A PHENOMENOLOGY OF TEACHERS' EXPERIENCES USING ONE-TO-ONE

TECHNOLOGY IN RURAL NORTH CAROLINA MIDDLE SCHOOLS

by

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Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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ABSTRACT

The purpose of this transcendental phenomenological study is to describe the experiences of middle school teachers using one-to-one technology in schools in rural North Carolina. The guiding theory, Technological Pedagogical Content Knowledge (TPACK), is a framework for interweaving technology, pedagogy, and content knowledge. The 12 participants in this study were middle school teachers from three schools in a rural North Carolina school district. The central research question for this study is: how do middle school teachers describe their daily experiences using one-to-one technology in schools in rural North Carolina. The supporting questions posed were: how do participants describe their self-efficacy regarding technology, their experiences regarding technology and its integration with pedagogy, their experiences regarding technology and its integration with the content they teach, how do participants describe the challenges and benefits of having one-to-one technology in the classroom, and how do participants describe the professional development opportunities they have or desire to have regarding the use of one-to-one technology in the classroom. Data collection methods included conducting interviews, generating focus group discussions, and an open-ended questionnaire. Data analysis procedures used were phenomenological reduction, imaginative variation, and a synthesis of textural and structural descriptions. Triangulation of data using interviews, focus groups, and questionnaires was used to establish credibility. Dependability was confirmed through epoche, member checks, and peer reviews. Rich thick descriptions of the participants' experiences using one-to-one technology in the classroom increased transferability.

Keywords: Learning by Design, One-to-One Technology, Technological Pedagogical Content Knowledge (TPACK).

Copyright Page

Dedication

This manuscript is dedicated to my family and the many professors who have guided me on this journey. Without your love and support I would never have been able to succeed.

Acknowledgments

       I would like to give glory to God for carrying me through this process. When I felt like I was becoming overwhelmed I would pray the verse Philippians 4:13 (NKJV) "I can do all things through Christ which strengtheneth me." I would also like to acknowledge all the people who have encouraged and guided me through this process. I especially want to acknowledge the guidance and support of Dr. Yocum without whom I would not have been able to successfully complete this study. I also want to acknowledge the love and support of my husband Rick. His patience and willingness to take care of our house and family while I worked was essential to my whole doctorial journey.

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List of Abbreviations

Academically or Intellectually Gifted (AIG)

Artificial Intelligence (AI)

Common Core State Standards (CCSS)

Digital Learning Competency (DLC)

English Language Arts (ELA)

Information and Communications Technology (ICT)

Literacy Design Collaborative (LDC)

National Center for Education Statistics (NCES)

National Middle School Association (NMSA)

North Carolina Department of Education (NCDPI)

North Carolina Standard Course of Study (NCSCOS)

Pedagogical Content Knowledge (PCK)

Professional Development (PD)

Professional Development Plan (PDP)

Professional Learning Community (PLC)

Research Question (RQ)

Technology Pedagogy and Content Knowledge (TPACK)

Zone of Proximal Development (ZPD)

CHAPTER ONE: INTRODUCTION

Overview

Technological integration in the classroom is not a new topic of study (Acai, et al., 2014; Ciampa, 2014; Dekhane Xu, & Tsoi., 2013; Grant, Tamin, Brown, Sweeny, Ferguson, & Jones, 2015; Mishra & Koehler, 2003; Parkay, Anctil, & Hass, 2014). Although there is a multitude of research on the use of one-to-one technology in countries other than the United States (Bergström, Mårell-Olsson & Jahnke, 2019; Ciampa, 2014; Davies, 2017; Greiff, et al., 2014; Selwyn, Nemorin, Bulfin & Johnson, 2017; Zhai., Zhang & Li, 2018), in urban and suburban American schools (Heath, 2017, Luo & Murry, 2018), and in high schools and colleges (Beeson, et al., 2014; Dekhane, 2013; Higgin & BuShell, 2017; Holen, et al., 2017; Varier, et al., 2017; Zhai., Zhang & Li, 2018), there is limited research on teachers' experiences using one-to-one technology in rural American middle schools. This study seeks to add to existing information by describing the experiences of teachers from rural middle schools in the foothills of North Carolina with one-to-one technology in the classroom. The theory guiding this study is Technological Pedagogical Content Knowledge (TPACK) as it is a framework for viewing the integration of technology with pedagogy and content knowledge (Mishra & Koehler, 2006). This chapter will provide background information for this study, the situation of self for me as the researcher, a brief examination of the problem statement, and a brief overview of the purpose statement. This chapter also introduces and examines the significance of the study, the research questions, relevant definitions, and includes a summary of the chapter.

Background

The process of integrating technology in a middle school classroom can be an exciting endeavor for students and educators. The abundance of educational applications, videos, and research sites bestow upon teachers almost unlimited possibilities in the classroom (Acai, et al., 2014; Ciampa, 2014; Dekhane, Xu, Tsoi., 2013; Grant, et al., 2015; NCDPI, 2016). Educators can even take advantage of virtual reality (VR) technology to take students on virtual fieldtrips to visit important sites not only on Earth, but throughout the entire solar system. Nevertheless, educators must remain vigilant to circumvent adopting technology beyond the scope of student access (Ciampa, 2014; Dekhane, et al., 2013; Parkay, et al., 2014; Zhai, Zhang & Li, 2018). Prensky (2005) rationalized that the prerequisite for integrating technology is ensuring the availability of technology for each student when he stated, "The missing technological element is true one-to-one computing, in which each student has a computing device he or she can work on, keep, customize, and take home" (p. 4). As one-to-one technology becomes more of a reality in school systems nationwide, professional development will be required to help teachers learn to adapt their curriculum to everchanging programs, software, and electronic devices (Acai, et al., 2014; Bergström, Mårell-Olsson & Jahnke, 2019; Ciampa, 2014; Dekhane, et al., 2013; Mishra & Koehler, 2003, Parkay, 2005; Selwyn, Nemorin, Bulfin & Johnson, 2017).

Related Studies

There have been many studies that focus on using technology to enhance learning in the classroom (Acai, et al., 2014; Chadli, Bendella, & Tranvouez, 2015; Dekhane, et al., 2013; Li, Snow, & White, 2015; Luo & Murray, 2018; McEwen, & Dube, 2015; Varier, et al., 2017; Zheng, Warschauer, Lin, & Chang, 2016). Many of these studies are focused on specific content

areas such as math, science, or reading (Acai, et al., 2014; Beeson, Journell, & Ayers, 2014; Dekhane, et al., 2013; Heath, 2017; Kennedy, Rhoads & Leu, 2016; Zhai, Zhang & Li, 2018). Other studies focus on pedagogy and learning (Ciampa, 2014; Davies, 2017; Higgin & Bushell, 2017; Holen, Hung, Gourneau, 2017; Luo & Murray, 2018). There are even studies that focus on the technology itself (Harper & Milman, 2016, Stefl-Mabry, Radlick, & Doane, 2010, & Varier, et al., 2017).   Technology integration in educational settings requires a cohesiveness between technology, pedagogy, and content knowledge (Mishra & Koehler, 2006). Other studies use TPACK to explore the lived experiences of either high school or sixth-grade teachers (Beeson, et al., 2014; Wetzel & Marshall, 2012); however, none of these existing studies are focused on understanding the experiences of teachers who are using one-to-one technology in a rural middle school.

Social

      According to Smith and McEwin (2011) "The challenge is for researchers to develop well-designed and implemented studies about young adolescents, their schools, their teachers, their communities, and other aspects of their healthy development and to communicate that research far and wide" (p.375). In this technological era, educators must prepare students for jobs that may not even exist (Greiff, et al., 2014; NCDPI, 2016). Teachers must rethink the way they look at the educational process (Greiff, et al., 2014; Mishra & Koehler, 2003). Students are no longer passive receivers of knowledge; they must be allowed to be active participants in their own learning (Bandura, 1991; Bruner, 1957; Higgins & BuShell, 2017; Mishra & Koehler, 2003). The integration of one-to-one technology in the classroom offers teachers a tool that can

guide students in the process of becoming active learners (Acai, et al., 2014; Ciampa, 2014; Dekhane, et al., 2013; Mishra & Koehler, 2003).

Theoretical

TPACK theory combines technology, pedagogy, and content knowledge into an interwoven practice of learning by design (Mishra & Koehler, 2003). This study involves the experiences of educators who are using technology as a tool for instruction in the classroom; therefore, I used TPACK theory (Mishra & Koehler, 2005) when describing the experiences of rural middle school teachers using one-to-one technology in the classroom.

> TPCK is the basis of good teaching with technology and requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones. (Mishra & Koehler, 2006, p.1029)

Figure 1 below is an illustration of the seven levels of TPACK. Unlike traditional methods which separate technology, pedagogy, and content; TPACK requires knowledge that all three aspects must have a dynamic relationship. This study used TPACK theory to guide the questionnaire, interview, and focus group questions, and serve as a base to search for significant statements (Moustakas, 1994).
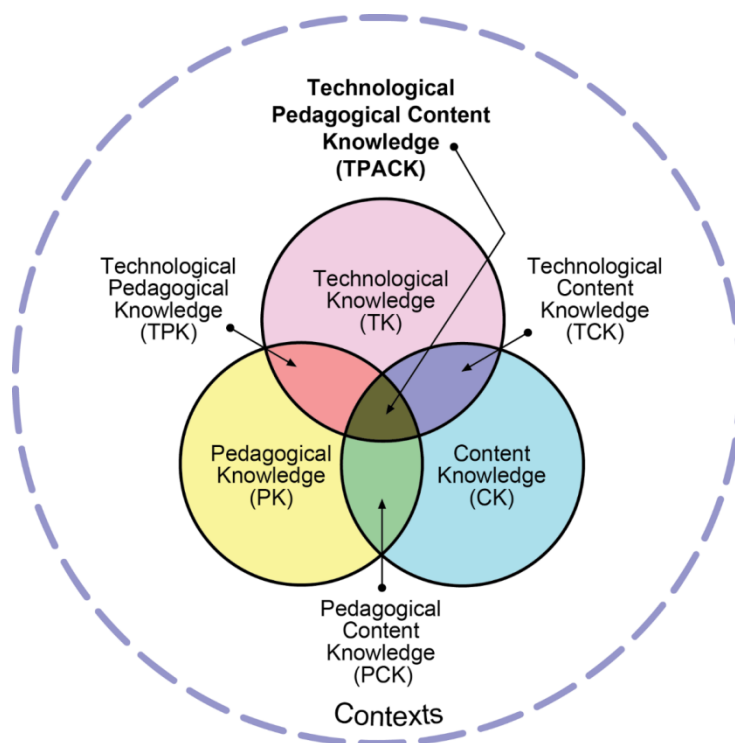
Figure 1. Reproduced by permission of the publisher, © 2012 by tpack.org

Situation to Self

Having spent 15 years working as a graphic artist, web designer, computer technician, and administrative assistant, I desire to understand ways that I can incorporate technology into my own classroom instruction. I have first-hand knowledge of the importance of using problem-solving skills to find innovative ways to use technology to reach an audience and fulfill responsibilities in the business world. I believe that these are skills that must be taught to students if they are going to be successful in the workforce of the future. Understanding teachers' lived experiences with TPACK is an essential starting point in this process.

Philosophical Assumptions

This study incorporates two philosophical frameworks within the qualitative design, ontological and epistemological. An ontological framework is appropriate for this study because the implications for practice are that "the researcher reports different perspectives as themes develop findings" (Creswell & Poth, 2018, p.20). A transcendental phenomenological study required me to use the voices of the individual participants to develop the themes through the process of horizontalizing (Moustakas, 1994). This process is part of Moustakas' transcendental-phenomenological reduction (Moustakas, 1944). To complete this process I had to describe the perspectives of the participants through the examination of identified themes.

Another philosophical assumption for this study is epistemological because it requires me to conduct studies in the field and become as close as possible to those being researched (Moustakas, 1994). I had to build a good rapport with the participants to create a safe and inviting atmosphere for interviews. This study required me to get to know the participants so that I was able to gain a deeper understanding of their experiences using one-to-one technology in the classroom.

Research Paradigm

The research paradigm for this study is social constructivism. Social constructivism required me "to rely as much as possible on the participants' views of the situation" (Creswell & Poth, 2018, p.24). In phenomenology, the perceptions of the participants are the underlying source of information (Moustakas, 1994). According to Moustakas (1994), "Typically in the phenomenological investigation the long interview is the method through which data is collected on the topic and questions" (1994, p.114).

Transcendental-phenomenological reduction required me to consider each teacher's experience on its own and of itself (Moustakas, 1994). I had to develop themes using the transcripts from the individual one-on-one long interviews. The reliance on the individual participants' interviews to describe their experiences using one-to-one technology in the classroom is evidence that social constructivism is the appropriate paradigm for this study.

Problem Statement

Teachers in 21st-Century classrooms face the challenge of not only understanding their content and pedagogy, they must also be knowledgeable when it comes to applying technology effectively in the classroom (Koehler & Mishra, 2005). Teachers must be able to incorporate technology to enhance the learning experience and not for its own sake (Acai, et al., 2014; Ciampa, 2014; Koehler & Mishra, 2005). Many existing studies focused on using tablet computers or gaming devices to enhance math and reading engagement (Acai, 2014; Chadli, Bendella, & Tranvouez, 2015; Dekhane, et al., 2013; McEwen & Dube, 2015). There have also been many studies conducted in urban and suburban areas with high minority populations (Li, Snow, & White, 2015; Luo & Murray, 2018; Varier, et al., 2017). Zheng, et al. (2016) stated, when examining research on learning in one-to-one environments, "The number of studies identified that deployed rigorous experimental or quasi-experimental methods was small" (p. 1076).

Thornton (2018) claimed, "Quality teaching is about how content is taught. Not only must the content be appropriate, proper, and aimed at some worthy purpose, but also the methods have to be morally defensible and grounded in shared conceptions of reasonableness" (p. 32). For educators to be able to use methods that meet these criteria, educators need information to

base the decision of how to teach content when they are using one-to-one technology. As new knowledge is added through shared perceptions, this knowledge deepens the meaning of the phenomena (Moustakas, 1994). "Like expertise in other complex domains, including medical diagnosis, chess, and writing, expertise in teaching is dependent on flexible access to highly organized systems of knowledge" (Mishra & Koehler, 2006, p.1020). Educators rely upon the experiences of their peers to improve their craft (Mishra & Koehler, 2006; Thornton, 2018). There is lack of research on the experiences of teachers who use one-to-one technology in rural middle school classrooms. The problem is that this void inhibits the ability of educators to benefit from the experiences of their peers.

Purpose Statement

The purpose of this transcendental phenomenological study is to describe the experiences of middle school teachers using one-to-one technology in schools in rural North Carolina. At this stage in the research, one-to-one technology can be understood as one Chromebook per student that can be used at home as well as in the classroom. The theory guiding this study is Technological Pedagogical Content Knowledge (TPACK) as it is a framework for viewing the integration of technology with pedagogy and content knowledge (Mishra & Koehler, 2006). TPACK provides a framework to describe the integration between pedagogy, technology, and content knowledge and proposes that teachers should be active learners as they integrate technology into their classroom practices (Mishra & Koehler, 2003). Koehler and Mishra stated (2005),

> Teachers need to master more than the subject matter they teach; they must also have a
> deep understanding of the manner in which the subject matter (or the kinds of

representations that can be constructed) can be changed by the application of particular technologies. (p.65)

Significance of the Study

This study is important because it adds to the research on one-to-one technology integration in rural middle school classrooms. Although there have been several studies of one-to-one technology in the classroom, most of these were done in urban or suburban schools with high minority populations (Heath, 2017; Higgins & BuShell, 2017; Luo & Murray, 2018; Varier, et al., 2017, Vaughan, 2010) or outside the United States (Davies, 2017). Many of the studies focused on high schools or a specific content area (Beeson, et al., 2014; Heath, 2017; Higgins & BuShell, 2017; Holen, et al., 2017). The studies that were conducted in rural middle schools had large minority populations (Vauhan, 2010). There is a need for examining the lived experiences of teachers integrating one-to-one technology in all core classes in rural middle schools in the United States (Harper & Milman, 2016; Luo & Murray, 2018).

This study adds the voices of educators in rural middle schools who are using one-to-one technology in the classroom to the existing literature. To meet technology requirements in CCSS and the state-wide educational initiatives for states which have left CCSS, educators must be able to rely on the experiences of those who have experienced the integration of technology in similar schools and classrooms. By describing the experiences of educators through TPCK theory, this study provides information that may aid rural middle school educators when integrating technology with their existing pedagogical content knowledge.

Research Questions

As a human science researcher, I must describe things as they are within themselves to allow the experiences of the teachers to be understood in their meanings and essences. The research questions for this study helped me to capture the meanings and the essences of the teachers using one-to-one technology in the classroom. This section will break down the research questions and examine how they were used to guide this transcendental phenomenological study.

Central Research: How do middle school teachers describe their daily experiences using one-to-one technology in middle schools in rural North Carolina?

The central research question contains both "social meaning and personal significance" (Moustakas, 1994, p.104). This question helped me to develop a broader understanding of the lived experiences of middle school teachers from a rural school system. This question did not "seek to predict or determine causal relationships" (Moustakas, 1994, p.105); it only sought to "reveal more fully the essences and meanings of human experiences" (Moustakas, 1994, p.105).

The majority of students in today's classrooms have grown up using mobile devices such as tablets, cell phones, and laptops (Onyema & Daniil, 2017). According to Mossey, Bromberg, and Manoharan (2019), "Specifically, 87% of whites and 80% of blacks are Internet users, and 74% of whites and 62% of blacks have some sort of broadband connection at home" (2017, p. 54). They went on to state, "Only72% of Hispanics reported owning a desktop or laptop computer, compared with 83% of whites. Further, only 78% of Hispanics reported going online regularly compared with 87% of whites" (Mossey, Bromberg, & Manoharan, 2019, p. 54).

