copy paper in front of me." While Amanda reflected, "Technology isn't it. I don't love it. I'll be honest. I do not love technology. I actually think it is not the best thing." Both Madison and Amanda further expressed their frustrations with technology during their lesson plan reflections especially when the technology did not work such as when the internet went down for a week in Madison's class or the Smartboard refused to respond to touch screen in Amanda's class, but, through the experience of having to rely on technology every day with students attending school virtually, their frames of reference were changed. In the summative conference, Madison shared, "I would just add that once I am used to it and know what we need to do, then I enjoy working with it. I've enjoyed working with the iPads and having all those resources available." Amanda, too, although she had much anxiety about technology expressed, she experience a transformational change, "…I had no idea where it was gonna go because I know they never used it and I really never taught with it so it was just…I feel like that's the best way to really, you know, like try it out. It can't, it can't be the end of the world. There's only one way to learn how to do something." Through the anxiety of being forced into a situation where using technology was the only way to teach the students that were at home learning virtually, these pre-service teachers had their own frames of reference about teaching technology challenged, and, in the end, experienced transformative learning as a result.

Auzzie taught 100% traditional students during her experience. Interestingly, Auzzie actually expressed the most confidence with technology at the initial interview, "I feel like I'm pretty decent at like working with technology…my generation, we've known technology ever since like Middle School, we've been surrounded by technology." Auzzie did express her anxiety over planning lessons using group work, though, such as, "wasn't sure how it was gonna

go like if they were gonna stay on task" and "I wasn't sure quite exactly how it was gonna go." Auzzie reflected that her cooperating teacher encouraged group work even during the pandemic, "It's kind of up to the discretion of the teacher…it hasn't been encouraged as it normally would be…Some teachers may be more likely to or more comfortable doing group work…Some teachers may value doing group activities and like collaboration between students a little bit more so they are comfortable as long as they take precautions." As a result, Auzzie did group work in every lesson she planned and reflected on these experiences, "…actually it went really well and I think they learned a lot from it but they also enjoyed it which is really important too" and "…they did an awesome job and they had a lot of fun with it. But they stayed on task and like understood the activity."

In this technologically mediated world, these experiences helped to prepare the pre-service teachers to overcome their anxiety with implementing new technology and facilitating group work, both skills necessary for New Literacies.

Literacy. Another theme that emerged to support this research question was below grade level literacy. Each of the participants shared how their classes were below grade level. Auzzie shared her thoughts about the cause of the deficiencies, "I think there's a lot of reason that they're struggling, but mainly because they did not get the foundation they needed last year in kindergarten because of how the year ended and then they started a little bit later this year." She also shared, "Probably five kids in that class…their parents…school is not even a thing…you can tell the students whose parents work with them at home and the students whose parents I mean don't. You can easily tell." Because of the low reading level of students, two of the pre-service teachers shared that they altered their lessons to read to students instead of allowing students to read. Auzzie shared, "I didn't ask the students to read because a lot of them still are

very much struggling with that, so I decided for time's sake, I just would read it to them." While Amanda shared, "…it wasn't going to happen…so I just went over the sheet with the class." Though these classes were all first grade classes, lessons were altered to include teacher led reading to save time in the lessons because of the low level readers.

The pre-service teachers were able to experience the student support team process as the teachers worked towards getting students that were struggling more than the rest the special education supports they needed, "My teacher has to do interventions with at least probably half of the students in the class. They're moving forward, but it's a struggle."

Hindering students. Because the context of all language is social, according to New Literacies, being literate is being able to enter into a Discourse and be able to competently perform in that Discourse (Lankshear & Knobel, 2017). This definition is essential to understanding another theme that emerged in the data: hindering students. Auzzie shared her thoughts on remote learning and the decrease in group work interactions among students due to social distancing, "That's something that has changed, the social interaction between students, not only the fact that they're behind in school, but I think that maybe their emotional and social development might be affected as well. They're not having the kinds of interaction that they should on a daily basis." Amanda echoed these thoughts, "they're sitting at home and they're just watching and really, they don't have any like interaction with anyone because they keep themselves on mute because if they don't, you hear them all over the classroom." This lack of social interaction was shared by 100% of the pre-service teachers. Even Auzzie with all traditional students shared, "You can't do quite as much group activities and they can't really touch hands or swap stuff. I can't give my kids hugs. That kind of sucks." In this new technologically mediated, pandemic world, the data shows that students are given limited

opportunities to enter into a Discourse whether it be a book that the teacher reads to the class instead of allowing students to read on their own, students living in a muted bubble without interactions with their teacher or peers, physical contact with their teachers or peers being nearly non-existent, or group work passed over for individual assignments due to social distancing.

A Comparative Case-Teaching with Technology during a Pandemic

Part of phenomenological research consists of summarizing interviews in a highly descriptive fashion so that the report elicits in the reader a "vicarious experience" whereby they "understand what it would be like to experience the phenomenon themselves" (Johnson & Christenson, 2016, p. 449). After signing up for this study, two participants were assigned the same school, in the same grade level, across the hall from each other with one pre-service teacher, Auzzie teaching 100% traditionally, meaning all students physically came to class each day, while another pre-service teacher, Amanda taught concurrently with 41% attending virtually and 59% attending traditionally. This difference in the type of instruction created a noteworthy juxtaposition of teaching during a pandemic that is presented below in an effort to allow the reader to not only better understand the experience of teaching literacy during a pandemic, but to highlight how idiosyncratic the experience of teaching is as only qualitative research can do.