Understanding the experiences of teachers in the classroom is vital to developing professional development that is relevant to teaching 21st century learners.

Supporting Research Question 1: How do middle school teachers describe their self-efficacy regarding technology?

Mishra and Koehler (2003) claim "that effective technology users often find innovative and conceptually sophisticated (though not necessarily technologically sophisticated) solutions to authentic pedagogical problems through the creative reinterpretation and re-purposing of existing technologies" (p. 5). This question helped me understand the participants' beliefs in their ability to successfully integrate one-to-one technology in their classrooms.

Supporting Research Question 2: How do middle school teachers describe their experiences regarding technology and its integration with pedagogy?

This question sought to discover the lived experience of participants as they integrated technology with their pedagogical practices. According to Mishra and Koehler (2006), technological pedagogical knowledge is the ability to understand how technologies can change teaching practice.

Supporting Research Question 3: How do middle school teachers describe experiences regarding technology and its integration with the content they teach?

This question sought to discover the lived experiences of participants and they integrated technology with the content they teach. According to Mishra and Koehler (2006), "Technological content knowledge (TCK) is knowledge about the manner in which technology and content are reciprocally related" (p. 1028).

Supporting Research Question 4: How do middle school teachers describe the challenges and benefits of having one-to-one technology in the classroom?

This question sought to discover the lived experiences of participants through their triumphs and trials as they integrated one-to-one technology in the classroom. This question sought "to uncover qualitative rather than quantitative factors in behavior and experiences" (Moustakas, 1994, p. 105).

Supporting Research Question 5: How do participants describe the professional development opportunities they have or desire to have regarding the use of one-to-one technology in the classroom?

This question sought to discover the lived experiences of participants regarding their exposure to professional development. According to Koehler and Mishra (2008), "Literature on teacher professional suggests that such active involvement, in particular when teachers are engaged for a certain period of time, is vital for their learning" (p. 44).

Definitions

This section provides a defined list of the important words and terms that will be used in this study. These words and terms are taken from the guiding theory and methodology for this study.

1. *Epoche* – "Greek word meaning to refrain from judgement, to abstain from or stay away from the everyday, ordinary way of perceiving things" (Moustakas, 1994, p.33).

2. *Learning by design* – teachers work to create relevant learning opportunities by using authentic problem-solving skills (Mishra & Koehler, 2003).

3. *One-to-one technology* - one-to-one technology can be understood as one Chromebook per student that can be used at home as well as in the classroom.

4. *Pedagogical content knowledge* – "the knowledge of pedagogy that is applicable to the teaching of specific content" (Koehler & Mishra, 2009, p.64).

5. *Pedagogical knowledge* – "teachers' deep knowledge about the processes and practices or methods of teaching and learning" (Koehler & Mishra, 2009, p.64).

6. *Technological content knowledge* – "an understanding of the manner in which technology and content influence and constrain one another" (Koehler & Mishra, 2009, p.65).

7. *Technological pedagogical knowledge* – "an understanding of how teaching and learning can change when particular technologies are used in particular ways" (Koehler & Mishra, 2009, p.65).

8. *Technological Pedagogical Content Knowledge (TPACK)* – "an understanding that that emerges from interactions content, pedagogy, and technology knowledge" (Koehler & Mishra, 2009, p.66).

Summary

This chapter outlined the background for this study including relevant, historical research on one-to-one technology, the social aspects of one-to-one technology in the classroom, and a brief explanation of TPACK theory. TPACK theory provided a framework for this study because it is a weaving together of technology, pedagogy, and content knowledge (Mishra & Koehler, 2006). According to Thornton (2018), the methods of a quality teacher must be "morally defensible and grounded in shared conceptions of reasonableness" (p.32). It is important for educators to have research verified information to help them make decisions on

how to teach content. Moustakas (1994) claimed, as new knowledge is added through shared

perceptions, this knowledge deepens the meaning of the phenomena. There is a lack of research

on the experiences of teachers who use one-to-one technology in rural middle school classrooms.

The problem is that this void inhibits the ability of educators to benefit from the experiences of

their peers. The purpose of this transcendental phenomenological study is to describe the

experiences of middle teachers using one-to-one technology in schools in rural North Carolina.

CHAPTER TWO: LITERATURE REVIEW

Overview

According to Moustakas (1994), it is necessary for the researcher to access prior relevant studies in order to distinguish "their designs, methodologies, and findings from the investigator's own study" (p.110). The researcher must also indicate "what new knowledge he or she is seeking and expects to obtain" (Moustakas, 1994, p.110). Following Moustakas' guideline, I began this study by gathering data from many literary sources. I found it necessary to first compile information regarding the theoretical framework for this study, TPACK. The information on the TPACK framework serves as the foundation for this study. Understanding the theoretical framework and important thinkers logically led to a need for an overview of traditional views of pedagogical content knowledge and of traditional views of the integration of technology in the classroom. An understanding of the traditional view of technological integration in education is necessary to create a schema on which to build unfamiliar ideas. I also found it necessary to expound upon the distinctiveness of young adolescent students in middle school as well as that of 21st-Century Learners. Using information gathered from current literature, I will examine the TPACK framework, the traditional view of pedagogical content knowledge, the traditional view of technology integration in education, and define and describe how Technological Pedological Content Knowledge (TPACK) can be used for successful integration of technology in the middle school classroom.

Theoretical Framework

The theoretical framework for this study is the Technological, Pedagogical, Content Knowledge (TPACK) framework by Mishra and Koehler (2006). Mishra and Koehler combined

many years of individual and combined research to develop the TPACK framework (Mishra &
Koehler, 2006). TPACK is a "conceptual framework for educational technology" (Mishra &
Koehler, 2006, p.1017); therefore, it is an appropriate framework for this study. For this section
on the theoretical framework, I will begin by introducing the founders of the TPACK framework,
next I will describe the background of TPACK theory, and finally I will explain the importance
of TPACK for successful technological integration in schools.

Important Thinkers

The founders of the TPACK framework are Punya Mishra and Matthew Koehler. Mishra
and Koehler are experts in their fields of study. According to *The Handbook of Technological
Pedagogical Content Knowledge (TPACK) for Educators 2nd Edition* (2016) Punya Mishra is
"one of the ten most influential people in the field of educational technology" (p.314) and
Matthew Koehler's "work explores the pedagogical affordances (and constraints) of newer
technologies for learning, specifically in the context of the professional development of teachers
and the design and evaluation of technology-rich and innovated learning" (p.313). Mishra and
Koehler's backgrounds and expertise within the area professional development for educators
with the goal of increasing technological pedagogical content knowledge for classroom
integration lends credence for the use of TPACK theory in this study.

Mishra and Koehler (2006) developed a framework to help educators and educational
leaders with the successful integration of educational technology into content specific
pedagogical practices. Mishra and Koehler (2006) argued that a lack of theoretical grounding
and a tendency to focus on technology itself instead of how to use technology have impaired
educators' willingness and ability to integrate technology in the classroom. Mishra and Koehler

have both published several articles on their individual research based on theory (Ferdig, Mishra, & Zhao, 2004; Mishra, Koehler, & Zhao, in press; Mishra, Zhao, & Tan, 1999), practical applications (Koehler & Mishra, 2002; Mishra, 2005; Mishra, Hershey, & Cavanaugh, in press; Wong, Mishra, Koehler, & Siebenthal, in press), and empirical research (Koehler & Mishra, 2005; Koehler, Mishra, Hershey, & Peruski, 2004; Koehler, Mishra, & Yahya, in press; Vyas & Mishra, 2002). These articles prepared them to work together to develop the TPACK framework (Mishra & Koehler, 2006).

The Importance of TPACK According to Mishra and Koehler

Technology is always evolving, and many educators find it difficult to keep up with the pace of constantly changing educational software (Mishra & Koehler, 2003; Mishra & Koehler, 2006). Professional development often focuses on specific software or programs that can be used in multiple content areas (Mishra & Koehler, 2006). This focus leaves teachers to learn how to use the technology for their content by trial and error (Mishra & Koehler, 2006). The software and programs often fail to truly connect to content in relevant ways or it becomes obsolete and gets replaced by the time the teacher has mastered its use for his or her content needs. This can leave teachers frustrated and unwilling to learn how to use the latest educational technologies (Mishra & Koehler, 2006).

The TPACK framework enlightens educators and educational leaders about the importance of professional development which incorporates a professional learning community (PLC) in which educators can learn by design (Mishra & Koehler, 2006). Learning by design allows educators to use design-based activities which provide a rich context for learning and work well to provide opportunities for sustained inquiry and revision (Mishra & Koehler, 2006).

Mishra and Koehler (2006) claimed, "we thought that they were well suited to help teachers develop the deep understanding needed to apply knowledge in the complex domains of real-world practice" (p.1034). By practicing learning by design, PLCs allow members to share their combined knowledge while working together to find innovative ways to incorporate recent technologies to meet content specific pedagogical practice (Mishra & Koehler, 2006).

Related Literature

It is important to understand traditional views of pedagogical content knowledge and how TPACK has evolved from that theoretical framework. This section begins by discussing Shulman's framework and then moves into some of the traditional learning theories that have impacted pedagogical practices. These theories include the theories of Bruner, Bandura, and Vygotsky as they are still relevant when discussing how students learn. A brief explanation of these theories is important to help build background knowledge for understanding how teachers are incorporating technology in the classroom.

Traditional View of Pedagogical Content Knowledge

Shulman (1986), was the originator of the Pedagogical Content Knowledge (PCK) framework. PCK was used by Shulman to explain the importance of creating a cohesiveness between pedagogical knowledge and content knowledge (Mishra & Koehler, 2006; Shulman, 1986). Pedagogical knowledge is the knowledge of the way that teachers actually teach their content. The methods a teacher incorporates, such as lectures, the flipped classroom, project-based learning, or worksheets and assessments, make up the teacher's pedagogical practice. What the teacher actually teaches is known as content knowledge. Teachers are considered to be experts in the content knowledge within their fields of study. Although teachers may be experts

in the content they teach, teachers must also rely upon the use of research verified pedagogical

practices to keep students engaged (Mishra & Koehler, 2006; Schunk, 2016; Shulman, 1986).

Not only must students be engaged, they must also be challenged with scaffolded lessons to

enhance learning. Teacher self-efficacy has been shown to play an important role in increasing

or decreasing student motivation and academic achievement (Acai, et al., 2014; Dekhane, et al.,

2013; Mojavezi & Tamiz, 2012; Rice & Wilson, 1999).

In *This We Believe: Keys to Educating Young Adolescents* (2010), by the National Middle

School Association (NSMA) (2010), the claim was made that educators must know how to

create authentic, relevant lessons to motivate young adolescent learners (NMSA, 2010; Smith,

2011; Thornton, 2018). Traditional views of pedagogical best practice in the middle school

included student voice and choice, scaffolding instruction to push students to the next level, and

the use of authentic, relevant lessons (Schunk, 2016; Smith, 2011). The TPACK framework is

one way that educators can ensure they are relying upon research verified pedagogical best

practices when integrating technology in the classroom to support and enhance learning.

Theories of Bruner, Bandura, and Vygotsky

Educators must be cognizant of introducing educational technology that is appropriate to

their students' intellectual and psychological levels (Arslan, Demirtas & Eskicumalý, 2015;

Cayton-Hodges, Feng & Pan, 2015; Hobbs, 2006; Liou & Kuo, 2014; Schunk, 2016). Bruner's

theory of constructivism, Bandura's theory of social constructivism, and Vygotsky's Zone of

Proximal Development (ZPD) all lend credence to the importance of teachers modeling life-long

learning and scaffolding of new instruction that is built upon existing schemas in order to help

students achieve optimal educational success. Whether students come to class with no

knowledge of how to use technology such as Chromebooks, or students come to class with advanced knowledge of how to use technology, teachers must be prepared to create lessons that are challenging, relevant, authentic, and appropriate.

Bruner's theory of constructivism. According to Bruner's theory of constructivism, people rely upon existing schemas to serve as a starting point for the acquisition of new knowledge (Bruner, 1957; Schunk, 2016). Bruner (1957) posited that veridical perception depends upon primitive categorization based upon cues that are inferred from previous experiences. Perceptual readiness is achieved when a person needs less stimuli to access categories for experiences. A lack of experience with technology can imped the state of perceptual readiness for students. According to Bruner (1957), perceptual readiness is a necessity for a smooth adjustment. If students lack perceptual readiness, they may become stressed, lack motivation, and fail to learn the new information.

Bandura's theory of social constructivism. Bandura (1991) claimed that personal factors such as cognition, environmental factors, and behavior all work together to construct understanding of the dynamic environment. Social cues, such as trivial feedback, can have a big impact on student motivation (Bandura, 1991). Social constructivism pointed to the idea that social comparisons can led to both advantageous and detrimental results (Bandura, 1991; Schunk, 2016). Students who have limited experience using the types of technology being integrated may feel inept compared to their peers. This can cause students to suffer from low self-efficacy when using technology this causing them to fail to achieve success.

Vygotsky's Zone of Proximal Development (ZPD). Vygotsky describes the zone of proximal development (ZPD) as the distance between what a child can do on his or her own and

what he or she can do with guidance (Vygotsky, 2011; Schunk, 2016). According to Vygotsky, learning should not rest at the child's actual mental age, but it should be enough ahead that the child is growing intellectually as well as psychologically. Although Vygotsky never actually used the term scaffolding when discussing his theory, ZPD and scaffolding are terms that are often used together in pedagogical circles (Schunk, 2016). It is important that technology be appropriate to the student's ZPD so that the he or she is learning without becoming frustrated. If a student lacks previous experience with technology, he or she may require additional guidance from the teacher or peers to help him or her master the skills necessary to be successful.

Using Technology for Scaffolding Instruction

Using scaffolding to improve learning is a process that requires teachers to move students along the continuum of working with guidance from the teacher or peers to working independently as new skills are mastered (Schunk, 2016). Bandura's participant modeling technique included the practice of scaffolding instruction. The practice of scaffolding instruction also fits well with Vygotsky's ZPD (Schunk, 2016). Educational technology is often designed to scaffold instruction and help students master new skills. These programs that include scaffolded instruction can be used to enhance motivation as well as learning (Larkin, 2016; Ngan Hoe & Ferrucci, 2012; Shin, et al., 2010).

Educational games are one type of technology that incorporate the practice of scaffolding instruction. Educational games often have goals that must be met before students are able to advance through the game (Acai, et al., 2014; Ciampa, 2014; Dekhane, et al., 2013). Students must master small goals and build upon the existing knowledge gained by completing those goals in order to develop the skills necessary to meet larger goals. As students progress through

the games, they are required to ponder their understanding and then work to correct any misunderstandings. Using educational games does not exempt the teacher from conferencing with students to help set goals and teach important information (Acai, et al., 2014; Ciampa, 2014; Dekhane, et al., 2013). Technological games used as tool to enhance content knowledge must be appropriate for instruction and add to the overarching educational experience (Acai, et al., 2014; Ciampa, 2014; Dekhane, et al., 2013; Schunk, 2016).

Young Adolescent Learners

This study focuses on young adolescent students who are in grades seven and eight; therefore, it is necessary for me to discuss some of the key factors that set students in middle school apart from students in elementary and high schools. Young adolescence refers to the ages of 10 to 15-years-old. Young adolescents are a unique group of learners (Alexander, 1973; NMSA, 2010; Smith, 2011; Thornton, 2018) who are undergoing great changes mentally, physically, psychologically, socially and emotionally. Vars (1980) uses the term transescence to describe "the stage of development which begins prior to the onset of puberty and extends through the early stages of adolescence" (p. 8). The changes young adolescent transescent learners undergo during this time period is second only to the changes that take place during infancy (NMSA, 2010). The fact that everyone matures in diverse ways and at differing paces means that middle school classrooms are filled with students who vary greatly in mental, physical, psychological, social, and emotional maturity (Alexander, 1973; NMSA, 2010; Smith, 2011; Thornton, 2018).

Due to the unique nature of young adolescent learners, "flexibility is an important key to the success of a middle school program - flexibility to accommodate the wide range of individual

differences and the characteristic ambivalence of the transescent learner" (Alexander & Kealy, 1969, p.153). Young adolescents seek relevant, authentic, and engaging academic activities (NMSA, 2010; Sadowski, 2008; Smith, 2011; Thornton, 2018). Technological advancements allow educators to create relevant, authentic, and engaging academic activities to meet the unique needs of young adolescent learners. Studies that focus on the experiences of teachers who teach elementary, high school, or adult learners lack transferability to the experiences of teachers who teach young adolescent, middle school students.

21st-Century Learners

It is important for educators and other stakeholders to understand that most young adolescents who are in middle schools today have been using some form of educational technology since kindergarten. Research has shown that traditional classrooms have failed to keep 21st-Century learners actively engaged in learning (Lee, et al., 2016; Lemley, Schumacher, & Vesey, 2014; Quinn, 2015; Rentfro & Mann, 2017; Zhao, 2015). Middle school students are already at risk for disengagement from school and the failure of traditional schools to engage 21st-Century leaners increases the chances of disengagement in young adolescents (NMSA, 2010; Sadowski, 2008; Rentfro & Mann, 2017; Thornton, 2018). Lecture-based, teacher centered instruction seems outdated to students living in a fast-paced, instant access world (Lee, et al., 2016; Lemley, Schumacher, & Vesey, 2014; Quinn, 2015; Rentfro & Mann, 2017; Zhao, 2015). Often, even though modern technologies are made available in classrooms, such as interactive white boards, many teachers are not using them "in new and innovative ways" (Schipper & Yocum, 2016, p.380). The 21st-Century learner expects classrooms to offer opportunities for creativity, collaboration, critical thinking, and communication (Lee, et al.,

2016; Lemley, Schumacher, & Vesey, 2014; NMSA, 2010; Quinn, 2015; Thorton, 2018; Zhao, 2015).

Not only do teachers have to find ways to keep 21st-Century learners engaged, they must also find ways to prepare them for jobs that do not yet exist (Childress, 2017; Lee, et al., 2016; Lemley, Schumacher, & Vesey, 2014; Varier, et al.; 2017; Zhao, 2015). The Framework for 21st-Century (see Figure 2) outlines the necessary sills that must be incorporated into all aspects of education.
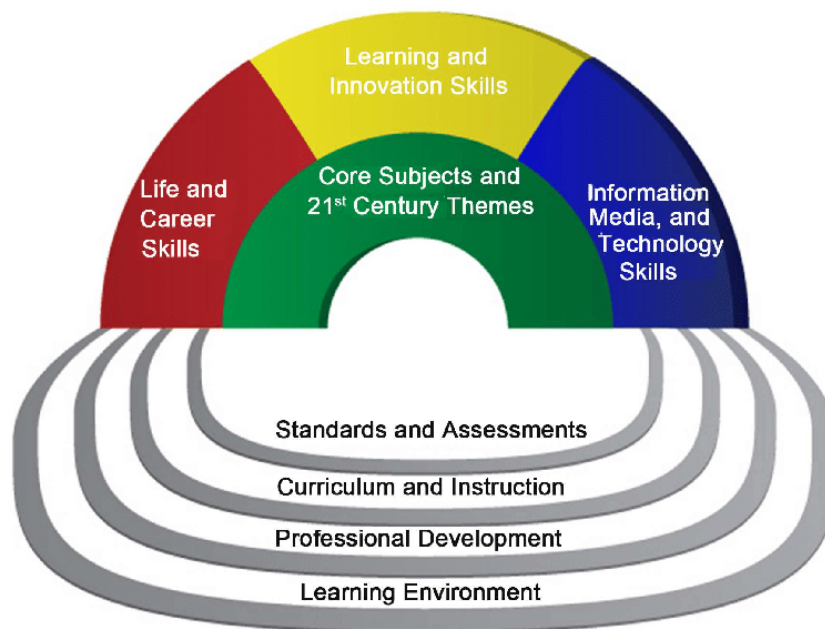
Figure 2. Framework for 21st Century. Copyright Creative Commons 3.0 Unreported .

Student Choice

One of the ways that educators can create authentic and relevant lessons for young adolescents is to allow students a choice in what and how they acquire knowledge (National Middle School Association, 2010). Providing students with the opportunity to choose a portion

of how and what they learn has been shown to have an impact on student motivation (Lesaux, et al., 2012; Schunk, 2016; Servilio, 2009; Thompson & Beymer, 2015; Thoonen, et al., 2011).

By choosing what and how they learn, students are more likely to take ownership of their own learning. Students taking ownership of their own learning are more likely to preserve as the tasks become more advanced (Bandura, 1991; National Middle School Association, 2012; Servilio, 2009). Students have been shown to be more capable of maintaining focus when they enjoy the learning task and this improved focus should lead to improved student success (Day & Kroon, 2010; National Middle School Association, 2012; Servilio, 2009; Thoonen, et al., 2011).

Online learning through web-based applications like the Google Suite for Education provide many ways for students to take control of how they provide evidence of learning (Bartolo, 2017; Day & Kroon, 2010; Servilio, 2009). Online research capabilities also aid educators who want to provide students an opportunity to select their own research topics. A school library can now include virtually unlimited numbers of books and magazines which allow students more choice in literature and nonfiction reading selections.

A Traditional View of Technology Integration

Researchers in the field of technology integration have shown that many teachers embrace the use of new technology in the classroom (Grant, et al., 2015; McEwen & Dube, 2015; Rice & Wilson, 1999). These researchers also pointed to the fact that teachers who have a high self-efficacy are more likely to embrace the utilization of new technology in the classroom (Grant, et al., 2015; McEwen & Dube, 2015). Although many educators may embrace the use of new technology in classrooms, they may also feel it important to not to exclude more traditional methods of instruction (Dekhane, et al., 2013; McEwen & Dube, 2015; Schunk, 2016). Many

researchers and educational leaders have agreed that computer and mobile applications and programs should be considered as a tool of instruction and not expected to take the place of classroom educators (Acai, et al., 2014; Ciampa, 2014; Dekhane, et al., 2013; Grant, et al., 2015; NCDPI, 2016; Rice & Wilson, 1999).

Technology integration requires that technology is used to enhance learning and not just for the sake using the technology itself (Parkay, Anctil & Hass, 2014; Schunk, 2016; Mishra & Koehler, 2003). According to Hobbs, "When clearly defined objectives are lacking, there is no sound basis for the selection or use of instructional materials, content, or methods" (2006, p. 41). Teachers must find ways to actively use technology to enhance learning and motivation (Mishra & Koehler, 2003; Parkay, Anctil, and Hass, 2014; Schipper & Yocum, 2016; Schunk, 2016). Schipper and Yocum (2016) found that, although teachers use technology, they may not use it fully. Teachers may use new technology in old ways, such as using an interactive white board in the same way the teacher would use a normal projector screen (Schipper & Yocum, 2016). According to the NSMA (2010), today's students are part of the "wired generation" and we must find ways to make learning relevant to them through appropriate use of technology.

Teacher Self-Efficacy Using Technology

Considering that educator self-efficacy has been linked to students' self-efficacy and motivation, it is important that educators understand how to the use computer and mobile applications for education that will be used in the classroom before introducing them to students (Acai, et al., 2014; Dekhane, et al., 2013; Rice & Wilson, 1999). It may be necessary for the teacher to be able to guide students as students use the implemented computer and mobile applications introduced in the classroom. If an application or program is too difficult to use or

does not work correctly, students can become frustrated. Therefore, the better acquainted the teacher becomes with the applications and programs, the simpler it will be for the teacher to assist students as students they continue with the learning task at hand.

As one-to-one technology becomes more widely available in school systems, professional development to help teachers navigate through the myriad of programs and applications may be necessary for teachers to gain self-efficacy regarding the use of technology in the classroom. The North Carolina Department of Public Instruction (NCDPI) requires Digital Learning Competency (DLC) as part of the required continuing education credits for license renewal (NCDPI, 2016). This requirement is in place to ensure that educators are comfortable with and knowledge about guiding students in the use of new technologies. DLCs also provide educators will a vast array of programs and online resources that are available for use in the classroom (Ciampa, 2014; NCDPI, 2016).

Technology and Goal Achievement Theory

Goal achievement theory includes setting goals that emphasize improving skills and knowledge, increasing understanding and achieving mastery. Setting goals gives students a purpose while increasing student motivation (Alexander & Schuldt, 1984; Anderman, Anderman, & Meece, 2006; Chadli, Bendella, & Tranvouez, 2015; Korpershoek, Kuyper, & Werf, 2015; Ruzek, et al., 2015; Turner, et al., 2014). Increasing student motivation has been shown to reduce behavior issues and improve learning (Anderman, Anderman, & Meece, 2006; Ciampa, 2014; Chadli, Bendella, & Tranvouez, 2015; Korpershoek, Kuyper, & Werf, 2015; Ruzek, et al., 2015; Schunk, 2016; Turner, et al., 2014). Goal achievement theory posits that the more difficult the goal and the more invested the student is in the goal, the more likely it is that

the goal will be achieved (Alexander & Schuldt, 1984; Anderman, Anderman, & Meece, 2006; Schunk, 2016)

There are many computer and mobile applications which have a goal achievement element in the form of awarded points or prizes students earn as they master skills (Acai, et al., 2014; Ciampa, 2014; Dekhane, et al., 2013). Some applications also have competition modes which allows students to test their abilities against one another while the students attempt to master new content (Anderman, et al., 2006, Rice & Wilson, 1999). Successful use of these, and other, computer and mobile applications require students to be motivated enough to stay focused and persevere until content is mastered. Scaffolding may be required to help students learn the programs and to keep them from getting frustrated if they struggle to win rewards (Ciampa, 2014; Dekhane, 2013; Schunk, 2016).

Technological Pedological Content Knowledge (TPACK).

TPACK theory is a framework that weaves pedagogical content knowledge with technological integration (Mishra & Koehler, 2006). TPACK requires teachers to understand how to use the available technology in a way that enhances student learning. When teachers work together to create cohesive lessons using TPACK theory, they are learning by design (Mishra & Koehler, 2006). Mishra and Koehler argued that teachers must learn by design to be successful because technology continues to change at a rapid pace. By working in groups, teachers use critical thinking skills to create lessons and classroom environments that use technology to improve learning and engagement. The traditional view of technology integration often had teachers using technology based on professional development that was specific to individual programs or hardware (Harper & Milman, 2016; Mishra & Koehler, 2006). This type

of professional develop does not prepare educators when there are changes or updates to the existing programs and forces teachers to always be learning new programs that may or may not be useful for them (Mishra & Koehler, 2003).

Mishra and Koehler (2006, 2008, 2009) merged the knowledge gained from their many years of research to design the TPCK framework. They worked to develop a framework that can grow and change as technology changes (Mishra & Koehler, 2006). Because TPACK relies on teachers to continue using critical thinking within a community of practice, innovative ideas are constantly emerging to help teachers use technology as a tool to enhance instruction (Mishra & Koehler, 2006). TPACK is an interweaving of technological knowledge, pedagogical knowledge, and content knowledge.

Integration of Technology in the Classroom

This section will explore the literature related to the integration of technology in the classroom including Common Core State Standards (CCSS), the importance of teacher self-efficacy, some of the methodologies that have been used for existing studies, how teachers have been reported to be integrating technology, existing studies on single subjects, existing studies from outside the USA, the lack of true one-to-one technology in many existing studies, and the need for professional development. I will begin this section with a brief overview of how teachers are using technology in the classroom and expand on these ideas based on information from existing literature. I will then examine the current state of existing literature and use this to highlight how this study is significant and will add to the existing literature.

Technology Requirements Through Common Core State Standards (CCSS)

Common Core State Standards in Math and English Language Arts (ELA) have been adopted by 42 states (Common Core State Standard Initiative, 2016). The goal of CCSS is to prepare all students in the United States for college and careers following high school graduation. North Carolina is one of the many states that adopted and revised CCSS. Although not every state is using the Common Core that has been set by the federal government, most states have adopted curriculum standards that must be met at each grade level.

The North Carolina Standard Course of Study (NCSCOS) defines the appropriate content standards for each grade or proficiency level and each high school course to provide a uniform set of learning standards for every public school in North Carolina (NCDPI, 2018). The NCSCOS goals for ELA include the integration of technology under standards such as "CCR Anchor Standard W.4 – Use digital tools and resources to produce and publish writing and to interact and collaborate with others" (NCDPI, 2018, p.29), "CCR Anchor Standard W.6 – Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism (NCDPI, 2018, p.p.30), " and "CCR Anchor Standard SL.5 – Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations" (NCDPI, 2018, p.36).

Teaching 21st Century skills includes teaching media literacy; therefore, teaching media literacy is necessary to meet federal and state mandated guidelines. The proliferation of digital devices means that young adolescents are constantly being bombarded with information that is cognitively, inappropriate for them (Redmond, 2015). Students need to be made aware of the dangers that exist on the web. Predators disguising themselves as young adolescents or teens

rely upon the naivety of young adolescents. Students must be taught not to share any of their personal information online as this can lead predators to the students (Redmond, 2015). Young adolescents also need to be aware that advertisers often target their age groups due to the impulsivity and gullibility of many young adolescents (Considine, 1985; Redmond, 2015).

NCDPI also requires teachers to earn digital learning competency (DLC) credits as part of the renewal process. To fulfill these DLC requirements, educators can attend local professional development sessions related to the integration of technology in the classroom (NCDPI, 2016), complete courses from schools of higher education, or attend workshops aimed at teaching digital learning competencies. Educators in North Carolina need to have knowledge of the types of technologies and programs that are available if they are to be expected to follow the guidelines for incorporating technology in the classroom which are found in the NCSCOS and as part of NCDPI's DLC renewal credit requirements.

The Importance of Teacher Self-Efficacy

Research has shown that teacher self-efficacy plays a vital role in student achievement and willingness to attempt new educational tasks. Although licensed teachers are trained to be knowledgeable in content pedagogy, they often lack the technological knowledge needed to create content specific lesson plans which integrate technology (Mishra & Koehler, 2006). This lack of technological knowledge may cause a teacher to develop a low self-efficacy when he or she is required to incorporate technology in the classroom. This low self-efficacy may cause teachers to avoid utilizing new forms of technology. Low teacher self-efficacy and negative views expressed by teachers may cause students to develop a negative perception of technology integration.

Technological integration in the classroom has been shown to have mixed results (Anthony, 2012; Chappell, et al., 2015; Ciampa, 2014; Davies, 2017; Harper & Milman, 2016; Zheng, et al., 2016). While several studies have found that the integration of technology increases student motivation and can improve learning (Acai, et al., 2014; Bartolo, 2017; Bebell & O'Dwyer, 2010; Chadli, Bendella, & Tranvouez, 2015), others have found that a lack of professional development may impede the ability of teachers to incorporate technology in the classroom (Anthony, 2012; Beeson, Journell, & Ayers, 2014; Bergström, Mårell-Olsson & Jahnke, 2019; Burns & Polman, 2006). The ways teachers integrate technology depends upon their self-efficacy and comfort level with the type of technology needed for the content being taught (Bartolo, 2017; Davies, 2017; Harper & Milman, 2016; Lefter & Petrovici, 2016; Mishra & Koehler, 2006; Prensky, 2001; Zheng, et al., 2016).

A lack of professional development and limited time to learn how to use new technology for specific content area needs have often been cited as reasons that teachers do not fully embrace the idea of using of technology in their classrooms (Burns & Polman, 2006; Harper & Milman, 2016; Mishra & Koehler, 2003; Mishra & Koehler, 2006; Zheng, et al., 2016). Often, computer programs and applications are not designed specifically for educational use. It may be difficult for teachers who are lack digital competency to find ways to successfully integrate these types of technology in meaningful ways.

Teachers who have a low self-efficacy regarding the integration of technology in the classroom are less likely to look for ways to incorporate technology (Bebell & O'Dwyer, 2010; Beeson, et al., 2014; Harper & Milman, 2016; Mishra & Koehler, 2003; Mishra and Koehler, 2006; Zheng, et al., 2016). To help educators with low self-efficacy related to the integration of

technology feel more confident, support from peers, administration, and other stakeholders is necessary (Heath, 2017; Hineman, Boury, & Semich, 2015). It is also important to give educators time to conduct research and to share their experiences with one-to-one technology in order to provide a knowledge base for educators with low-self efficacy to pull information from (Bebell & O'Dwyer, 2010; Mishra & Koehler, 2006; Smith, 2011; Thornton, 2018). Schools should be places of learning for both students and educators.

Methodologies Utilized in Existing Studies

There have been many studies which examined the use of technology in educational settings. These studies used varying methodologies to examine technological integration from various perspectives. Qualitative studies seek to describe a phenomenon through the voices and experiences of those who have experienced, or are still experiencing, it. Quantitative studies seek to quantify a phenomenon. Using a mixed-methods design allows a researcher to combine qualitative and quantitative methods to examine and describe a phenomenon.

Case studies. Many of the existing studies related to technology in the classroom incorporated a case study research method (Anthony, 2012; Beeson, Journell, & Ayers, 2014; Bergström, Mårell-Olsson & Jahnke, 2019; Heath, 2017; Higgins & BuShell, 2018; Hineman, Boury, & Semich, 2015; Li, Snow, & White, 2015). Case studies are used to provide an in-depth understanding of a single case or multiple cases. The case study methodology is bounded by the time, place, and context in which the phenomenon occurs. Case studies are used when researchers seek answers to the "how" and "why" questions of a shared phenomenon (Creswell & Poth, 2018, Stake, 1995; Yin, 1998).

Many of the existing case studies related to the integration of technology in the classroom took place in a single school setting and most of these were focused on the experiences of single subject content teachers (Anthony, 2012; Beeson, Journell, & Ayers, 2014; Heath, 2017; Higgins & BuShell, 2018; Hineman, Boury, & Semich, 2015; Li, Snow, & White, 2015). Case studies focus on a single bounded group; therefore, they may lack transferability to other groups (Creswell & Poth, 2018; Patton, 2015).

Phenomenology. Another qualitative research methodology used in research is phenomenology (Bartolo, 2017; Lou & Murray, 2018). Phenomenological studies seek to find meaning through rich thick descriptions of the lived experiences of many people who have shared the same phenomenon. Descriptions in phenomenological studies are gathered through long, open-ended interviews (Creswell & Poth, 2018; Moustakas, 1994; Patton, 2015). The researcher uses the data in the interviews to search for themes and synthesize the information to uncover the essence of the phenomenon.

Quantitative methodology. Many existing studies relied upon quantitative methodology (Acai, et al., 2014; Chadli, Bendella, & Tranvouez, 2015; Chang, Liang, & Tseng, 2014; Krishnan, Cusimano, Lee & Chen, 2018; Liou & Kuo, 2014; McEwen & Dube, 2015; Wang, & Yim). Quantitative studies seek to answer a research question by examining relationships between variables (Creswell & Poth, 2018). Unlike qualitative studies, quantitative studies can include large numbers of participants.

Many of the existing studies relied upon survey data and then used Likert-Like scales to quantify teachers' and students' experiences using technology in the classroom. Although several of these studies showed an increase in student motivation when technology was used

(Acai, et al., 2014; Chadli, Bendella, & Tranvouez, 2015; Chang, Liang, & Tseng, 2014; Gilboy, Heinerichs, & Pazzaglia, 2015; Krishnan, et al., 2018; Liou & Kuo, 2014; McEwen & Dube, 2015; Wang, & Yim), some studies found an increase in student and teacher anxiety due to a lack of technological literacy (Arslan, Demirtaş, & Eskicumalý, 2015; Kennedy, Rhoads, & Leu, 2016, Kim & Jang, 2015). Unlike a transcendental phenomenological study, a quantitative study does not capture the essence of the lived experiences of the research participants.