Science Lesson

Each of the pre-service teachers were required to teach three Science segments. Both Auzzie and Amanda focused on magnets when they taught their science segments to 1st grade classes across the hall from one another. Each class had a completely different experience, though.

Auzzie introduced the lesson on magnets with her 100% traditional class by asking the class what they knew about magnets followed by a Brainpop magnet video. This was followed

by a whole group discussion on what students saw in the video that stuck out to them. Students then wrote down magnet facts in their magnet journals they created while the students that finished early were given time to color and decorate their journals. Auzzie then passed out to each student a book about magnets and read it to them while connecting back to the Brainpop video by "ask[ing] them questions throughout the book. 'Like oh, do you remember?...we saw this in the video!'" Auzzie then took the class to the science lab and opened with a real-world scenario, "A hotel opened up in Panama City and they have hired you to clean the beach for them…when you go to the beach, do you want to be stepping on a bunch of nails and nuts and bolts and stuff? And they were like, no. So, I said, well, they've hired you to use your magnets to dig through all the sand in front of their hotel and get all that stuff out for them." Using large clear tubs filled with sand, nuts, bolts, and seashells, the fourteen students were separated into four groups and given magnets from the school's stemscopes kit. The groups were given 15 minutes to dig around in the sand and explore. After sanitizing and cleaning up the science lab, they went back to the classroom and reflected on magnets. "So I had them all open up their books and I just like held the book up to where they could see it…And then like I would put the book down and show…I used one magnet to repel the other and push it, like I across the table and they just thought it was magic." Auzzie reflected on the fact that the science lab did not look as though it had been used.

> The science lab doesn't look like a lot of people are using it, and it's probably because most people have half their class online or more than half of their class virtual. And so, I don't know if I would have done the Hands-On activity. I mean I would still have wanted to do it but I would have been a little more apprehensive because I would feel like I'm

leaving those students out. I would have to find a way to still have them involved in the lesson.

After teaching this lesson, Auzzie was quarantined for having Covid-like symptoms for three days as she waited for the results of the test to return. The test came back negative so Auzzie was able to return to the school to finish her lesson segment on magnets with the students.

Across the hall, Amanda prepared to teach her own lesson on magnets. “When I was planning this lesson, I was struggling a little bit because magnets isn't exactly the best thing to teach online on the zoom platform because you really want them to be able to have it in their hand and be able to manipulate it.” Amanda began the lesson with a KWL chart with the whole class and shared her exasperation with dividing her time between the traditional and the virtual students, “I'm trying my best to, you know, [to] be 50/50 because it's very hard. It really is hard too. Sometimes you'll forget that the zoom friends are there because they're so quiet because they mute themselves and I'm like, oh gosh, look back at them.” The next segment of the lesson involved the virtual and traditional students working on separate activities. The virtual students did “boom cards, which are cards where it shows a picture and then it says yes or no. And it's just a virtual thing. And they click yes or no. And it like, goes through the cards. It's kind of like an assessment,” while the traditional students did a hands-on activity. “I made bags with all different types of things that were magnetic or not magnetic, pass them out, and then they had a worksheet that had all of the things in the bag listed and then on the right side had yes or no underneath. Is it magnetic? And it said yes or no. They would Circle it.” Amanda shared that while students worked at their desks, “I try to minimize how much I'm walking around the room and how close I'm getting to them…which is sad.” To conclude the lesson, Amanda, “used a Google jamboard. And this was so that everyone could collaborate on it.”

Two classes, the same grade, the same school, the same standard taught, but very different experiences. While one teacher took a more hands off approach to teaching that she even described as sad as it included minimizing how much she walks around the room, giving feedback on the computer instead of in person, students working in isolation, and providing virtual students with an online assessment activity as the learning activity for magnets, the traditional students, or those students in the class and across the hall, had a drastically different experience. While both sets of traditional students received a hands-on experience with magnets, one included students working in isolation with limited interaction from the teacher, while the other included the whole class, the science lab and stemkits, involved group work and real world scenarios, and allowed students to hold their own books and read along with the teacher. The juxtaposition of these two lessons on magnets shows that the way in which technology is used can be detrimental to a successful lesson.

ELA/Reading Lesson

With seven students on zoom and ten in class, Amanda planned a reading lesson for her con-current students. When Amanda chose the book *If you give a Mouse a Cookie*, making the book accessible to all students was time consuming, "So I went and got the book from library and I had to scan each page of the book and then I uploaded it on to a Google doc. And then transferred it over to Kami. And then had to put it on canvas. So that's how the students looked at that. They looked at on their computer. It is crazy. It is a lot. It's a lot of work." Amanda wanted to teach cause and effect using sentence strips and having students walk around the room and find their match, "I kind of wanted to write cause and effects on sentence strips and get them to find their match. Like, around the room, can't do that. She [the cooperating teacher] was like, no, it's not gonna work…" Amanda expressed her frustration with planning con-current lesson plans

and being unable to do the lesson she would have liked to have done to teach cause and effect, “It's very, very difficult to do something like that with the virtual students. So, whatever you do in class, it has to be applicable for your Zoom students and that's just not. It's just not easy. Honestly, like it takes creativity so low because you can't do the things that you want to do with everyone, and then you've got your Zoom students who are wondering well, why can't we do that?”