Mixed-methods. Another research method that has been used in past studies of technology integration in the classroom was mixed-methods (Chappell, et al., 2015; Dekhane, Xu, & Tsoi, 2013; Holen, Hung, Gourneau, 2017; Keane & Keane, 2017; Keane & Keane 2018; Ngan Hoe & Ferrucci, 2012). Like quantitative studies, mixed-methods studies seek to answer a research question and include a hypothesis. Using a mixed-methods design allows the researcher to view a phenomenon from many directions to provide an overview of the essence of the phenomena by incorporating a qualitative approach to a portion of the data collection process (Creswell & Poth, 2018; Patton, 2015).

Each of the mixed-methods studies also incorporates a quantitative section which describes the tests and procedures which were used to collect, analyze, and quantify data (Creswell & Poth, 2018; Patton, 20105). The quantitative selections often rely on survey data using a Likert scale to quantify experiences (Chappell, et al., 2015; Dekhane, Xu, & Tsoi, 2013; Holen, Hung & Gourneau, 2017; Keane & Keane, 2017; Keane & Keane 2018; Ngan Hoe & Ferrucci, 2012). Holen, Hung, and Gourneau (2017) used the following example,

One sample question from the student survey, "I use my laptop for school work most of the time," gathered data on the effects of the interaction between students (subject) and

the one-to-one initiative (tools) in studying behaviors (object). The student survey

consisted of 12 questions on a 1–5 point Likert scale and one ranking question focusing

on their learning experience and use of the technology. (p.31)

By combining the qualitative data and quantitative data into one research project

researchers hope to gain a more complete picture of the phenomenon being studied (Creswell &

Poth, 2018; Patton, 2015). The rich, thick descriptions from the qualitative data serve to help the

researcher understand the lived experience of the participant. The data quantitative portion of

the study provides a repeatable and measurable outcome that has often been viewed as having

greater validity in the research community (Creswell & Poth, 2018; Patton, 2015).

How Do Teachers Integrate Technology?

Studies have been conducted which sought answers to the question of how teachers are

using one-to-one technology in the classroom (Anthony, 2012; Beeson, et al., 2014; Ciampa,

2014; Heath, 2017; Higgin & BuShell, 2017). These studies showed that many teachers were

integrating technology for educational gaming, assessment, and as a tool for research. Teachers

regularly use technology for lecture presentations and to add media to lectures. Many of the

existing studies also found that teachers were using technology to increase communication both

in and out of the classroom.

In the educational setting, students were reported to frequently use technology for typing

papers, conducting research, and browsing the internet (Anthony, 2012; Bebell and O'Dwyer,

2010; Beeson, et al., 2014; Ciampa, 2014; Harper & Milman, 2016; Heath, 2017; Higgin &

BuShell, 2017; Luo & Murray, 2018). Studies also showed that students are using technology to

create products of learning such as presentations, videos, websites, and graphic arts (Day &

Koon, 2010; Dede & & Erdoğan, 2015).

Students need to be provided with authentic, relevant learning experiences (NMSA,

2010; Schunk, 2017; Smith, 2011) and technology has the potential to provide these experiences

when teachers are trained in the use of appropriate technologies, programs, and applications for

their content areas (Beeson, et al., 2014; Mishra & Koehler, 2006; Yim, Warschauer, & Zheng,

2016). Using technology allows teachers to take advantage of virtual reality glasses to send

students on field trips around the world without ever leaving the classroom, use mathematical

manipulatives, provide primary sources, complete virtual science labs, and many other

experiences that would otherwise be impossible.

The use of authentic, relevant learning experiences through the use of integrated

technologies have been shown to enhance motivation and learning (Cayton-Hodges, 2015; Day

& Koon, 2006, Kang, 2018; Moyer-Packenham, Baker, Westenskow, Anderson, Shumway,

Rodzon, & Jordan, 2013). Research has found that using virtual manipulatives can help students

achieve success by providing a visual representation of abstract ideas (Cayton-Hodges, 2015;

Moyer-Packenham, et al., 2013). Virtual manipulatives can play a pivotal role in science and

mathematics educational experiences.

Online literature circles provide an opportunity for students to choose how they will

provide evidence of learning and provides greater opportunities for interaction between students

outside of school. This choice and opportunity to collaborate outside of school via internet

technologies can enhance learning and increase motivation. Access to primary sources allows

students greater insight into the cultural mores of earlier civilizations and the rise of the modern

area. There are many more examples of ways internet technologies and software programs can enhance learning by providing authentic and relevant experiences; however, it is beyond the scope of this literature review to discuss them all.

Technology for assessment. Many existing studies have found that teachers often use technology for assessment purposes (Bebell, et al., 2010; Chang, Liang, Tseng, 2014; Dede & Erdoğan, 2015; Kennedy, Rhoads, & Leu, 2016; Ngan Hoe & Ferrucci, 2012; Orlando & Attard, 2016). Many forms of assessments on technological devices offer automatic grading for the teachers and instant feedback for students. Assessment programs often allow the test creator to preload responses that explain what the student did right and wrong. Instant feedback provided to the student by these programs allows him or her to reflect upon his or her errors and learn from those errors. Bandura (1991) reiterated the importance of feedback to increase student motivation and success.

There are some programs that use the data collected from students' formative assessments and build upon that data to create more challenging assessment items as students gain in understanding (Cayton-Hodges, Feng, & Pan, 2015; Ngan Hoe & Ferrucci, 2012; Orlando & Attard, 2016; Shin, et al., 2017). The AI (artificial intelligence) in these assessment programs force students to master material before they can move forward, thus effectively scaffolding instruction. Some of these programs are in the form of games and using gaming for instruction has been found to increase student motivation in addition to helping students master skills (Chadli, Bendella, & Tranvouez, 2015; Ngan Hoe & Ferrucci, 2012; Orlando & Attard, 2016; Shin, et al., 2017).

Technology to enhance communication. Technology has often been used as a means to improve communication between teachers, students, and parents. Email allows students to contact teachers when questions arise with homework or classwork. Using technology as a means of communication can help students feel more capable of completing homework and missed assignments because students can ask classmates or teachers for help (Davies, 2017). Students can also communicate with online tutors if they need additional help that cannot be provided by teachers or peers. Email allows teachers to send due date reminders for homework and projects. Email also allows teachers to contact students and parents when problems arise and to keep a record of when contact was made and exactly what was discussed.

Technology can be used to create digital communities of learning within the classroom setting. Using collaborative tools, such as Google Documents, empowers students by allowing them to work together on projects at home as easily as they work together in the traditional classroom (Bartolo, 2017; Yim, Warschauer & Zheng, 2016). Students can share ideas and links to research that is needed to complete projects and reports.

Online classes in colleges and universities often use discussion board forums as a means of communication, to check for understanding, and as a tool for collaborative learning. Students who are not yet in college can also participate in online discussion post in programs like Canvas and Google Classroom. These forums allow students to share their projects and offer encouragement and constructive criticism to one another (Bartolo, 2017; Yim, Warschauer & Zheng, 2016).

Technology can also be used to create communities of learning that contain a mixture of students from around the world. Students in the United States can join their peers in other

countries to collaborate on inquiry-based projects or simply get to know one another. Spending time with students in other areas of the world helps to improve global awareness. Federal and state standards require students to practice skills to help them become more globally aware (NCDPI, 2016; U.S. Department of Education, 2017). The ability to communicate with people from other countries also allows teachers to build empathy in students for people from other areas. Communicating with people from other countries also provides students with the ability to learn about other cultures in an authentic way.

The flipped classroom. The use of technology in schools has changed the way instruction takes place in some classrooms. The flipped classroom model allows students to receive instruction at home and then practice and refine what they have learned in the classroom (Gilboy, Heinerichs & Pazzaglia, 2015; Grant, et al., 2015; Ozdamli & Asiksoy, 2016). The flipped classroom requires the teacher to create and assign instructional materials such as lectures, videos, presentations, readings, worksheets, and hyper-docs (hyper-docs are documents that contain links to videos, research sites, or other information). These materials are used to "teach" the material to students.

This instructional method enables students to learn at their own pace instead of having to keep up with the whole class. Students can watch videos and presentations as many times as they need to until they feel confident with the material. Students can also take the time to look up unknown words without fearing what other people think about their lack of knowledge. By practicing in class, the teacher can ensure that students know the information and are reinforcing correct ideas and methods (Gilboy, Heinerichs & Pazzaglia, 2015; Grant, et al., 2015; Ozdamli & Asiksoy, 2016).

The flipped classroom can be especially stressful for students who have experienced limited exposure to the types of technologies used in the flipped classroom. Students who have had little previous exposure to the types of programs being used need more guidance in order to be successful (Arslan, Demirtas, & Eskicumalý, 2015; Cayton-Hodges, Feng, & Pan, 2015; Chadli, Bendella & Tranvouez, 2015; Chappell, et al., 2015; Dekhane, Xu, & Tsoi, 2013; Harper & Milman, 2016). It is imperative for students to have the time to become comfortable with the technologies being used in order to reduce stress, increase motivation, and enhance learning (Arslan, Demirtas, & Eskicumalý, 2015; Chappell, et al., 2015; Dekhane, Xu, & Tsoi, 2013; Harper & Milman, 2016; Higgins & Bushell, 2018; Keane & Keane, 2017).

Single Subject Area Studies

There are a myriad of studies from math classes using one-to-one technology (Cayton-Hodges, 2015; Lee & Boyadzhiev, 2015; Lee & Chen, 2010; Ingram, 2017; Kennedy, Rhoads & Leu, 2016; Orlando & Attard, 2016; McEwen, 2015; Ngan, 2012; Soto, 2015; Tucker, Moyer-Packenham, Westenskow & Jordan, 2016). These studies have shown that math-based applications can be used to motivate students and increase learning through scaffolded instruction (Ngan, 2012; Tucker, et al., 2016) and positive feedback in the form of online rewards and certificates (Cayton-Hodges, 2015; Tucker, et al., 2016). These studies also pointed to the need for students to have more choice in how they used mathematical applications (Cayton-Hodges, 2015; Tucker, et al., 2016). The finding from these studies are in line with Bandura, Bruner, and Vygotsky's learning theories an AMLE's call for more student choice to improve student motivation.

There are also studies that focused solely on using technology for reading, social studies, and sciences (Chadli, Bendella & Tranvouez, 2015; Rice & Wilson, 2010). Studies that focused solely on English Language Arts (ELA) classrooms, found that using laptops or Chromebooks worked well for researching and writing papers (Krishnan, et al., 2018; Yim, Warschauer, & Zheng, 2016). Science teachers were able to use technology to allow students to complete virtual labs; however, difficulty learning the programs and issues with the technology itself have been found to be a deterrent to teachers using technology in the classroom (Grant, et al., 2015, Koehler & Mishra, 2005, Mishra & Koehler, 2006). Some of the technological issues that were found to be the biggest deterrents of technology integration in educational settings are a lack of one-to-one devices and unreliable internet connections.

Studies Outside the United States

Many studies that focused on one-to-one technology took place outside of the United States (Bergström, Mårell-Olsson & Jahnke, 2019; Ciampa, 2014; Davies, 2017; Greiff, Wüstenberg, Csapó, Demetriou, Hautamäki, Graesser, & Martin, 2014; Ingram, 2015; Liou & Kuo, 2014; Keane & Keane, 2018; Ngan, 2012; Spanos & Sofos, 2015; Selwyn, Nemorin, Bulfin & Johnson, 2017). Many of these studies found that technology was not used as often in classes where the teacher felt less competent in the use of the technological devices being used (Ciampa, 2014; Davies, 2017; Greiff, et al., 2014; Ngan, 2012; Orlando & Attard, 2016). These studies pointed to the importance of professional development aimed at helping teachers gain technological pedagogical content knowledge (Ciampa, 2014; Davies, 2017; Greiff, et al., 2014; Ingram, 2015; Orlando & Attard, 2016).

Most of the studies which took place in countries outside of the United States focused on the use of technology to increase mathematical achievement in primary or secondary schools (Ciampa, 2014; Ingram, 2015; Ngan, 2012; Orlando & Attard, 2016). These studies were not only solely focused on a single subject, they were predominately focused on elementary school students or elementary school teachers (Ingram, 2015; Ngan & Ferrucci, 2012; Orlando & Attard, 2016). These studies found that using technology intended to increase mathematical achievement also had a greater potential to increase student motivation when the teacher had a positive view of using technology as a tool for instruction (Ingram, 2015; Orlando & Attard, 2016).

Studies performed outside of the United States may lack transferability to classrooms in the United States due to cultural differences, socioeconomic status differences, and types of available technologies for use in the classroom. However, by comparing these studies to studies within the United States, researchers can uncover emerging themes that transcend cultural and socioeconomic lines. Some of these transcending themes that can be found in studies in the USA and elsewhere include teacher self-efficacy, the need for professional learning communities (PLCs), the need for professional development related to technology integration in the classroom, and the need for research verified best practices to guide classroom instruction (Arslan, Demirtaş, & Eskicumalý, 2015; Bartolo, 2017; Beeson, Journell, & Ayers, 2014; Burns & Polman, 2006; Chang, Liang, & Tseng, 2014, Englehart, 2013, Ferdig, Mishra, & Zhao, 2004; Grant et el., 2015; Luo & Murray, 2018; Spanos & Sofos, 2015).

A Lack of True One-to-One Technology

Many of the studies related to integrating technology in the classroom were not based on true one-to-one technology in which each student had access to his or her own device which could be used day at school as well at home (Bartolo, 2017; Bergström, Mårell-Olsson & Jahnke, 2019; Ciampa, 2014; Heath, 2015; Grant, et al., 2015; Kennedy, Rhoads & Leu, 2016; McEwen & Dube, 2015; Selwyn, Nemorin, Bulfin & Johnson, 2017). In these studies students often had a device for one class period, but students did not have access for the entire school day (Grant, et al., 2015; Heath, 2015; Ingram, 2015; Kennedy, Rhoads & Leu, 2016). In some cases, the teachers were forced to sign up for computer time; therefore, the teacher could only utilize technology in the classroom a few days a week (Ciampa, 2014; McEwen & Dube, 2015). These studies found that frustration over trying to get devices to use in the classroom served as a deterrent to teachers' willingness to incorporate technology (Ciampa, 2014, Heath, 2015; Kennedy, Rhoads, & Leu, 2016; McEwen & Dube, 2015).

A lack of one-to-one technology can also be a burden for students who do not have devices at home to use to complete online homework. This digital divide is often based on socio-economic status (Ritzhaupt, Liu, Dawson, & Barron, 2013; Vigdor, Ladd, & Martinez, 2014) and is especially problematic when teachers incorporate a flipped classroom model. A student's lack of technology in the home may require the teacher to provide hard copies of materials or offer to make time before or after school for students to access online materials. Students from poverty may lack access to personal transportation and find themselves unable to online work outside of regular school hours.

True one-to-one technology ensures that each student has a device that can be used both at school and at home. While the studies that lacked true one-to-one technological integration offered important insight into the use of technology in the classroom, they failed to capture the essence of the lived experiences of teachers who have students with access to technology both in the classroom and at home.

A Need for Professional Development for TPACK

The importance of professional development opportunities has been discussed in many articles both inside and outside the United States (Burns & Polman, 2006; Ciampa, 2014; Davies, 2017; Grant, et al., 2015; Greiff, et al., 2014; Ingram, 2015; Lefter & Petrovici, 2016; Orlando & Attard, 2016). These articles pointed to low teacher self-efficacy being a barrier to the teachers' willingness to incorporate technology in the classroom. This was especially true when there were issues with the technology being used for instruction. Low teacher self-efficacy was also linked to a lack of student motivation and achievement when using technology for academic purposes. The need for targeted professional development related to technology integration encompassed all subject areas and grade levels (Ingram, 2017; Lefter & Petrovici, 2016; McEwen, 2015; Ngan, 2012; Orlando & Attard, 2016; Rice & Wilson, 2010).

It is vital that teachers have knowledge of best practices when using technology to enhance their students' academic experiences. The use of technology solely for the sake of using technology is not an effective practice. Technology should not be used if it does little or nothing to enhance academic knowledge. Professional development for technology that is not content specific may cause teachers to use technology ineffectively or fail to use the technology altogether. Mishra and Koehler (2006) stated that with the rapid rate of changing technology, it

is necessary for teachers to rely on PLCs, critical thinking skills, and time to practice with technology before introducing it in the classroom. Teachers must rely on these practices to build the necessary skills to use TPACK when creating effective technology enriched lessons.

The use of technology for gaining knowledge, practicing skills, and proving knowledge is a requirement in all grade levels and all core subject areas within the United States. This requirement is present both at state and federal education levels (NCDPI, 2016; U.S. Department of Education, 2017). Students must have the opportunity to research information and create multimedia projects using technology. Federal and state standards also require students to use technology as a tool to present projects and collaborate with peers (NCDPI, 2016; U.S. Department of Education, 2017).

Mishra and Koehler (2006) found that professional development failed to provide adequate training that enabled teachers to guide and teach students in the use educational technology. To gain pedagogical content knowledge, traditional educators should always rely upon research verified best practices. Relying on research verified best practices should also be the standard when teachers are seeking to gain technological pedagogical content knowledge. Although there are a multitude of studies on the use of technology integration in elementary school mathematics classes achievement (Ciampa, 2014; Ingram, 2015; Ngan, 2012; Orlando & Attard, 2016), there is a gap in the literature on the integration of one-to-one technology in all subjects in rural middle school classrooms. It is important to find ways to help educators find ways to use technology as a tool for enhancing learning in all content areas while engaging 21st Century learners (Ingra, 2015; McEwen & Dube, 2015, Mishra & Koehler, 2006; Ngan, 2012; Orlando & Attard, 2016). In order to keep up with the rapid pace of changing technology,

teachers must rely upon communities of learning in order to find innovative ways of utilizing new technologies in the classroom (Ingra, 2015; McEwen & Dube, 2015, Mishra & Koehler, 2006; Orlando & Attard, 2016). Koehler and Mishra (2005), stated it in this way, "There is no "one best way" to integrate technology into curriculum. Rather, *integration efforts should be creatively designed or structured for particular subject matter ideas in specific classroom contexts*" (p.60). This requires teachers to not only know the content they teach, but also how to use technology to teach their content.

Professional development using the TPACK framework is designed to allow teachers to learn-by-design in by being involved in professional learning communities. Teachers improve their self-efficacy while building a knowledge base. This is accomplished by teachers and educational leaders working together in order to discover innovative ways to use technology that best fits each particular content area. The TPACK framework recognizes that there is no one-size-fits-all solution to technology integration. Technology is a tool to be used to enhance pedagogical practices, it does not take the place of traditional instruction.

When teachers have a chance practice with technology, they are better equipped to trouble correct problems as they arise. Knowing how to correct issues helps to alleviate frustration that could otherwise cause a teacher to stop incorporating technology in the classroom. Teachers being able to help students fix issues also reduces student frustration and stress which negatively impacts student achievement and motivation.

The knowledge base built in PLCs also allows teachers provide more guidance to students as they use technology for instruction. If teachers are unable to guide students in the correct use of technology, students may find themselves unable to complete required tasks and

become frustrated and stressed. The TPACK framework not only provides teachers with the opportunity to learn-by-design, it supplies teachers with the knowledge of how to teach students the skills necessary for students themselves to practice the skill of learning-by-design. This ability to learn-by-design will help students take control of their own learning (Mishra & Koehler, 2006) which increases student motivation especially in young adolescent learners (NMSA, 2010). Increases in student motivation have been shown to aide in the increase of student academic achievement (Gilboy, Heinerichs, & Pazzaglia, 2015; Lesaux, Harris, & Sloane, 2012; Liou & Kuo, 2014; Maslow, 1954).

As rural middle schools located in the Foothills of North Carolina begin to incorporate one-to-one technology, it is important for these teachers to be able to draw upon existing literature and experiences from other educators who have already lived through the incorporation of one-to-one technology in the classroom. The experiences of teachers from other countries, urban, suburban, elementary, and high schools may lack transferability to teachers from middle schools in rural North Carolina; however, some insight should be able to be gained from the existing research. By adding the experiences of teachers from rural middle schools in the North Carolina Foothills, some transferability may be present for other middle school educators from rural districts within the Southern United States. This study will add to the existing literature; therefore, it is relevant to the educational field and is significant to those wishing to know more about one-to-one technology integration in rural middle schools.

Summary

It is currently known that one-to-one technology is becoming a reality in many schools across the United States (Acai, et al., 2014; Beeson, et al., 2014; Ciampa, 2014; Davies, 2017;

Greiff, et al., 2014; Holen, et al., 2017). Although there is a multitude of research and literature

available on the integration of one-to-one technology in countries other than the United States

(Ciampa, 2014; Davies, 2017; Greiff, et al., 2014), there is limited research on teachers'

experiences using one-to-one technology in rural middle schools in the United States. Single

subject studies dominate the existing literature and may lack transferability to the experiences of

teachers from other content areas. Many of the studies on technology integration in the United

States took place in urban schools, suburban schools, elementary schools, high schools, or

colleges (Beeson, et al., 2014; Dekhane, 2013; Heath, 2017; Higgin & BuShell, 2017; Holen, et

al., 2017; Luo & Murry, 2018; Varier, et al., 2017) and may lack transferability to middle school

classrooms.

In addition to studies being done outside the United States, focusing on single subjects,

and centering around urban or suburban elementary and high schools, a large portion of the

participants lacked a device for every student all day that could be taken home (Bartolo, 2017;

Ciampa, 2014; Grant, et al., 2015; McEwen & Dube, 2015). The experiences of teachers who

lacked true one-to-one technology integration may not be transferable to the experiences of

teachers who have a device for every student to be used at school and at home. There is lack of

research on the experiences of teachers who use one-to-one technology in rural middle school

classrooms. The problem is that this void inhibits the ability of educators to benefit from the

experiences of their peers. The purpose of this transcendental phenomenological study is to

describe the experiences of middle teachers using one-to-one technology in schools in rural

North Carolina.

CHAPTER THREE: METHODS

Overview

The purpose of this transcendental phenomenological study was to describe the experiences of middle school teachers using one-to-one technology in schools in rural North Carolina. This chapter begins with a review of transcendental phenomenology and the appropriateness of using this design methodology for this study. Following the design, I will reintroduce the research questions, describe the site, participants, procedures, the role of the researcher, data collection methods, data analysis methods, trustworthiness, and ethical considerations. This chapter will end with a summary.

Design

This study uses a variation of the transcendental phenomenological research design described by Moustakas (1994). I will begin this section on the design used for my study by briefly examining the phenomenological research method. I will then go into a more detailed analysis of the processes of Moustakas' (1994) transcendental phenomenology.

A transcendental phenomenological research design is appropriate for this study because Moustakas states, "The researcher following a transcendental phenomenological approach engages in disciplined and systematic efforts to set aside prejudgments regarding the phenomenon being investigated . . ." (p.22). This study required me to set aside preconceived notions (epoche) in order to "be completely open, receptive, and naïve in listening to and hearing research participants describe their experience of the phenomenon being investigated" (Moustakas, 1994, p.22). This study used a variation of Moustakas' transcendental

phenomenological research design to describe the experiences of middle school teachers using one-to-one technology in schools in rural North Carolina.

What is Phenomenology?

Gall, Borg, and Gall (2007) define phenomenology as "the study of the world as it appears to individuals when they lay aside the prevailing understandings of phenomena and revisit their immediate experience of those phenomena" (p.648). The phenomenological researcher understands that a thorough description of the lived experiences of everyday life is imperative if the researcher desires to truly understand the essence of the phenomena being studied (Moustakas, 1994; Schutz, 1967). Phenomenology requires the researcher to lay aside his or her preconceived ideas so that the results are reflective of the lived experiences of the participants (Creswell & Poth, 2018; Gall, Borg, & Gall, 2007; Moustakas, 1994; Patton, 2015; Schutz, 1967). Edmund Husserl claimed that the phenomenological researcher must suspend the "natural attitude" through the process of epoche before he or she can look beyond the "mere appearance" of the phenomena to understand the true essence of the phenomena (Moustakas, 1994; Schutz, 1967). Phenomenology has three main branches, Husserl's transcendental phenomenology, Heidegger's hermeneutic phenomenology, and Merleau-Ponty and Sartre's existential forms of phenomenology.

Transcendental Phenomenology

Clark Moustakas developed his research design for transcendental phenomenology by intertwining the research designs of philosophers like René Descartes, Wilhelm Friedrich Hegel, Edmund Husserl, and Immanuel Kant (Moustakas, 1994). Though Moustakas claimed he wished to especially recognize Husserl as his most significant influence (Moustakas, 1994), he

included Descartes, Hegel, and Kant when discussing how he combined the human science research philosophies of the past together in order to develop his research design. Moustakas (1994) claims that like Husserl, he has the misfortune of being "in love with philosophy" (p. 25). Immanuel Kant was the first person to use the term phenomenology; however, Hegel was the first to construct a well-defined meaning (Moustakas, 1994).

According to Creswell and Poth (2018), "Moustakas's (1994) transcendental or psychological phenomenology is focused less on the interpretations of the researcher and more on a description of the experiences of participants" (p. 78). Schutz (1967) described the importance of phenomenological research by claiming:

> Whereas I can observe my own lived experiences only after they are over and done with, I can observe yours as they actually take place. This in turn implies that you and I are in a specific sense "simultaneous," that we "co-exist," that our respective streams of consciousness intersect. (p. 102)

Moustakas' Transcendental Phenomenological Major Processes

Moustakas' design incorporates the processes of epoche, transcendental-phenomenological reduction, imaginative variation, and textural-structural synthesis to explore and describe the experiences of people regarding a particular phenomenon. "Any phenomenon represents a suitable starting point for an investigation" (Moustakas, 1994, p.26). This study used the transcendental phenomenological methodology as a framework; therefore, it was necessary for me to provide a description of each of these processes. Due to the fluidity of a transcendental phenomenological study, some of the processes, such as epoche, will necessarily be repeated at several points throughout the study. Using these processes, I sought to describe

the experiences of middle school teachers using one-to-one technology in schools in rural North

Carolina.

Research Questions

Central Research: How do middle school teachers describe their daily experiences using one-

to-one technology in schools in rural North Carolina?

Supporting Research Question 1: How do middle school teachers describe their self-efficacy

regarding technology?

Supporting Research Question 2: How do middle school teachers describe their experiences

regarding technology and its integration with pedagogy?

Supporting Research Question 3: How do middle school teachers describe experiences

regarding technology and its integration with the content they teach?

Supporting Research Question 4: How do middle school teachers describe the challenges and

benefits of having one-to-one technology in the classroom?

Supporting Research Question 5: How do middle school teachers describe the professional

development opportunities they have or desire to have regarding the use of one-to-one

technology in the classroom?

Setting

Pseudonyms were used in place of all institutional names. Using pseudonyms helped me

to ensure confidentiality and minimal risks to participants. This study took place at Foothills

Rural Middle School (FRMS), East Rural Middle School (ERMS), and West Rural Middle

School (WRMS). All three middle schools are small rural middle schools in the Foothills of

North Carolina. This purposeful sampling allowed me to describe the lived experiences of

middle school teachers from rural middle schools. All three middle schools are located in my local school district which made it easier for me to conduct the interviews and focus groups in face-to-face settings. I am a middle school teacher and have no ability to influence any of the teachers' job security.

The demographics of ethnicity for Foothills Rural Middle School are: 85% Caucasian, 7% African American, 3% Asian, and 5% Hispanic. In FRMS, 75 % of the students are eligible for free or reduced lunch. In FRMS, 25% of students are living with one biological parent, 15% are not living with either biological parent, 35% are living with a biological parent and stepparent, and 25% are living with both biological parents. FRMS has seventh and eighth grades only. The core classes in FRMS are arranged in two four-man teams for both grades. Six core teachers have been teaching for less than 10 years and eight core teachers have been teaching over 10 years. Two of the core teachers have been teaching over 20 years.

The demographics of ethnicity for East Rural Middle School are: 80% Caucasian, 10% African American, 5% Asian, and 5% Hispanic. In ERMS, 80% of the students are eligible for free or reduced lunch. In ERMS, 30% of students are living with one biological parent, 10% are not living with either biological parent, 38% are living with a biological parent and stepparent, and 22% are living with both biological parents. ERMS has seventh and eighth grades only. The core classes in ERMS are arranged in two four-man teams for both grades. Eight core teachers have been teaching for less than five years and three core teachers have been teaching between five and 10 years. Three of the core teachers have been teaching over 20 years.

The demographics of ethnicity for West Rural Middle School are: 75% Caucasian, 10% African American, 7% Asian, and 8% Hispanic. In WRMS, 80% of the students are eligible for

free or reduced lunch. In WRMS, 30% of students are living with one biological parent, 30% are

not living with either biological parent, 20% are living with a biological parent and stepparent,

and 20% are living with both biological parents. WRMS has seventh and eighth grades only.

The core classes in WRMS are arranged in one four-man team and one five-man for both grades.

Three core teachers have been teaching for less than five years and two core teachers have been

teaching between five and 10 years. Three core teachers have been teaching over 10 years and

nine of the core teachers has been teaching over 20 years.

Participants

This study used purposeful sampling because in a phenomenological study all

participants must have experienced the phenomenon (Moustakas, 1994). Moustakas' main

criteria for choosing a participant was that he or she has experienced the phenomenon being

studied. I used purposeful sampling to get participants who are teachers experiencing using one-

to-one technology in the classroom (Patton, 2015). I informed all participants of the nature of

the study, obtain informed consent, ensure their confidentiality, and delineate the responsibilities

of myself and the participants (Moustakas, 1994). I also followed the ethical principles of

research.

To ensure maximum saturation, the participants in this study consisted of 12 core subject

teachers who were using one-to-one technology in their classrooms (Polkinghorne, 2005). The

sample size is appropriate to this study because a phenomenological study should consist of 10 to

25 participants (Polkinghorne, 2005). To ensure maximum variation and sample saturation I

chose two teachers from two of the research sites and multiple teachers from the same site. This

allowed me to choose multiple teachers who taught at both grade levels and multiple teachers

who taught each core subjects as participants in this study (Creswell & Poth, 2018; Polkinghorne, 2005). Pseudonyms were used for all participants to protect confidentiality and ensure minimal risks.

The pilot study participants were teachers at Foothills Rural Middle School. One pilot study participant was female, and the other pilot study participant was male. They ranged in age from 30-years-old to 60-years-old. The teaching experience of the pilot study participants ranged from six years to 20 years. The pilot study participants were core subject teachers who taught either the seventh or eighth grade. Both pilot study participants had his or her bachelor's degree. Using teachers from different grades, ages, levels of experience, and genders, I was able to view the phenomenon from many perspectives. This also allowed me to ensure that the interview questions accorded me a deeper understanding of the experiences of middle school teachers using one-to-one technology in schools in rural North Carolina.

The participants from Foothills Rural Middle School consisted of one male and seven female teachers. The teachers at FRMS included core teachers who have been teaching between two and one-half and 28 years. All of the teachers have at least a bachelor's degree, with two teachers having master's degrees and being National Board-Certified teachers.

The participants from East Rural Middle School consisted two female teachers. The teachers at ERMS will included core teachers who have been teaching between four and 10 years. One participant has her master's degree and the other participant has her bachelor's degree.

The participants from West Rural Middle School consisted of two female teachers. The teachers at WRMS included core teachers who have been teaching between nine and 28 years. Both of the participants from WRMS have master's degrees.

Procedures

In his book, *Phenomenological Research Methods*, Moustakas (1994) provided a detailed description of the procedures and methods for the transcendental phenomenological research design. These steps include finding a topic that has both a social meaning and significance, conducting a thorough literature review, setting the criteria for participants, informing participants about all aspects of the study, developing interview questions, conducting and recording interviews, and organizing and analyzing data to provide rich, thick descriptions that capture the essence of the experience (Moustakas, 1994).

The first step in this study was to complete an application seeking approval from Liberty University's Institutional Review Board (IRB). This application included a letter from the school district written on the district's letterhead granting permission to conduct this study at the selected schools. This letter granted me permission to interview teachers across the district. No data was collected until I received IRB, school district, and school administration approval.

Pilot testing was used to "refine and develop research instruments, assess the degrees of observer bias, frame questions, collect background information, and adapt research procedures" (Creswell & Poth, 2018, p. 165). The pilot testing consisted of two individual interviews, one focus group with both participants, and two completed questionnaires. The data from the teachers in the pilot study was included in this transcendental phenomenological study. The interview and focus group questions for the pilot test was used to verify that the questions could

be used to collect necessary information which allowed me to better understand the phenomenon of teachers' experiences using one-to-one technology more fully. Using the information obtained in the pilot study allowed me to adjust the questions before beginning the actual study.

Following the pilot study, I used purposeful sampling to select core teachers from each site.   I sent these teachers the consent form and a link to the questionnaire which I created in Google Forms. The questionnaire was used to provide demographic and professional information from the participants. The questionnaire was also used to access the participants' familiarity with TPACK theory.

Once I received the completed consent forms, I contacted each participant to set up times and dates for interviews. The one-hour individual interviews were conducted on workdays, before school, or after school and did not interfere with instructional time. The interviews were recorded using two small recording devices. All interviews were transcribed by me. Member checks were used to ensure accuracy of the transcripts (Creswell & Poth, 2018; Moustakas, 1994).

The focus group session took place during the teachers' planning time. Due to the need to conduct the focus group session, only eighth-grade teachers at FRMS participated in the focus group session. The focus group session lasted approximately an hour. The focus group discussion was transcribed by me. Member checks were used to ensure accuracy of the transcript (Creswell & Poth, 2018; Moustakas, 1994).

Using the framework as described by Moustakas (1994) which includes epoche, phenomenological reduction, imaginative variation, and structural-textural synthesis I conducted data analysis as each piece of data was collected. Using journaling, I practiced epoche

throughout the study to help me bracket out, personal feelings, experiences, and preconceptions that are related to the phenomenon of teachers' experiences using one-to-one technology in the classroom. I used phenomenological reduction to create "a textural description of the meanings and essences of the phenomenon" (Moustakas, 1994, p. 34). I constructed structural descriptions using imaginative variation to provide a picture of the experiences of teachers using one-to-one technology in the classroom and connect with it (Moustakas, 1994).

The Researcher's Role

I am the human instrument for this study and therefore must take measures to ensure that my personal bias and preconceived notions do not interfere with this study (Moustakas, 1994). I have five years' experience teaching middle school. I have been teaching at one of the research sites for the past four years. My job as a teacher does not place me in a position of authority over any of the participants.

I spent 15 years working in an office as a web designer, graphic artist, IT tech, and administrative assistant for the sales manager. I am a Christian and I believe in following the scripture from I Corinthians 10:31 (New International Version): "So whether you eat or drink or whatever you do, do it all for the glory of God." This guides my practice as a teacher and researcher. My philosophical assumption is ontological as I believe that people experience the world in diverse ways. This philosophical assumption causes me to lean toward transcendental phenomenology because I want to explore the lived experiences of people who are sharing the same experiences (Creswell & Poth, 2018; Moustakas, 1994; Patton; 2015).

Data Collection

Before any data was collected, I gained IRB approval from Liberty University and permission from the school district where the research sites are located. An explanation of the study and the participants' roles was provided. In addition to informing the participants of the nature of the study, the obtained informed consent ensured their confidentiality and delineated the responsibilities of me and the participants (Moustakas, 1994). Online consent forms were sent to all participants to be signed and returned before any form of data collection began (See Appendix C). I followed the ethical principles of research.