For the cause and effect lesson, Amanda chose to incorporate group work to complete a graphic organizer, “I have an odd number on Zoom and an odd number in the class. So I paired three on Zoom together. I had one group of three and then the other two on zoom and then there was one left over on Zoom…I put them with an in-class friend…when that happens my in class friend will just log on to zoom and they'll work together.” As the students worked together, Amanda followed their progress using technology,

> Kami is just a website where you can upload a document…they can access it, you can draw on it, you can type on it and you upload it. I uploaded it to their canvas which is how they access all of their work that I have assigned for them. It's called a quick grader on there and so I can sit down at my desk due to covid. I can literally look at exactly what they're doing as they're doing it.

The virtual students were provided typed commentary on their work and were able to type commentary back to the teacher. Both the teacher and the students stay muted most of the class. “It's hard to unmute. That's another thing. I know this, I can't unmute them and really talk because the kids in class are so like loud. So I had [to] like, type in the comments to them…the Kami page works really well, because I can go and add comments without having to directly speak to them.” This technology allowed Amanda to provide feedback to students, though

Amanda reflected on the experience for the students as, “they're sitting at home and they're just watching and really, they don't have any like interaction with anyone”

With nearly one-half of the class as virtual, Amanda became agitated with technology not performing as expected. “The technology…was like a curveball and I was like at one point, ‘Ugghhhhh!’ I just said, ‘oh my gosh’ in my head I was like, ‘No!’” While attempting to share an example of cause and effect by discussing the effect of a sunny day on ice cream when you are outside, the results of her drawing on the smartboard changed the graphic organizer for all the students so that when they attempted to work on the assignment in their groups, all they saw was the melted ice cream and the sun Amanda had drawn. The additions had to be removed, the assignment re-uploaded, the screens of all students refreshed before the students could complete the graphic organizer. Amanda reflected on her lesson, “It was so difficult for me. It did not go the best…If I had to rate it, it was a 2.”

Auzzie’s ELA lesson was very different. She focused on author’s purpose with a teacher made anchor chart, some books students brought from home, group work including acting out scenarios and a worksheet. No technology. “I reviewed my anchor chart… author's purpose…it had a pie like a big old pie…persuade, inform entertain.” Auzzie had students go home the day before and bring a book from home so that they could apply what they had learned to the books brought in. “I would say like about half of them brought in books. They were so excited to share their books and we would go through each one and say, oh, the author wrote this book to entertain you like if it was a Superman book.” She put the students in groups of two or three with a prompt like “convince the class to eat bubblegum flavored ice cream or tell us a story about a bully named Homer. Tell us about sea turtles. And so, I gave them…around 10 minutes to work together and come up with what they were gonna say, or act out for the class.” Auzzie actively

visited the groups while they were working together, “I would go around to each group and kind of like guide them in the right direction…Each group got to go up to the front and they would…act out their prompt card, and after they did, it would give them, you know, a round of applause, of course, and everybody …would have to guess what the author's purpose for their cards was.” The students then colored a worksheet with different colored crayons based on if the book title was a persuasive, informative, or entertaining book. Auzzie concluded the lesson going over the worksheet with the class and again reviewing the anchor chart.

These comparative lessons will be looked at again in Chapter 5, but for now they raise some interesting questions about how technology is positioned in the traditional classroom and how technology is framed as an educational solution or not. Such as are we preparing pre-service teachers to make instructional decisions regarding technology that result in increasing academic achievement or are we simply preparing them to plan for passive use technology?

Summary

This chapter reflected on the phenomenological themes that emerged from the semi-structured interviews to include initial, lesson plan reflection interviews, and summative, the lesson plans and reflections. The three research questions were answered with the essential essence statements that were derived from the data along with the corresponding theoretical frameworks. Several methods were utilized to capture the lived experiences of pre-service teachers integrating technology in literacy instruction including document analysis of lesson plans for TPACK components, strategic planning of interviews to coincide with lesson plan delivery, and pre-service teacher reflections of experiences. Chapter 5 provides a brief overview of the essence of the phenomenon experienced by the pre-service teachers and provides the limitations, implications, and recommendations that were gleaned from this study. These

implications and recommendations may be valuable to pre and in service teachers, teacher educators, district administrators, and leaders of educators of higher education.

CHAPTER V: DISCUSSION

The problem addressed with this study was that with technology impacting the very definition of literacy (Sang, 2017) coupled with a history of teacher preparatory programs (TPP) not preparing pre-service teachers to integrate active use technology in the classroom (Kimmons, et al., 2015; Maddux & Cummings, 2004), the new post-Covid-19, technology-mediated world may present new challenges for pre-service teachers. The purpose of this qualitative phenomenological study is to explore pre-service teachers' experiences with technology integration to understand how teacher preparatory programs (TPPs), schools, and districts can help to better prepare pre-service teachers to teach literacy using technology, including teaching remotely--using virtual instruction may have emerged from pandemic responses, but there are signs that some version of remote learning may permanently be a part of schools as the New York Times reported that not only are there plans for keeping some online schools after the pandemic, but remote learning days may be taking the place of weather days (2020 & 2021).

The findings from this study strengthen our understanding of pre-service teacher integration of technology to teach literacy, highlight new challenges, and shed light on what TPPs, schools and districts can do to better prepare pre-service teachers to teach literacy using technology, including technology remotely. This chapter includes an analysis of findings, limitations of the study, recommendations for future research and implications of the study.

Analysis of the Findings

The analysis of the findings shed light on new challenges for pre-service teachers, supported and delineated from the prior research on pre-service teacher technology integration, and highlighted the need to do more to prepare pre-service teachers for teaching in a post Covid-19 world.

Technology Confidence

In studies conducted on pre-service teachers' view of multiliteracies and technology use, the literature supports that pre-service teachers self-perceptions indicate that they are comfortable with technology integration to teach literacies (Alhazza & Lucking, 2017; Ulu et al., 2017; West, 2019); however, the data suggests that this was not the case for the pre-service teachers in this study. Each of the pre-service teachers expressed discomfort with integrating technology to teach literacy. In fact, two of the three participants responded when asked to share an example of a lesson they had observed or taught that used technology to teach literacy that they had no experiences observing or teaching a lesson using technology to teach literacy. Again at the end of their Block 3 field experience, the pre-service teachers reviewed their answer to this question and each stated that they had no experiences observing or teaching a lesson using technology to teach literacy. This leads me to wonder if the pre-service teachers understood either their own definitions of literacy or how to use technology to teach literacy.

Although the review of research showed that there is a correlation between heavy use of technology by pre-service teachers and a "rosy view" of technology uses (Alhazza & Lucking, 2017), the pre-service teachers in the study, though admitting they had grown up with technology, lacked confidence with technology and the data suggests had the opposite of a "rosy view" of technology uses in education. This initial lack of confidence may have been a result of having to not only implement technology into the classroom, but to also plan for the logistics involving technology to teach students remotely.

Technology Integration

Technology is always changing. How universities prepare pre-service teachers to adapt to these ever-changing technologies will be essential to the success of teachers coming into

classrooms. With the onset of the Common Core State Standards (CCSS) in 2010, the standard requirement mandated technology integration throughout K-12 education. Ten years later, in a post Covid-19 world, remote learning necessitated technology integration as many students remained at home to learn virtually rather than traditionally. Even though mandated by standards and necessitated by circumstances, the findings revealed that pre-service teachers were ill-prepared to implement technology in an engaging and meaningful way choosing passive use technology or, when given the choice, no technology at all. This was especially highlighted through the use of the comparative case study in Chapter 4 that showed how two pre-service teachers taught the same grade, at the same school, across the hall from each other and taught a lesson on the same standard (magnets) though the implementation was drastically different. The pre-service teacher that taught all traditional students did not choose to implement any active use technology but had a successful lesson, while the pre-service teacher that taught both traditional and virtual students integrated multiple uses of technology both active and passive without having the same level of success. The research shows, though, that the quality and quantity of technology integration in pre-service teachers' educational experiences is a crucial determining factor for new teachers' technology integration (Hasse, 2017; Instefjord & Munthe, 2016; Skophammer & Reed, 2014). This case allows me to see the idiosyncratic nature of teaching and how nuanced implementation of technology can be. It further does not give me much optimism about these particular pre-service teachers using technology in the future.

Even when the pre-service teachers did integrate active use technology, the majority of the traditional learners were not included in these lessons as they were provided an alternate assignment. This finding supports the body of research indicating that TPPs are not adequately preparing pre-service teachers to integrate active use technology for 21st century learning (Hasse,

2017; Kimmons, et al., 2015; Maddux & Cummings, 2004; US Department of Education, 2017). Research shows that there is a presumption that pre-service teachers will be able to integrate technology into the classroom simply due to their age, but that is not the case (Schmid et al., 2021). This study contributes to this research as the three, 22 year-old pre-service teachers struggled to integrate technology though their situation with con-current teaching was unique, but speaks to the need for further research into anxiety as an indicator of transformational learning. This study adds to the body of research supporting the fact that pre-service teachers receive one technology course that provided guidance on how to use technology itself, but do not provide instruction on how to effectively integrate the technology into content areas reflected by the ways in which technology was used in the classroom (Kimmons, et al., 2015; Maddux & Cummings, 2004).

Transformative Learning

Brooks contends that the transformational process is achieved through conversation, and, by listening and sharing personal experiences with one another, we develop a better understanding of our own experiences (2000). It is the belief that our understandings of the world are historically and culturally situated and that transformational learning occurs through participation in the social process of co-creating new narratives (Brooks, 2000; Casebeer & Mann, 2017). It is this understanding that no story perfectly evokes all that is true, but that all experiences regardless of the differences of the persons having the experience contribute to the way we make meaning of our own experiences; therefore, the more voices and narratives we listen, the more abundantly we experience our own lives (Brooks, 2000). Through remote teaching and being required to design lessons, pre-service teachers reflected on their frames of reference and experienced transformative learning with technology integration and group work

that are necessary for fostering literacy in the 21st century. Although the theme initially presented itself as fear/anxiety/apprehension, it seems to have been more discomfort with trying new things and challenging frames of reference from their prior experiences. In the end, it was this discomfort that resulted in transformative learning of two of the participants to implement technology in lesson planning albeit if only with virtual students in most cases and the implementation of group work for learning with the pre-service teacher that was not required to teach students remotely.

Literacy Instruction

The pre-service teachers in the study were able to define the term literacy in somewhat generic ways that hinted at the nature of multiliteracies (Table 6); however, in practice, these definitions of literacy were not necessarily prevalent. One of the pre-service teachers explored the scientific method and student understanding of the language necessary to enter into a scientific discourse; however, the students were never given the opportunity to experiment with that language in a meaningful way as the instruction consisted of whole group teacher-led instruction rather than the incorporation of peer collaboration. The first dimension of Mulilliteracies Pedagogy is that students utilize the available meaning-making resources in life experiences to solve problems (Lankshear & Knobel, 2017); for example one pre-service teacher had students bring in books from home to discuss in class to solve the problem of understanding author's purpose, and, even transitioned to the second dimension of Multiliteracies Pedagogy where, with teacher support, students develop metalanguage to describe the available resources by acknowledging the purpose of the book as persuasive, informative or entertaining; however, the pre-service teacher fell short of leading students into interpreting and comprehending different modes of multiliteracies since the pre-service teacher did not use any multimedia