Triangulation of data is the process of using multiple methods of obtaining data on the same phenomenon to increase understanding and allow for increased reliability (Creswell & Poth, 2018; Moustakas, 1994; Patton, 2015). Triangulation of data was used in this study to increase the reliability of the data collected (Creswell & Poth, 2018; Moustakas, 1994; Patton, 2015). The data collection methods used were conducting interviews, generating discussion for a focus group, and creating an open-ended questionnaire. I refrained from leading the participants' answers or asking pointed questions (Moustakas, 1994). All questions, aside from demographic information, were semi-structured and open-ended.

The first step in the triangulation process for my study was the questionnaire. It was necessary for me to administer the questionnaire first because it was used to provide demographic information about the participants. The questionnaire also provided background information that helped me to make connections with the participants.

The second step in the triangulation process for my study was the individual interview. It was fitting for the individual interview to follow the questionnaire because the questionnaire

provided me with information that helped to guide my individual interviews. The individual interview was the logical next step because the individual interview is the main source of data in a transcendental phenomenological study (Moustakas, 1994; Schutz, 1967).

The third step in the triangulation process for my study was the focus group interview. "Focus groups sometimes are used by researchers to explore such phenomena as individuals' reactions to educational programs and practices" (Gall, Gall, & Borg, 2005, p.313).The focus group interview was the logical next step because at this point, the questionnaires and individual interviews had been completed. The questionnaire and individual interviews helped me to build a repertoire with the participants and made the focus group feel more relaxed.

Surveys/Questionnaires

This study required me to create an open-ended questionnaire for participants (See Appendix D). I created the questionnaire using Google forms. Participants completed the questionnaire at the beginning of the study to provide demographic information, describe their familiarity with TPAK concepts, and record their thoughts when the one-to-one concept was first introduced to them. The questionnaire took approximately 30 minutes to complete and participants were able to complete them online at their convenience.

Open-ended questions were used to help collect demographic information and to help me select participants for the study. This information also aided the imaginative variation process for the development of structural descriptions (Moustakas, 1994). The open-ended questions also provided an opportunity for the participants to describe their thoughts when the integration of one-to-one technology was first introduced. This helped me to use thick rich descriptions for the structural description of individual experiences (Moustakas, 1994).

Questionnaire pilot testing. Pilot testing of this questionnaire was used to ensure that the data collected would be useful for helping with participant selection and that the questions were appropriate for the central research question. The pilot test participants were the same participants as the individual interview pilot test participants.

Demographic Questionnaire Questions

1. What school are you at? (The name of the school will be changed for the study.)

2. What is your name? (This will be changed for the study.)

3. Please choose your age range: 20 to 30, 31 to 40, 41 to 50, 51 to 60, 61 or older.

4. What is your gender?

5. What is the highest level of education you have received?

6. What subject and grade level do you teach?

7. How long have you been teaching this grade level?

8. Describe your thoughts when the integration of one-to-one technology was first introduced to you.

9. Describe the setting where the integration of one-to-one technology was first introduced to you.

Questions one through seven were used to collect demographic information which aided the imaginative variation process for the development of structural descriptions. This helped me to choose participants for this study and aided in the creation of rich thick descriptions of the individual experiences.

Question eight provided an opportunity for the participants to describe their thoughts when the integration of one-to-one technology was first introduced. This helped me to create thick rich descriptions for the structural description of individual experiences.

Question nine provided an opportunity for the participants to describe their setting when the integration of one-to-one technology was first introduced. This helped me to create thick rich descriptions for the structural description of individual experiences.

Interviews

Due to the nature of transcendental phenomenological research, interviews are the main source of data collection used by the researcher (Moustakas, 1994). Semi-structured, informal, and interactive interviews which take place in a comfortable setting are the main source of data collection for a transcendental phenomenological study (Moustakas, 1994). Unlike structured interview questions which cannot be changed, semi-structured interview questions can be altered as needed to allow the participants to share their experiences (Creswell & Poth, 2018; Patton, 2015). Semi-structured interview questions allow the researcher to ensure that the interview meets the purpose of the study unlike unstructured interviews, which have a risk of not answering the research question (Creswell & Poth, 2018; Patton, 2015). Using semi-structured interviews allowed me to alter, add, or exclude questions as needed during the interview process. Semi-structured, informal, and interactive interviews were appropriate for this study because as Moustakas states:

> The phenomenological interview involves an informal, interactive process and utilizes open-ended comments and questions. Although the primary researcher may in advance develop a series of questions aimed at evoking a comprehensive account of the person's

experience of the phenomenon, these are varied, altered, or not used at all when the co-

researcher shares the full story of his or her experience of the bracketed question. (p.114)

In order to discover the essence of each teacher's lived experience, it was necessary for me to develop broad, open-ended interview questions (See Appendix E). These questions allowed the voice of the participants to be fully shared (Creswell & Poth, 2018). The first questions were icebreaker questions that were used to establish trust between me and the participants (Patton, 2015). An establishment of trust helped participants to be comfortable enough to be honest and forthcoming with their answers.

Through semi-structured interviews, I gained a deeper understanding of the essence of the experiences of the participants in my study. These interviews took place in a comfortable setting, were informal, and were interactive. To discover the true essence of each participant's experience, it was necessary for me to develop broad, open-ended interview questions. These questions allowed the participants to share the essence of the experience in their own voices (Creswell & Poth, 2018).   The first questions were icebreaker questions that were used to establish trust (Patton, 2015). The establishment of trust ensured that the participants feel safe enough to be honest and forthcoming with their answers.

In transcendental phenomenological research, all interviews must be recorded and transcribed verbatim (Moustakas, 1994). Member checks by the participants should be used to establish credibility (Creswell & Poth, 2018). This was accomplished by providing each participant a copy of his or her completed transcript (Moustakas, 1994). Using member checks allowed the participants to check for errors or ask for statements to be excluded that were too personal or that he or she felt revealed his or her identity.

Each teacher chosen for this study participated in a single interview that lasted approximately one hour. The interviews were recorded using two small recording devices. The devices were tested before each interview to ensure they were in working order. The recordings will be kept confidential. The interviews took place in the teachers' classrooms which allowed me to experience the lived experience of the classroom setting. Conducting interviews in the teacher's classroom also aided in creating a safe and inviting atmosphere for the participants. These interviews took place during teacher workdays, planning periods, and during school breaks and did not interfere with instruction time.

All interviews were recorded and transcribed verbatim (Moustakas, 1994). Member checks by the participants were used to establish credibility (Creswell & Poth, 2018). A copy of the completed transcript was sent to each participant. This allowed the participants to check for errors or to ask that statements be excluded that were considered too personal or revealing. **Pilot interviews**. I used pilot interviews to help me test the validity of the interview questions. The pilot interviews lasted approximately an hour per interview. Pilot interviews took place in the participants' classrooms. Pilot interviews were conducted during teacher workdays, planning periods, or during school breaks so as not to interfere with instruction time. The pilot study participants were not participants in my actual study.

I used convenience sampling for the pilot study. The participants in the pilot study consisted of two middle school teachers from Foothills Rural Middle School as more of these teachers volunteered to be part of my study upon IRB approval. According to Gall, Gall, and Borg (2007), convenience sampling can be used as a sampling method "assuming, of course, that the sample suits the purpose of the study" (p. 175). Anne has been teaching for 17 years and

teachers eighth grade English Language Arts. Robbie has been teaching for six years and teaches seventh grade Social Studies.

Standardized Semi-Structured Open-Ended Interview Questions

1. Please introduce yourself to me, as if we had never met before.

2. Please walk me through a typical day in your classroom.

3. Please you tell me about some of your favorite teaching memories.

4. What made them special to you?

5. Please tell me about any particularly challenging moments you experienced while teaching?

6. What made them so challenging?

7. How would you describe your level of comfort using technology outside of the classroom?

8. How would you describe your level of comfort using technology in the classroom?

9. Please describe a successful lesson you have designed that uses technology.

10. What made this lesson particularly effective?

11. Please describe an unsuccessful lesson you have designed that uses technology.

12. What made this lesson particularly ineffective?

13. Please describe how one-to-one technology influences your pedological decisions?

14. Please describe how one-to-one technology influences the way you present content to your students?

15. How would you describe professional development related to one-to-one technology integration offered at your school or district level?

16. Please describe professional development related to technology that would be especially useful for you.

17. What insight could you offer to a teacher whose school is integrating one-to-one technology for the first time?

18. Please share anything that you would like to add regarding one-to-one technology in the classroom.

Questions one through six are social questions that helped to create a "relaxed and trusting atmosphere" (Moustakas, 1994, p.114).

Questions seven and eight were designed to help the participant focus on his or her self-efficacy using one-to-one technology in the classroom. These questions helped to answer RQ1. The ways teachers integrate technology depends upon their self-efficacy and comfort level with the type of technology needed for the content being taught (Bartolo, 2017; Davies, 2017; Harper & Milman, 2016; Lefter & Petrovici, 2016; Mishra & Koehler, 2006; Prensky, 2001; Zheng, et al., 2016).

Questions nine through 12 were designed to help the participant focus on the challenges and benefits that he or she has experienced using one-to-one technology in the classroom. These questions helped to answer RQ4. While several studies have found that the integration of technology increases student motivation and can improve learning (Acai, et al., 2014; Bartolo, 2017; Bebell & O'Dwyer, 2010; Chadli, Bendella, & Tranvouez, 2015), others have found that a lack of professional development may impede the ability of teachers to incorporate technology in the classroom (Anthony, 2012; Beeson, Journell, & Ayers, 2014; Burns & Polman, 2006).

Question 13 was designed to help the participant focus on his or her experiences integrating one-to-one technology with pedagogy in the classroom. This question helped to answer RQ2. Although teachers may be experts in the content they teach, teachers must also rely upon the use of research verified pedagogical practices to keep students engaged (Mishra & Koehler, 2006; Schunk, 2016; Shulman, 1986).

Question 14 was designed to help the participant focus on his or her experiences integrating one-to-one technology with content in the classroom. This question helped to answer RQ3. Students need to be provided with authentic, relevant learning experiences (NMSA, 2010; Schunk, 2017; Smith, 2011) and technology has the potential to provide these experiences when teachers are trained in the use of appropriate technologies, programs, and applications for their content areas (Beeson, et al., 2014; Mishra & Koehler, 2006; Yim, Warschauer, & Zheng, 2016).

Questions 15 and 16 invited the participant to discuss professional development. This question helped to answer RQ5. Mishra and Koehler (2006) claimed that professional development often focus on specific software and hardware, while lacking ways to integrate these with content and pedagogy.

Question 16 and 17 allowed the participant to take assume the role of the expert using one-to-one technology in the classroom (Creswell & Poth, 2018).

Question number 18 is a one-shot question (Patton, 2015). This closing question invited the participant to share any experiences that he or she did not share during the interview.

Focus Group

This study required me to use ice-breaker questions that were used to generate discussions for a focus group (See Appendix F). I conducted one focus group session at FRMS.

The focus group session was held in the media center at the site and lasted approximately 30 minutes to an hour. This neutral setting was used to help the participants feel more relaxed and willing to share with the group. Snacks were also provided to help create a relaxed atmosphere. I conducted one focus group interview at FRMS after all participants from that site had completed their individual interviews. All the participants involved were eighth-grade core teachers who had completed individual interviews. The focus group session was recorded using two small recording devices. The recording devices were tested before the focus group session. The recordings will be kept confidential.

Focus Group Questions

1. I would like each of you to tell me a little bit about yourself.

2. Please describe how technology has affected you as a professional educator.

3. How would you describe the support offered by your peers regarding technology integration?

4. How would you describe the support offered by your school administration or district regarding technology integration?

5. I would like each of you to offer insight into strategies that may be useful for other educators using one-to-one technology in the classroom.

6. Please add anything that you can regarding your experiences using one-to-one technology in the classroom.

Question one served as an icebreaker question and helped to create a "relaxed and trusting atmosphere" (Moustakas, 1994, p.114).

Questions two through four invited the participants to discuss their experiences using

technology and any support they received. Mishra and Koehler (2003) claim that teachers need to learn by design and should do this by sharing knowledge and working in groups to solve problems.

Question five allowed the participants to assume the role of expert (Creswell & Poth, 2018).

Question six was a closing question and allowed the participants a final chance to share any pertinent information regarding their lived experiences using one-to-one technology in the classroom (Creswell & Poth, 2018).

Data Analysis

I used the modified van Kaam method for data analysis that was suggested by Moustakas (Moustakas, 1994). This section will begin with an explanation of the modified van Kaam method and then expound upon Moustakas' transcendental phenomenological procedures.

Using the complete transcription of each research participant:

1. *Listing and Preliminary Grouping*

   List every expression relevant to the experience. (Horizontalization)

2. *Reduction and Elimination:* To determine the Invariant Constituents:

   Test each expression for two requirements.

   a. Does it contain a moment of the experience that is a necessary and sufficient constituent for understanding it?

   b. Is it possible to abstract and label it? If so, it is a horizon of the experience. Expressions not meeting the above requirements are eliminated.

   Overlapping, repetitive, and vague expressions are also eliminated or

presented in more exact descriptive terms. The horizons that remain are the invariant constituents of the experience.

3. Clustering and Thematizing the Invariant Constituents:

Cluster the invariant constituents of the experience that are related into a thematic label. The clustered and labeled constituents are the core of themes of the experience.

4. Final Identification of the Invariant Constituents and Themes by Application Validation

Check the invariant constituents and their accompanying theme against the complete record of the research participant. (1) Are they expressed explicitly in the complete transcription? (2) Are they compatible, if not explicitly expressed? (3) If they are not explicit or compatible, they are not relevant to the co-researcher's experience and should be deleted.

5. Using the relevant, validated invariant constituents and themes, construct for each co-researcher as *Individual Textural Description* of the experience. Include verbatim examples from the transcribed interview,

6. Construct for each co-researcher and *Individual Structural Description* of the experience based on the Individual Textural Description and Imaginative Variation.

7. Construct *for each research participant a Textural-Structural Description* of the meanings and essences of the experience, incorporating the invariant constituents and themes.

From the Individual Textural-Structural Descriptions, develop a *Composite*

Description of the meanings and essences of the experience, representing the

group as a whole (Moustakas, 1994, pp.120-121)

This method required me to use complete transcriptions from each interview for the

purposes of horizonalization, reduction and elimination, clustering and thematizing of invariant

constituents, application validation, individual textural descriptions, individual structural

description, individual textural-structural descriptions, and a composite description of the

essences of the whole group (Moustakas, 1994). This section will describe how I used each step

of Moustakas' method to explore and describe the experiences of middle school teachers using

one-to-one technology in schools in rural North Carolina.

Epoche

Transcendental phenomenology is a design framework that allows researchers to see the

phenomenon in a new way as if it were the first time the phenomenon has been experienced

(Creswell & Poth, 2018). According to Moustakas (1994), Descartes and Kant both perceived

the "critical values of returning to the self to discover the nature and meaning of things as they

appear in their essence" (Moustakas, 1994, p. 26). It was the return to self that Husserl

developed into the concept of epoche. During the process of epoche, it is necessary to eliminate

all suppositions in order to generate new knowledge (Moustakas, 1994).

The process of epoche required me to journal about my preconceived notions about using

one-to-one technology in the classroom. As a current classroom teacher with a history working

as an IT tech, web designer, and graphic artist, it was vital for me to look at the experiences of

teachers using technology in the classroom through an unbiased lens. Epoche necessitated that I

return to myself to make sure that I did not examine the experiences of others through my

personal opinions and experiences (Moustakas, 1994).

Horizonalization

Once the interviews were transcribed, horizonalization was the next step. There are

unlimited horizons for every phenomenon. By using maximation variation I was able to describe

the experiences of middle school teachers using one-to-one technology in schools in rural North

Carolina. Horizonalization of data required me to regard "every horizon or statement relevant to

the topic and question as having equal value" (Moustakas, 1994, p. 118). In the horizonalization

process, every statement has equal value. Moustakas (1994) stated, "No horizon lasts

indefinitely, regardless of wish, hope, or fear" (p.95). Because no horizon lasts forever,

phenomenological reduction and elimination were the logical next step.

Reduction and Elimination

Reduction and elimination was the step that required me to analyze the data to determine

the invariant constituents, also known as horizons (Moustakas, 1994). Invariant constituents

must "contain a moment of the experience that is a necessary and sufficient constituent for

understanding it" (Moustakas, 1994, p. 121). I had to be able to abstract and label invariant

constituents in order for them to be horizons of the experience. I eliminated overlapping,

repetitive, and vague expressions and presented them in more exacting descriptive terms

(Moustakas, 1994). "The horizons that remain are the invariant constituents of the experience"

(Moustakas, 1994, p. 121)

Transcendental-phenomenological reduction. The process in Moustakas' design which

follows epoche is the transcendental-phenomenological reduction (Patton, 2015). Moustakas

used the name transcendental-phenomenological reduction because every experience is considered as unique and is explored and explained as if it were experienced for the first time. Textural or noematic, descriptions are derived from this uncovering of the phenomenon. Noematic descriptions are explained as "perceived as such" by Moustakas (1994). It is the pure description of the experience void of preconceived notions.

Transcendental-phenomenological reduction required me to look at each teacher's experience as a unique experience in and of itself (Moustakas, 1994). Following Moustakas' process, I recorded a pure description of each experience as if it were experienced for the first time. Creswell and Poth (2018) drew from Moustakas when they explained this process. The process of transcendental-phenomenological reduction allowed me to develop a list of significant statements, group the statements into emerging themes, and then use that information to describe "what" the participants experienced.

Clustering and Thematizing of Invariant Constituents

Once the invariant constituents were identified, I began to search for themes. I labeled recurring themes. The invariant constituents were clustered into thematic units which became "the core themes of the experiment" (Moustakas, 1994, p. 121).