technology to expand the lesson (Lankshear & Knobel, 2017). The pre-service teacher's experience offers little hope that this particular PST will be able to teach the four dimensions of multiliteracies pedagogy (Figure 3) since, when given a choice, active use technology was not used in any lesson planning during her field experience. Further, there were missed opportunities during each of the lessons on magnets to incorporate multiliteracies as time was cited as a factor. These findings speak to current trends in research for disciplinary literacy in science, technology, engineering and mathematics (STEM) that suggest that integrating literacy instruction at the elementary level into science instruction using a project-based curricula provides contexts that encourage productive struggle as students work towards collaboration, interdisciplinary language, and writing skills for conceptual thinking (Paugh & Wendell, 2021).

Understanding the importance of cultural diversity in teaching literacy is reflected in the TPACK framework as the component that encircles all other types of knowledge, PCK, TCK, TPK, and TPCK, as well as the sociocultural approaches to literacy that emerged from New Literacies as the social and cultural contexts are needed to competently function in secondary Discourses (Lankshear & Knobel, 2017). The data reflected that the three White 22 year-old females which is representative of the population of teachers obtaining their elementary education degree (See figure 5), taught in a diverse school district without having a complete understanding of cultural diversity. Though there is a section in the lesson plan to plan for cultural diversity (Appendix F), when a participant reached out to a course professor for guidance with this section of the lesson plan, an opportunity for a critical conversation regarding cultural diversity was missed. Furthermore, when a pre-service teacher in the study had a classroom consisting of 50% Black, 45% White, and 5% Asian students, the pre-service teacher reflected that she did not have much cultural diversity in her classroom because the students took

interest surveys and participated in some of the same activities at home. The findings from this study suggest that not enough is being done by TPPs to prepare a mostly White female workforce to meet the needs of students from diverse backgrounds, or, at the very least, the three participants for this study did not receive enough from their TPPs.

The findings from my study speak to recent literacy research trends, specifically on the importance of understanding literacy across content areas and on culturally informed literacy instruction. In a qualitative review of 56 studies of culturally informed literacy instruction, the research shows that the instruction should be shaped by the sociocultural characteristics of the students for whom the instruction is designed (Kelly et al., 2021). This is in direct contradiction to the perceptions of the pre-service teachers regarding literacy instruction as exemplified by one pre-service teacher that shared that cultural diversity does not need to take in consideration the cultural characteristics of the classroom. Again my findings are in line with the current trends in literacy research as pre-service teacher programs are charged with having the critical conversations regarding disability and race at key moments with pre-service teachers (Beneke & Cheatman, 2020). This was reflected in the missed opportunity in my study when a pre-service teacher shared her lack of understanding of culture diversity with the professor only to be provided with an answer instead of an understanding. Current research trends suggests that this lack of understanding of the need to teach cultural diversity with literacy adds to the "gross imbalance of Whiteness in centuries of curricula" and can have negative outcomes, specifically for Black students. (Wynter-Hoyte & Smith, 2020, p. 426).

Pandemic Losses

The data from the study shows that the widespread academic losses from the pandemic led pre-service teachers to choose to do read-alouds instead of having students read

independently reflecting a need for more differentiation strategies; furthermore, the data suggests that the divide between high and low performing students caused by the differences in parental involvement may have been exasperated due to the increased amount of time that students spent at home. This lack of equity between homes has always been an issue for educators, but the true impact will be something that needs to be explored further. Though not part of the study itself, the overwhelming data reflects the need to focus on the social and emotional learning of students as necessitated by the pandemic to include proactive measures to address social and emotional learning deficiencies caused by time spent away from peers.

Limitations of the Study

There were limitations to the study. The first limitation was the resource and time constraints indicative of performing a study to meet the requirements for a doctoral degree. Additional delimitations and limitations are as follows:

- Purposeful sampling was done on one section of students from one university of pre-service teachers that were enrolled one of their last classes before becoming a teacher. These classes encourage students to gradually acquire responsibilities in the classroom under the guidance of a mentor cooperating teacher.
- The pre-service teachers were undergraduate students at one university and may have been influenced by the beliefs of the instructors at the institution.
- The pre-service teachers that volunteered for the study were all White female students.
- The pre-service teachers that volunteered for the study were all assigned to 1st grade classrooms.
- Though measures were taken to ensure that the lesson plan interviews took place before the pre-service teacher meeting with the course professor to avoid influence by the

professor, the lesson plan reflections seemed to be greatly influenced by the lesson plan interviews.

- Because of restrictions due to Covid-19, all interviews were completed utilizing an online video conferencing software, Zoom. The lack of in-person presence for the interview could be a possible limitation.
- Because each pre-service teacher will be paired with a different cooperating teacher, there will be different in experiences based on the latitude the cooperating teacher gives the pre-service teacher to make instructional choices.
- Because of Covid-19, the pre-service teachers did not experience a typical teacher preparation experience as they were forced to miss out on time in the classroom in Spring and Fall of 2020.

Recommendations for Future Research

From this study, there are many future research projects that can be explored. Further research questions that emerged from this study include:

1. How can TPPs confirm the effectiveness of technologically integrated strategies for New Literacy instructions to incorporate active use technology?
2. How can teachers with low confidence for integrating technology be moved to change from traditional instructional models that include passive use technology to active use technology?
3. How can TPPs and District leaders best prepare pre-service teachers to be culturally responsive teachers of literacy?

Another recommendation from this study is to explore some unexpected themes that emerged from this research such as the impact that Covid-19 has had on group work and social

interactions and its impact on the social and emotional well-being of students. There was much data that supported how virtual students were hindered due to the lack of social interactions and this warrants more research to determine the extent and what can be done to support these students.

Implications of the Study

The findings from this study can be especially beneficial for pre-service teacher education programs. The research on pre-service teacher integration of technology indicates that though the one technology class that pre-service teachers are required to take is not sufficient, providing the technology course as one of the first teaching classes and then having all the classes build upon that course material was found to be an effective method for systemic change (Tondeur et al., 2012). The course "Technology for the 21st Century Classroom" was taught to the pre-service teachers during Block 1 of the TPP. Though the course was taught at the beginning of the teaching courses, the data suggests that the courses in Block 2 and Block 3 did not build upon that course material in a way that resulted in transference of knowledge since, when given the option, the pre-service teachers did not choose technology integration. Furthermore, the data suggests that though there is a section in the lesson plan for cultural diversity planning, the lack of understanding of diversity reflects that not enough is being done to prepare a mostly White female workforce to meet the needs of students from diverse backgrounds. The professors of the TPPs should be provided training on teaching diversity so that the lesson plan box of culture diversity is not an item that is simply checked off, but one that is understood and implemented to best meet the needs of the students they serve. The approach to this issue should also include recruitment efforts for males and minorities for enrollment into

the elementary education teacher preparatory programs to expand the diversity of the pre-service teachers entering area elementary schools.

Similarly, schools and district administration responsible for the new teacher mentor/mentee program could use the findings from this study to inform professional development programs for new teachers coming out of teacher prep programs. These professional development programs could be designed to ensure that pre-service teachers understand *why* technology integration is important and support active use technology planning through the mentor/mentee partnership to increase teacher confidence. Another aspect of professional development that the data suggests is needed is on cultural diversity by highlighting the importance of designing lessons that support cultural diversity. More needs to be done to prepare a mostly White female workforce to meet the needs of students from diverse backgrounds. Schools and districts can benefit from this information to provide new teacher training that includes planning for the diversity of specific schools or districts. The results of this study also reflects a need for proactive measures to address social, emotional, and academic learning deficiencies caused by the pandemic. Since some students have not been in school for over 15 months at the conclusion of this study, the district could provide more professional development on social and emotional learning and differentiation for low level readers. More time will be needed for teachers to plan for these levels of differentiation.

Conclusion

The purpose of this qualitative phenomenological study was to explore pre-service teachers' experiences with technology integration. The findings from this study help us to better understand how teacher preparatory programs (TPPs), schools, and districts can better prepare pre-service teachers to teach literacy using technology, including teaching remotely--using

virtual instruction may have emerged from pandemic responses, but there are signs that some version of remote learning may permanently be a part of schools (NY Times, 2020; 2021). In this study, the lived experiences of pre-service teachers teaching literacy in a technologically mediated post Covid-19 world were explored as they made instructional decisions regarding if and when they would use technology and which students would use technology. This study provided implications, challenges and recommendations for TPPs, schools, and districts to better meet the needs of pre-service teachers entering into this post Covid-19 educational arena.

Based on this study and others that are surely being studied at this time, explicit instruction on how to integrate active use technology to teach literacy including teaching students remotely is needed. In addition, more time is needed for teachers to differentiate teaching and learning for students that have been hindered academically, emotionally, and socially by the pandemic.

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Appendix A. Initial Interview Protocol

First, do I have your permission to record our talk?
I'd also like to confirm that you consent to be interviewed as a part of this research project. Is that correct?

Before we begin, can you please share how you would like for me to identify you? I would like for you to share what characteristics of yourself you find the most important/relevant some examples include your age, gender, ethnicity, religious beliefs, role(s) in community, education level, or interests. I will include in my study whichever characteristics you think define you. I'd like to also share that all of your responses will be anonymous and your actual identify confidential.

Are you ready to begin?

Why did you go into teaching?

How would you describe your experiences with technology?

How would you define literacy?

Before the pandemic, what did teaching literacy look like in classrooms you've observed?

What technology have you seen used in the classrooms you've observed?

Describe a lesson that you have observed or taught using technology to teach literacy.

Describe a memorable experience with a student involving using technology to teach literacy.

Suppose I'm teacher that has been in a coma for a year and it's my first day back at work tomorrow, explain to me how my job has changed.

Thanks for taking the time to talk with me about teaching literacy during these unprecedented times. Do you have any questions for me at this time?

This concludes our initial interview and I will contact you for a follow-up interview near the end of this academic semester.

Appendix B. Lesson Plan Interview Protocol

Hi, again. Do I have your permission to record this interview?

In this follow-up interview, I would like for you to share your experience with teaching literacy remotely.

What grade and subject did you teach?

Did you teach in person or virtually?

About what percentage of your students were traditional? Virtual?

Take a moment to think about the lesson you taught. Please carefully describe your experience from beginning to end including your thoughts during the process. I would like to feel like I am there with you.

What aspect of this lesson did you feel most confident with? Least? Why?

Is there anything that you would change about your lesson? Explain.

Thanks for taking the time to talk with me again about teaching literacy during these unprecedented times. Do you have any questions for me at this time?

This concludes one of our lesson plan interviews. Once we have had two, I will contact you for a summative interview near the end of this academic semester.

Appendix C. Summative Interview Protocol

Hi, again. Do I have your permission to record this interview?