Application Validation

Application validation is the process that I used to be describe the themes that were recurring in the study. These themes had to be "explicitly expressed in the completed transcriptions" (Moustakas, 1994, p.121) and had to be necessary to understand the lived experience of the participant. Themes that were not relevant or explicated expressed were not used by me in this study.

Individual Textual Descriptions

Individual textual descriptions were used to explicate the experiences of the participants. I used verbatim examples from the interview transcripts, focus group transcript, and questionnaire to support emerging themes. Moustakas called this process in his design transcendental-phenomenological reduction (Moustakas, 1994). Moustakas used the name transcendental-phenomenological reduction because every experience is considered as unique and is explored and explained as if it were experienced for the first time. Textural or noematic, descriptions are derived from this uncovering of the phenomenon. Noematic descriptions are explained as "perceived as such" by Moustakas (1994). It is the pure description of the experience void of preconceived notions.

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Individual Structural Descriptions

The process of imaginative variation allows the researcher to grasp the structural, or noetic, the essence of the experience. Imaginative variation requires the researcher to view the

experience from a myriad of angles. This enables the researcher to comprehend that path to the truth of the experience is not singular, but many themes will emerge to build the structural descriptions of the phenomenon. Just as the noetic experience of exploring a tree requires the viewer to view the tree from every angle in order to "know" that particular tree, imaginative variation requires the researcher to use imagination and frames of reference to explore the individual experience.

Imaginative Variation

The process of imaginative variation allowed me to grasp the structural, or noetic, the essence of the experience. Imaginative variation required me to view the experience from a myriad of angles. This enabled me to comprehend the fact that the path to the truth of the experience is not singular, but many themes emerged to build the structural descriptions of the phenomenon. Just as the noetic experience of exploring a tree requires the viewer to view the tree from every angle in order to "know" that particular tree, imaginative variation required me to use imagination and frames of reference to explore the individual experience.

Imaginative variation required me to look at the phenomenon in relation to the setting and context in which it took place. I had to look at the demographics of the school system, student to teacher ratio, the teacher's level of experience in both pedagogical-content knowledge and technological pedagogical-content knowledge, professional development access, and classroom setting. Each of these angles helped me to provide a description of "how" the experience happened.

Textural-Structural Synthesis

The final stage in Moustakas' transcendental phenomenological research design is a textural-structural synthesis "of the essences of the experience of the phenomenon as a whole" (Moustakas, 1994, p. 190). This synthesis is a combing of transcendental-phenomenological reduction and imaginative variation processes. This is what Moustakas referred to as the description of the essence of the experience (Moustakas, 1994). The textural-structural synthesis tells both "what" was experienced and "how" it was experienced.

The textural-structural synthesis for my study required me to write a rich, thick description of the experiences of middle school teachers using one-to-one technology in schools in rural North Carolina. This description was a combination of the pure descriptions of each teacher's experience and the many angles that the experience can be viewed. The textural-structural synthesis allowed me to get to the "essence" of the phenomenon of the experiences of middle school teachers using one-to-one technology in schools in rural

Trustworthiness

Trustworthiness in qualitative research refers to the researcher using verified methods to establish credibility, dependability and confirmability, and transferability. This study required me to use validation strategies from the lens of the participant and readers as well as my personal lens (Creswell & Poth, 2018). The following methods were used in this study to address trustworthiness: credibility through triangulation of data, dependability through epoche, confirmability through member checks and a peer review, and transferability of the study through rich thick descriptions (Creswell & Poth, 2018).

Credibility

Triangulation of data was used to establish credibility. The process of triangulation increased the reliability of the study by "corroborating evidence from different sources to shed light on a theme of perspective" (Creswell & Poth, 2018, p. 260). Triangulation of data was accomplished by using the evidence from interviews, focus groups, and questionnaires to discover themes and perspectives. Triangulation of data was an ongoing process that I used as data was collected. Triangulation of data was an acceptable means of establishing credibility because I used multiple sources and methods to provide corroborating evidence (Creswell & Poth, 2018).

Dependability and Confirmability

Epoche was incorporated by me for dependability. The process of epoche required me to journal about my own experiences and preconceived notions of the integration of the phenomenon. I included a short, relevant, biographical description of my own experiences that described my personal level of comfort and expertise with computer software and my role as an educator as this could have influenced the way I interpreted the lived experiences of the participants. The process of epoche helped me to view the participants experiences without suppositions (Moustakas, 1994).

Member checking allowed me to confirm the accuracy of the interview transcriptions (Moustakas, 1994). The participants were given a copy of the transcripts from their interviews so that the transcripts could be checked for accuracy. This was important because I could have misinterpreted nonverbal cues or misunderstood responses. Participants were also allowed to

request that some responses not be used if they failed to truly represent the lived experience of the participant.

A peer review was used as a means of confirmability (Creswell & Poth, 2018). I gave the data, without any identifiable information, to someone who is familiar with the topic for review. This peer was knowledgeable enough about the topic to make sure that the data collected was within the scope of the study and past research. This was a crucial step to keep me honest in my reporting. The names of the participants and schools remained anonymous during this process to protect the privacy of all participants.

Transferability

I described the site, participants, and the phenomenon with thick rich descriptions to create a picture of the experience for the reader (Creswell & Poth, 2018). This rich thick description allows possible duplication of the study. The rich thick description may also be used to provide possible transferability to educators at a similar site. This process required me to revisit the raw data from my interviews immediately following their "collection to add further descriptions that might be helpful during the analysis" (Creswell & Poth, 2018). By quickly devoting time to revisit my interviews, I was better prepared to combine the noematic and noetic experiences of the participants.

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Ethical Considerations

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Ethical considerations must be a priority when performing human research. Member checks allowed the participants the opportunity to ask for any part of the interview they are uncomfortable with to be excluded (Creswell & Poth, 2018; Moustakas, 1994). According to Moustakas, the ethical standards that must be considered are that the researcher has,

established clear agreements with the research participants, recognized the necessity of

confidentiality and informed consent, and developed procedures for insuring full

disclosure of the nature, purpose, and requirements of the research project. (1994, p.109)

I did not begin collecting data until the study has been reviewed and approved by the IRB

at Liberty University. To ensure confidentially of participants and research sites, all participants

and sites were referred to using pseudonyms. Collected data has been kept in password protected

folders or in a locked safe in my home to ensure protection of data. I participated in epoche

through journaling activities to reduce researcher bias. All participants were reminded that they

could withdraw from the study at any time and that their identities will be kept confidential.

Summary

Chapter three described the transcendental phenomenological qualitative research

methods that were used in this study to examine the lived experiences of middle school teachers

using one-to-one technology in schools in rural North Carolina. The central research question

sought to how participants describe their experiences using one-to-one technology in the

classroom. Sub questions were developed to further provide inquiry on specific areas related to

my guiding theory, TPACK (Creswell & Poth, 2018).   The study took place at three middle

schools within the same district and required IRB approval and school district approval before

collection of data was able to begin.

I have described my role as the researcher and discussed the use of epoche as a method of

bracketing myself out of the data analysis (Moustakas, 1994). I described each interview and

focus group question, providing a rationale for each questions' inclusion in the study. I also

discussed how I used the answers from the questionnaire as a means of collecting demographic

information and participant selection. I analyzed data using epoche, horizontalizing, phenomenological reflection and imaginative variation to provide thick textual and structural descriptions of the experience which will culminate in a description of the essence of the phenomenon (Moustakas, 1994).

Chapter three also provided a description of how trustworthiness was addressed. Credibility was ensured through triangulation of data, dependability through epoche, confirmability through member checks and a peer review, and transferability of the study through rich thick descriptions (Creswell & Poth, 2018). Ethical considerations were also addressed in this chapter.

CHAPTER FOUR: FINDINGS

Overview

The purpose of this transcendental phenomenological study was to describe the experiences of middle school teachers using one-to-one technology in schools in rural North Carolina. This chapter provides a description of the 12 middle school teachers who participated in this study. The participants are first described using the demographic information and initial responses that shared using the online questionnaire. Following the initial participant descriptions, this chapter contains a table (see Table 1 Participant Demographic Information) of the information garnered from the questionnaire. The table is followed by a narrative of the individual participants' responses to the research questions which were gathered through individual interviews. Following the research question responses, this chapter provides a synthesized description of the focus group discussion session. This chapter also introduces results from the study through the research questions and discusses emerging themes in the context of the research questions, which were aligned to the TPACK theoretical framework that was used for this study, and will end with a summary.

Participants

According to Moustakas (1994), a main criterion for choosing a participant is that he or she has experienced the phenomenon being studied. Following the IRB guidelines, I emailed a rural school district to gain permission to complete my study. Using purposeful sampling, I emailed a recruitment letter (see Appendix B Recruitment Letter) to all core middle school teachers working in the participating rural school district. Once I received the completed consent form (see Appendix C Informed Consent Form) and questionnaire (see Appendix D Participant

Demographic Questionnaire), I set up interview times with the 12teachers who agreed to participate.

To ensure maximum saturation, this study consisted of 12 core subject teachers who were using one-to-one technology in their classrooms (Polkinghorne, 2005). The interviewed teachers consisted of two eighth-grade English teachers, two seventh-grade English teachers, two eighth-grade math teachers, one seventh-grade math teacher, two eighth-grade science teachers, one eighth-grade science teacher, two eighth-grade social studies teachers, and one eighth-grade social studies teachers. Two of the participants were in the age range of 20-29, four were in the age range of 30-39, five were in the age range of 40-49, and two participants were in the age range of 50-59. One male and 11 female participants were interviewed for this study. The participants came from three separate middle schools within the participating district. This diversity of participants ensured maximum variation in this study (Moustakas, 1994). All participant and school names were replaced with pseudonyms to allow anonymity.

All interviews were recorded using two small recording devices just in case there was a technological failure with one of the devices. These recordings were transcribed verbatim by me and the transcriptions were sent to the participants to ensure accuracy by using member checking (Moustakas, 1994). All of the participants' quotes shared in this chapter were written verbatim and included verbal ticks, vernacular, and grammatical errors in both writing and speech. I used verbatim quotes to allow me to share the authentic lived experiences of participants who were sharing the phenomenon of teaching a core subject in a rural middle school that provides one-to-one technology in the classroom (Moustakas, 1994). Table 1 describes the demographic data of the research participants.

Table 1

Participant Demographic Information

Pseudonym	Site	Age	Gender	Education	Content	Grade	Experience
Erika	ERMS	41-50	Female	Master's	English	8	10
Jessie	ERMS	41-50	Female	Bachelor's	English	7	4
Camilla	FRMS	51-60	Female	Master's	Social Studies	8	28
Hope	FRMS	21-30	Female	Bachelor's	Science	8	2.5
Irene	FRMS	31-40	Female	Master's	Math	8	15
Kim	FRMS	21-30	Female	Bachelor's	Science	8	5
Matilda	FRMS	41-50	Female	Master's	Science	7	6
Peggy	FRMS	51-60	Female	Bachelor's	English	7	15
Suzanne	FRMS	31-40	Female	Bachelor's	Math	8	12
Todd	FRMS	41-50	Male	Bachelor's	Social Studies	8	20
Meagan	WRMS	30-39	Female	Master's	English	8	9
Robin	WFMS	40-49	Female	Master's	Math	7	28

Camilla

Camilla is between 51 and 60 years old and has been teaching for 28 years. She is currently teaching eighth-grade social studies. Camilla has taught English, science, and social studies during her teaching career. She has taught sixth, seventh, and eighth grade. Camilla is a

National Board-certified teacher and has a master's degree. Camilla is currently teaching at Foothills Rural Middle School.

Camilla's verbatim response to the following question from the questionnaire: describe your thoughts when the integration of one-to-one technology was first introduced to you was, "I was happy that we did not have share technology anymore. I was also nervous because it is frustrating when you don't know how to do everything." Her response to the second question from the questionnaire, describe the setting where the integration of one-to-one technology was first introduced to you, was "It was in the back of the media center at a grade-level meeting. There were eight teachers, the media center coordinator, the principal, assistant principal, and someone from the county office."

Erika

Erika is between 41 and 50 years old and has been teaching for 10 years. She is currently teaching eighth-grade English. Erika has taught both seventh, and eighth grade. Erika is a National Board-certified teacher and has a master's degree. Erika is currently teaching at East Rural Middle School.

Erika's response to the following question from the questionnaire: describe your thoughts when the integration of one-to-one technology was first introduced to you was, "I was excited and a little apprehensive." Erika responded to the second question from the questionnaire, describe the setting where the integration of one-to-one technology was first introduced to you, by typing, "I don't remember exactly where it was. I was either in the media center or hallway."

Hope

Hope is between 21 and 30 years old and has been teaching for two and one-half years. She is currently teaching eighth-grade science. During her first half-year teaching, Hope taught sixth, seventh, and eighth grades in one combined class. She also taught a combined class of Physical Science, Biology, and Earth Science to high school freshman and sophomores during that half year. Hope is currently teaching at Foothills Rural Middle School.

Hope's response to the following question from the questionnaire: describe your thoughts when the integration of one-to-one technology was first introduced to you was, "I have always had one-to-one technology, but I am really glad to have it." Hope responded to the second question from the questionnaire, describe the setting where the integration of one-to-one technology was first introduced to you, by typing "I had one-to-one technology in high school and it was in the school I did my student teaching in."

Irene

Irene is between 31 and 40 years old and has been teaching for 15 years. She has a master's degree and teaches eighth-grade math. Irene also has experience teaching seventh grade math. She is currently teaching at Foothills Rural Middle School.

Irene's response to the following question from the questionnaire: describe your thoughts when the integration of one-to-one technology was first introduced to you was, "I thought it will be wonderful for assessments, but it is just a tool." Her response to the second question from the questionnaire, describe the setting where the integration of one-to-one technology was first introduced to you, was "I first heard about the one-to-one roll out during a grade-level meeting in the back of our media center."

Jessie

Jessie is between 41 and 50 years old and has been teaching for four years. She is currently teaching seventh-grade English. Jessie has taught both social studies and English during her teaching career. Jessie also has experience teaching sixth, seventh, and eighth grades. Jessie is currently teaching at East Rural Middle School.

Jessie's response to the following question from the questionnaire: describe your thoughts when the integration of one-to-one technology was first introduced to you was, "I was very hesitant, as this approach to education was not something I had ever utilized until this point." Her response to the second question from the questionnaire, describe the setting where the integration of one-to-one technology was first introduced to you, was "It was introduced during a grade level meeting."

Kim

Kim is between 21 and 30 years old and has been teaching for five years. She is currently teaching eighth-grade science. Kim has taught both math and science during her teaching career. Kim also has experience teaching sixth, seventh, and eighth grade. Kim is currently teaching at Foothills Rural Middle School.

Kim's response to the following question from the questionnaire: describe your thoughts when the integration of one-to-one technology was first introduced to you was, "My first thought was how will I use the technology effectively. I did not want to simply let it take the place of a delivery method, but actually use the tool to supplement the students' learning." Her response to the second question from the questionnaire, describe the setting where the integration of one-to-one technology was first introduced to you, was "I was introduced to the idea in college, but we

did not ever expound on the idea and how to effectively use it in the classroom. When my previous school went one-to-one a few years ago, it was pretty much a sink or swim type of mentality. By the time I had moved to the new county, I had already experienced being one-to-one for a few years."

Matilda

Matilda is between 41 and 50 years old and has been teaching for six years. She is currently teaching seventh-grade science. Matilda is a National Board-certified teacher and has a master's degree. Matilda has taught both seventh and eighth grades during her teaching career. Matilda is currently teaching at Foothills Rural Middle School.

Matilda's response to the following question from the questionnaire: describe your thoughts when the integration of one-to-one technology was first introduced to you was, "I thought it was really great that I would not have to try to get a cart anymore." Her response to the second question from the questionnaire, describe the setting where the integration of one-to-one technology was first introduced to you, was "I was a grade-level meeting with several people and a person from the county office. We had a chance to ask questions and they told us how they were going to support us as we tested it."

Meagan

Meagan is between 31 and 40 years old and has been teaching for nine years. She is currently teaching eighth-grade English. Megan is a National Board-certified teacher and has a master's degree. Megan is currently teaching at West Rural Middle School.

Meagan's response to the following question from the questionnaire: describe your thoughts when the integration of one-to-one technology was first introduced to you was, "I was

so excited. Allowing students to have their own free piece of technology helped me expand all kinds of learning opportunities." Her response to the second question from the questionnaire, describe the setting where the integration of one-to-one technology was first introduced to you, was "in my classroom."

Peggy

Peggy is between 51 and 60 years old, has fifteen years teaching experience, and is teaching eighth-grade English. She has taught both elementary and middle school English. She has also worked as an academically or intellectually gifted (AIG) student specialists. Peggy is returning to teaching after taking a few years off to take care of her grandchildren. Peggy is currently teaching at Foothills Rural Middle School.

Peggy's response to the following question from the questionnaire: describe your thoughts when the integration of one-to-one technology was first introduced to you was, "I was really nervous because I am not used to using technology." Her response to the second question from the questionnaire, describe the setting where the integration of one-to-one technology was first introduced to you, was "I was in my classroom getting setup when I was told that I had to attend PD sessions on one-to-one technology. I was introduced to what one-to-one technology meant in the classroom during PD at the high school."

Robin

Robin is between 41 and 50 years old and has been teaching for 28 years. She is currently teaching seventh-grade social studies. Robin has also taught sixth-grade math during her teaching career. Robin has a master's degree and is currently teaching at West Rural Middle School.

Robin's response to the following question from the questionnaire: describe your thoughts when the integration of one-to-one technology was first introduced to you was, "I was confused as to how I could use this type of technology daily with math. Math is a hands-on subject and with the one-to-one concept, it creates a new dynamic in the math classroom." Her response to the second question from the questionnaire, describe the setting where the integration of one-to-one technology was first introduced to you, was "Central Office Board Room.....filled with lots of teachers who were hearing this roll-out plan for the first time."