In this summative interview, I would like to share with you the transcript of our first interview and to revisit the questions I originally asked. Also, I shared with you the significant statements and meaning chart I created based on our interviews. Basically, let's go through the transcript and the significant statements and meaning chart together and see if there's anything you'd like to add, remove, change, or reiterate.

Have you had an opportunity to review the transcript of our original interview with the significant statements and meaning chart that I sent to you last week? Great.

Let's go through each question and see if you would like to make any adjustments.

Please also try to identify what, if anything, prompted you to change how you are thinking now relative to those earlier responses.

Are you ready to begin?

Appendix D. Recruitment Email

Good day. My name is Christy Grigsby, a doctoral student at Columbus State University. Under the supervision of my doctoral committee chair, Dr. Mark McCarthy, I would like to join your class via Zoom on March 4th at 9:30AM to request participation in my doctoral research project titled: A Phenomenological Study: Exploring K-12 Teachers' Technological Knowledge for Teaching Literacy Remotely. I will take no more than 5 minutes of your class time. I have attached a copy of my informed consent for your review.

Appendix E. Recruitment Script

Good day. My name is Christy Grigsby, a doctoral student at Columbus State University. Under the supervision of my doctoral committee chair, Dr. Mark McCarthy, I am asking for volunteers to participate in my doctoral research project titled: A Phenomenological Study: Exploring K-12 Teachers' Technological Knowledge for Teaching Literacy Remotely. At this time, I will read the informed consent. Here is my email: grigsby_christy@columbusstate.edu. I have also typed it in the chat box for spelling. Please email me if you would like to volunteer to participate, and I will send the informed consent for signature. Thank you for your time.

Appendix F. Lesson Plan format

Grade Level:	**Subject Focus:**	**Date:**
Georgia Standard(s) of Excellence (GSE):		
Individual Education Plan/504 Goal(s) and/or Benchmarks (as indicated on the student's IEP or 504 Plan):		
Deconstructing/ Unpacking the Standard(s) <u>Determine key terms:</u> Identify and underline key terms within the standard and/or element(s). <u>Identify concepts and skills</u> students will need to know, understand, and be able to do to reach proficiency.		
Learning Target(s) Targets must be aligned to the GSE and with the assessment(s); targets should be stated as measurable (e.g., 'I can' statements for students).	**I can...** **I can...**	
Assessment/ Evaluation Assessment(s) must be aligned to the GSE and learning target(s). Questions to consider when developing your assessment plan: What is your evaluative criteria? What evidence will you collect to demonstrate students' understanding/mastery of the learning target(s)? What evidence will you collect to demonstrate students' usage of the language demands (i.e., function, vocabulary, syntax, and/or discourse)?	*This is an assessment plan and should be written as such.* **Assessment Plan for Learning Targets:** If formative use words, if the assessment is for a grade use the numbers **Assessment Plan for Learning Targets Aligned with IEP Goals and/or 504 Plans:** The assessment plan for IEP and 504 students is the same.	
Materials What resources will be used to engage students?		
Classroom Management Strategies What procedures will you employ to manage transitions, behavior, passing out materials, etc.?		
Supports for Students What instructional strategies and planned supports, will you employ to meet the needs of each student in	**Accommodation(s)**- (A change that helps a student overcome or work around the disability)**:** **Modification(s)**- (A change in what is being taught or what is expected from the student)**:**	

order for each student to demonstrate learning and move towards mastery regarding the learning target(s)?	**Differentiation**- (Tailoring instruction to meet individual needs; differentiating the content, process, and/or product)**:** ● *The list below is not limited to only these specific groups of students. Groups of students should be added to the list based on the context of your classroom.* o Cultural Diversity: o Gifted: o Below skill level (e.g., struggling reader):
Introduction to Lesson/ Activating Thinking Use knowledge of students' prior learning, personal, cultural, and/or community assets to 'hook' them (i.e., get them excited about the lesson, learning segment, and/or mini-unit).	
Body of Lesson/ Teaching Strategies and Learning Task(s) What will you have the students do after you introduce the lesson to demonstrate learning that aligns with the learning targets (i.e., learning task): How will you support students (i.e., teaching strategies and planned supports)? What questions will you ask to promote higher level thinking?	
Closure: Summary of Learning Tasks How will the students summarize and/or share what they have learned to prove they know and understand the standard(s) and its vocabulary? What opportunities will you provide for students to apply new knowledge while making connections to prior learning and their personal, cultural,and/or community assets?	
Reflection, Analysis, and Next Steps Reflection includes characteristics of the lesson and **specific examples** of what went well AND <u>what</u> can be improved and <u>why</u>. Specific examples should be aligned with the	**Reflection** (Provide a description of the events that occurred throughout the lesson.): **Analysis of Student Learning** (Analysis includes what students did well with and what they are still struggling with related to the learning target(s) and reflections of WHY):

learning target(s) and evidence of students' learning.	**Analysis of Teaching Effectiveness** (Analysis includes how effective the teaching strategies and planned supports were and/or were not and reflections of WHY): **Next Steps** (Based on the analysis of students' learning and teaching effectiveness, what are your next steps to strengthen your teaching practice AND support students' learning? This will include different teaching strategies and planned supports than what had been used in this lesson; AND the new, proposed teaching strategies and planned supports must be grounded in research and/or theory):

Appendix G. Sample Summative Interview Meaning Chart Updated

Madison: Units of General Meaning	
1. "But so, it's been just kind of a, like, a steady Work up to me doing this kind of my whole life"	1. Being a teacher is something all of the events in Madison's life have led her to become.
2. "I did struggle with having to do things at the pace of others, where I couldn't just work and do it all on my Pace because I tend to work a lot quicker than a lot of people"	2. Madison was homeschooled, and she struggled with the transition to public school because she had to slow down and go at the pace of others because she worked quicker than her peers.
3. "I am not great with technology at all." Madison added, "I would just add that once I am used to it and know what we need to do, then I enjoy working with it. I've enjoyed working with the ipads and having all those resources available"	3. Madison expressed her discomfort with technology.
4. "I'm a very, very old soul in that way, where I like my things hard copies paper in front of me, I think it partially is because I need hands on everything" Madison added, "It is a lot of paper trying to deal with all those hardcopies with 20 students and so having the ipads with their homework was really really helpful"	4. Madison is a hands on learner and prefers everything hardcopy over electronic.
5. "We focus more on the understanding…So literacy to me is just a general understanding of the concepts that you're working with and that that you can you can understand the things that you need to work with and you have the ability to read them if you if you need to."	5. Madison defines literacy as understanding concepts and your ability to read if you need to.
6. "The students, I think now are very technology oriented, whereas there's a little bit more struggle getting them to interact with each other and to really like bear down and work on something" Madison added, "I have now been able to witness that a lot of the books that they're doing are online. And a lot of the reading and everything that has to do with that, in general is online to give virtual students access as well. So, they're not doing as many hard copy books"	6. Madison feels that students today rely on technology and it hinders their willingness to interact with each other and work on something
7. "They kind of expect it to be technology based or have something to do with the computer. So there's a little bit of a I don't know a slowness with not having to use technology and stuff"	7. Madison notes that students expect instruction to be technology based and teachers struggle to motivate when there is no technology in a lesson
8. "Things like on the Chromebooks and the Smart Board and interactive like modules and games that we can pull up"	8. The technology used in classrooms consists of chromebooks, Smartboards, and interactive modules and games from websites.

Appendix H. Sample Color Coded Essence Statements by Theme

Qualitative Categories

Participant 1-Purple text, Participant 3-Green text, Participant 4-Red text

Confidence-teacher controlled	15. "Anytime I'm speaking I feel pretty confident because I know I'm in control so I'm sharing the modeling in the beginning, talking about a Bad Case of Stripes from the day before and getting the students to repeat after me because that way I can really like assess and see if they know what I'm talking about. Giving me a thumbs up, thumbs down type of thing."
Confidence-teacher controlled	14. "I like leading the discussions and just bouncing off of their questions and Like, taking what they say and trying to manipulate it in a way that will get me to my final goal of the lesson, I like doing that."
Confidence-teacher controlled	17. "I went through like the anchor charts with them because I already knew how that was going to go, and that was more like with responsibility on me"
Cultural Diversity	1. "Began the lesson by just asking students about magnets. And like what they knew about magnets already. And just kind of engaging, their prior knowledge by talking about like, oh, these are some magnets. We might see in our real life and like, this is some ways that we could use them."
Cultural Diversity	2. start the lesson by just reviewing, what we learned yesterday. And then yesterday I had had them go home and look for a book to bring in. About I would say like about half of them brought in books. they were so excited to share their books and we would go through each one and say, oh, the author wrote this book to entertain you. Like if it was a Superman book
Cultural Diversity	2. "And they were saying stuff at first, they were saying under the bed and like in the cabinets and stuff like that and then I was like, but where would you find magnets stuck to things at home like where to make it stick to. So then we transitioned into like, the what makes magnets stick to things"
Cultural Diversity	6. "It was the fridge, a lot of them were saying, like my mom's office chair or something like that. One of them was like my dogs kennel. I don't know, there was a lot of different answers. Some of them were kind of funny, I don't really remember, a lot of answers, but after we talked about what they found at home, that was magnetic."
Cultural Diversity	10. "Cultural diversity, doesn't necessarily mean that we have to use a specific culture or one that matches the class. It can also mean that you're just talking about their everyday lives using connecting the lesson to their everyday life. When I'm at home in my own living area, there's magnets all around me
Cultural Diversity	10. "I was like, what am I gonna do for cultural diversity? We're just talking about magnets. And so he suggested that I just talked about magnets in their homes because each of them has their own home culture or whatever and so that was just how I tied that in was just asking them about magnets at home"
Cultural Diversity	11. "No, not really. I mean, I don't have a lot of diversity in my classroom, so it was, it was a lot of the same, the same answers, but most of the time, the students don't even realize that they're having like a cultural diverse step thrown at them. It's just another part of the lesson."
Cultural Diversity	12. "I have maybe half the class are African-American students and then I think I have one Um, one Asian American students. And then the rest are just white students but all of them, all of them come from kind of the same home background. I want to say because I got profiles of them and then we did interest, I did interest surveys at the beginning of the year. And ask them about, like, what do you do at home? Do you like to read at home stuff like that? So, there wasn't a lot of like, Diversity in the in the way that they are at home. If that makes sense."
Cultural Diversity	13. "But there wasn't really anything that I had specifically. Like, put in for cultural diversity."
Cultural Diversity	15. "Getting them to come home or go home and bring books from their home. So I kind of see what they're exposed to. And get them to share like a part of their lives. I guess kind of by bringing something like from there outside of the school, like their life outside of the school."
Cultural Diversity	16. "Two of them had books about Spider-Man. One of them had a book about Reptiles. I think it was, it was like a, just an animal book. One of them had a book about musical instruments from A to Z which was interesting. She's a like high level reader. She's probably the highest in class."