Suzanne

Suzanne is between 31 and 40 years old and has been teaching for 12 years. She is currently teaching eighth-grade math and high school Math I to eighth-grade students. Suzanne is currently teaching at FRMS.

Suzanne's response to the following question from the questionnaire: describe your thoughts when the integration of one-to-one technology was first introduced to you was, "That will be amazing! I was also hoping we would have content specific training on how to use the Chromebooks in the classroom." Her response to the second question from the questionnaire, describe the setting where the integration of one-to-one technology was first introduced to you, was "It was a grade level meeting. Everyone else was excited too!"

Todd

Todd is between 41 and 50 years old and has been teaching for 20 years. He is currently teaching eighth-grade social studies. Todd taught both seventh and eighth-grade social studies. Todd is currently teaching at Foothills Rural Middle School. Thomas was one of the first teachers to teach at FRMS.

Todd's response to the following question from the questionnaire: describe your thoughts when the integration of one-to-one technology was first introduced to you was, "I was glad to have the resources available for my students." Table 2 shows the demographic information of the focus group participants. His response to the second question from the questionnaire, describe the setting where the integration of one-to-one technology was first introduced to you, was "It was during a grade-level meeting in the back of our media center."

Table 2

Focus Group Participant Demographic Information

Participants Pseudonyms	Site	Age	Gender	Level of Education	Content Area	Grade Level	Years of Experience
Irene	FRMS	31-40	Female	Master's	Math	8	15
Hope	FRMS	21-30	Female	Bachelor's	Science	8	2.5
Kim	FRMS	21-30	Female	Bachelor's	Science	8	5
Suzanne	FRMS	31-40	Female	Bachelor's	Math	8	12
Todd	FRMS	41-50	Male	Bachelor's	Social Studies	8	20

Results

This study was guided by the following central research question: how do middle school teachers describe their daily experiences using one-to-one technology in schools in rural North Carolina. To reach maximum saturation, I interviewed teachers at differing experience levels, grade levels, content, and schools. I incorporated the following supporting research questions to help me understand and thus, describe, the experiences of the participants: how do middle school teachers describe their self-efficacy regarding technology, how do middle school teachers

describe their experiences regarding technology and its integration with pedagogy, how do middle school teachers describe experiences regarding technology and its integration with the content they teach, how do middle school teachers describe the challenges and benefits of having one-to-one technology in the classroom, and how do middle school teachers describe the professional development opportunities they have or desire to have regarding the use of one-to-one technology in the classroom.

Theme Development

TPACK theory (Mishra & Koehler, 2006) allowed me to create the research questions I used explore the experiences of the participating teachers regarding technology, pedagogy, content knowledge, and the way these three things have been intertwined in their lived experiences. After personally transcribing each interview and the focus group session (see Appendix G), I listed every expression that was relevant to the experience of using one-to-one technology in the classroom. Following Moustakas' reduction and elimination step, I removed expressions that did not "contain a moment of the experience that is a necessary and sufficient constituent for understanding it" (Moustakas, 1994, p.120) and expressions that could not be labeled. Once I had eliminated expressions that did not meet the requirements set by Moustakas (1994), I clustered the related invariant constituents into thematic labels. After identifying the thematic labels, I validated the themes by checking "the invariant constituents and their accompanying theme against the complete record of the research participant" (Moustakas, 1994, p.121; See Appendix H). I constructed an individual textual description of the experience for each participant by "using the relevant, validated invariant constituents and themes" (Moustakas, 1994, p.121; See Appendix I). Using Moustakas' transcendental phenomenological approach

and TPACK theory, the following themes developed: Comfort Level with Technology Influenced Shared Experience, Frustration with Technology Failures, Influencing Teacher Instructional Practices, Willingness to Learn New Technologies, Perceived Student Needs, and Technology is a Tool.

Theme One: Comfort Level with Technology Influenced Shared Experience

The first theme that emerged through the horizontalization of data was that the teachers' comfort level with technology, both inside and outside the classroom influenced their shared experiences using technology in the classroom. This theme emerged in all three areas of data collection. The less comfortable the teacher claimed to be with the use technology, the less he or she shared positive experiences. This can be seen in the experiences shared by Peggy. The more comfortable the teacher claimed to be with the use technology, the more he or she shared positive experiences. This positive association can be seen in the experiences shared by Kim, Todd, and Robin.

The first place that the participants' comfort levels using technology was addressed was the open-ended question that asked participants to describe their thoughts when the integration of one-to-one technology was first introduced to them. Peggy wrote, "I was really nervous because I am not used to using technology." During the individual interview, regarding her experience with technology outside the classroom, Peggy stated, "I don't use a lot of technology outside the classroom, I mean other than Skyping with my grandchildren." Her experience within the classroom showed that she was not completely comfortable using one-to-one technology. Peggy told me,

I... I mean I feel like it takes a lot more preparation on my part because I feel like honestly since I'm not as tech savvy as some of these students, because I'm so old, and feel like I'm late to the party because so much changed while I was out of the classroom.

Peggy was unable to describe a successful lesson using technology. When questioned about a successful lesson using technology, she asked, "Can we come back to that one, because I can't think of an example right now."

Kim described herself as being very comfortable with technology both inside and outside the classroom. On the questionnaire Kim showed that she wanted to use technology to enhance student learning when she stated "My first thought was how will I use the technology effectively. I did not want to simply let it take the place of a delivery method, but actually use the tool to supplement the students' learning." This is how she described her comfort level using technology outside the classroom,

I'm saying pretty comfortable with it. I mean I usually am using technology on, I mean every day, outside the classroom whether it's my phone and social media or it's my computer and working on stuff for school or reading the emails or you know, I'm pretty comfortable with it.

When describing her comfort level using technology in the classroom, she described it this way,

I would say that it's very close to the same. I was almost less confident just because with the programs that I know I'm comfortable with, but when I use a program or something for the first time I get nervous, but I would say I'm pretty comfortable with using because I can troubleshoot pretty well.

During the focus group, Kim stated

I don't know if I would ever know how to teach without it,.. because, when I started

teaching, I … I mean the middle school that I was at was already one-to-one and so I'm

not sure that I would know how to go, like how to go back. I mean, of course, you know,

there are things that we do that don't require the technology, but I rely on it so much that

you know, like we have a kid that broke his Chromebook and doesn't have it and I'm like,

"Okay, well, what do I do now?" because I feel like he's such, he's at a disadvantage,

because he doesn't have it … now. And so I don't know, because I've only been teaching

five years, so I don't know if I would know how to not teach without you know, without

it.

Kim's responses to the questionnaire, during the individual interview, and during the

focus group session showed that she was very comfortable using one-to-one technology in the

classroom. Kim was also able to describe a successful lesson technology,

Okay, I was pretty excited when I created a card sort online. And of course, I had to do

research on what I wanted and how to how to make it what I want because teaching the

new, you know teaching online this year that being new. I'm having to create like create

things that I normally do in class that are hands-on and make them digital, and so that

was fun. I was really excited, and the kids really liked it too, being able to drag and drop

those things where they needed to go and sort those things out.

Todd also had a high comfort level using technology. On the questionnaire he stated, "I

was glad to have the resources available for my students." Todd described his level of comfort

by stating, "I like technology. I'm kind of a tech nerd so it doesn't bother me." When asked

about his comfort level using technology in the classroom he stated, "Uh again, I enjoy using technology in the classroom." Todd's shared experiences were centered around student interest and learning.

> We do, we review, a lot of the hyperlink docks. I like those, creating, creating the, having students create interactive maps using Google Sheets and then populating it with information and in creating a map from it using Google Maps. I like that. It allows students to actually see visual representations of things were talking about. But again, I those are just a couple but there are others the biography projects that look like Facebook pages the students seem to enjoy those. So, there are several.

Robin talked about having a high comfort-level using technology at school. She shared very positive experiences when using technology in the classroom by stating,

> I actually feel better inside the classroom than I do outside the classroom, you know, my husband pretty much does everything else at home and you know, I don't mess with it. You know, I don't I really don't but in the classroom. I'm getting better and it's because I think we've had good people to kind of help us like last week, last week or the week before we did a session on Pear Deck. And so, I had not been exposed to Pear Deck and it is phenomenal. I mean, it's great. I love it with my slides. Now my side shows, and it's now interactive and the kids, because I did a lot of slideshows with the kids, so they can have those to look back. Also, because I don't use a textbook a whole lot. So, they've got that to look back on, but I love it now. So, that's something else I've added. So, I try to add something new. My goal is like once a month to try to add something new. So that was my new theme for this month is Pear Deck.

Robin was very excited when she was sharing her experiences using one-to-one technology in the classroom. She was smiling and used a lot of hand gestures. She described her experiences in this way,

I love escape rooms and scavenger hunt type things. So I've done a lot. I've designed my own Escape rooms. Now when I first started doing them about four years ago. I started doing Escape rooms and I use the actual the, the boxes with the locks and all that kind of stuff and our AIG department has those like they purchased them for our County. So, we have a lot of those and I did those and then as the years progressed I thought I can put this online now. I looked at some on Teachers Pay Teachers, and I thought, I bought one that was okay. And I thought I can do these myself I can do this. So, I've done those. I'd always do one at the beginning of the year about me and to help them get to know me and then I have them kind of create one as a group that we all do about them, so we can kind of get to know each other and they love it. So that's one of the best ones is that when I show them about me and then I give them the chance to do one themselves and they like that.

When asked about her comfort level using technology at home, Suzanne said "Like in my personal life. Oh, it's great. I love it makes things easy." Suzanne claimed she was just as comfortable using technology in the classroom as she was at home, "I love it too because it provides immediate feedback for them and for me."

Although Suzanne did not claim to have designed any lessons, she was excited to share how she felt one-to-one technology had a positive impact in her math classroom. She stated,

I don't know if you could say that I just designed it because a lot of the math curriculum

is already pre-made, but Desmos offers a lot of cool technology Integrations to our

lessons. So basically if I'm teaching scatter plots and I want something technology-wise

from Desmos. I just go and I search, and I find something that maybe correlates to what

I'm doing that day. And that would probably be the best opportunity. I have it something

that would be technology-based for them because I have different screens I could put up

there on the projector. And it will overlay all of their responses. Like if I say graph a

line of 2x, they all graph there line and then I just click a little magic button over here and

it will show up every single kid's graph on one graph on the screen for everybody else to

see and they can pick out and say that kid's slope is negative that can't be a slope but 2X

or something like that. So that's, I think fun.

Theme Two: Frustration with Technology Issues

Frustration with technology issues was one of the themes that emerged from the shared

experiences of the participants. Some of the technological issues mentioned included unreliable

internet service, missing links, and applications or programs not working correctly. Some of the

participants were further frustrated by students' impatience when the technology did not work.

Kim's unsuccessful lesson happened when she was out of the class and unable to help students.

She shared,

Okay, so there was a time when I was out with, I was out at a conference or something,

and decided to leave some videos, you know in, I don't remember if I was using Google

Classroom or Canvas or whatever, but I left some videos of instructions in in that for the

kids of me like describing things and instructing them on things and then asking them to

do some problems afterwards and because this was when I was teaching math and it flopped. They had trouble getting into the videos. They had they didn't understand fully what I was talking about because you know, maybe I only did like one or two problems and they needed more so, you know, it was it was a fun day to come back after that.

Robin shared an experience when a whole day was frustrating due to issues with technology. Her happy demeanor changed when she shared,

Well, I think here's my problem with that. Is that a lot of times I would incorporate technology. That's my plan A and then I don't have a plan B. So, for example, we came back from Thanksgiving break. We had no internet. This whole building it was dead, I'm talking dead, and my whole lesson was one where they needed to use their Chromebook. And so with you know classes starting at 7:30, I don't have any I don't have any time. Like none, there's no like flexible time built in to my schedule like the other teachers. They have Academy, so during that time they could maybe get something prepared for their first class while I don't have that. So, I had to pretty much just, you know, wing it a little bit which was fine. It worked out okay, but is it the best lesson? No because I had incorporated technology and I did not do a plan B. So, what I've learned from that is you can't always rely on it. It's not always going to be there. And so you always have to have something in the back of your mind because I think that was just, I guess a wake-up call for me because I'm, I'm, I'm just used to having it. You know, it's always working. There's no issues with it, and then it didn't come back on that day. When the county came out, it was almost 11:00.

Matilda also seemed clouded as she shared a frustrating day with failed technology. Her example was,

> Okay, um, probably the worst one is when you're like planning something and then on the Chromebook it didn't come up or something like that. Like where I just had this genetics thing, and I still think you have to, you can only open it with like Explorer and we don't have that on Chromebooks. And yeah, so like that's probably the most, like when you like planning all this stuff and then I'll send the link and it just doesn't work with it, or it powers out, or you just something. That's, that's so frustrating.

The focus group shared a different frustration with one-to-one technology. The county they work in has a program called Classroom Rely that allows them to monitor student computers. The frustration the focus group shared was how students were learning to fool Rely and so it does not always work correctly. The following conservation was recorded during the focus group interview.

Suzanne began by saying "I would say find a way to monitor what they're doing. I think that creates... the most aggravating part for me."

Irene nodded her head and agreed, "Yeah, kids used to pass notes."

Suzanne smiled, "Yeah."

Irene broke in "And it's so hard."

Suzanne continued speaking over Irene, "Now they just open up a Doc."

Irene continued speaking over Suzanne, "It's so much harder to catch them now."

Kim nodded her head and claimed, "Yeah, because they label those documents like 'social studies.'"

Irene broke in excitedly "yeah"

Kim continued, "or 'math warm-ups' or you know, whatever it may be. So when you like roll over it on any of that, our Classroom Relay, you're like, 'oh that's just something,' so, unless you click on it and actually pull it up you think they're actually doing their work."

Hope smiled and rolled her eyes as she said, "It's okay, if you label it week it was like 'Week 37 News' and like they have like the little five little things and each thing. I was like, 'we've not been in school 37 weeks.' Everyone in the focus group laughed at Hope's example.

Theme Three: Influencing Teacher Instructional Practices

One-to-one technology influenced the way the teachers planned and presented information to students. This theme emerged as teachers shared their experiences during interviews. This theme emerged as teachers shared a typical day in their classes, how one-to-one technology influenced the way they present information, and when they shared how one-to-one technology influenced their pedagogical decisions.

When I asked Todd how one-to-one technology influenced the way he presented information to his students, he was thoughtful for a few moments and then shared,

> Now some of the tools we have, especially with like showing video clips, with like things like Edpuzzle, or the ability to put PDF files of readings and the access to short passages, to have students read, or the use of e-books in the classroom has changed a lot and then it gives us access to more things than we've had before which is, is a plus.

Matilda described the way one to one influenced the way she differentiates instruction for her students. Matilda pulled up the Quia website and showed me an example of a preassessment she has created while she told me,

Well, I like to like start usually like some kind of pre-assessment. So like if you have a, you know, they just go and they just answer some questions and then it can tell, like it won't, I can set it up so that it doesn't give them an answer that doesn't give them a score. Doing that kind of blows their mind, but the goal isn't for them to know. I just want them to see I want to see what they know so then we can move into our stuff and you know, I can focus on what I really didn't, what they weren't able to answer and stuff like that.

Jessie discussed the way one-to-one technology influenced the way she presented information to her students by saying,

I would say mostly with a video and one thing that I really like about it is when we do have to watch a video and I can if I can post it through at Edpuzzle and, if it's working properly, then they can work on that at their own pace and I don't have to show the video and if they have their guided viewing questions, "Okay number one. All right. I'm going to stop it. Everyone write in an answer. Are you okay? You're not finished. I'm sorry. We got to go on." It's helped them. It's helped manage the pace of instruction and individual eyesight, which I think is great. It helps with formative assessment with the Edpuzzle the, the Pear Deck. It's great too, our learners are so different now and it is great to be able to provide a visual with what they're learning so that they have that text. They can have the text in front of them and also a visual at the same time. I think that that's fabulous lots of different ways.

Meagan appeared excited when talking about how one-to-one technology influenced her pedagogical decisions. She told me,

I think it is wonderful because all students have access. For students who do not have wi-fi at home, our school has worked to get them a free hotspot. I am able to assign more personalized lessons and students can work in their free time in other classes and/or at home. Students know a lot about technology, so this is usually high interest when we involve their Chromebooks.

She was also smiling when she was talking about how one-to-one technology influenced the way she presented information to her students. Meagan smiled and said,

I am a big supporter of Google Classroom. I post our assignments, clear directions, reminders and extra materials that may help students. This gives them more access that previous classes of students have had. I like that they can communicate and ask me questions as well, even when we aren't face-to-face.

Theme Four: Willingness to Learn New Technologies

Another theme that was revealed was the willingness the participants had to learn new technologies. As the participants shared their experiences, they discussed learning from others, professional development sessions, and what they would like to learn more about. The need to learn how to find and use content specific materials and applications that are available online was important to all of the participants.

Camilla was excited about PD (professional development) offered by her district. She smiled as she shared the following example,

Well, I was thrilled last year to find out that my county was offering Google Level 1 Certification so that you would know how to use, not just Google Docs, but Google Sheets, Forms, Classroom, emails, everything that Google offers, YouTube, how to make

things with it. I was thrilled that on year three, think, three of having Chromebooks that we finally got that kind of intensive training. Not just on a specific app, but on the whole gamut of Google, to help us to really have a much better idea of how to use it, how to implement it, and it has made teaching not so stressful for me to actually know how to use some of the Apps and programs in Google.

Erika also shared that she was willing to learn new technologies when I asked about her comfort level using technology in the classroom. Erika was laughing when she talked about how she is the one who is always willing to try new things.

Pretty good. I think that, that's where I'm at, that at, that years 20 sometimes, I've got some teachers who have been teaching little bit longer that aren't quite as comfortable with it. But just in general, I'm that person, that when I go to workshop and they say, oh try this I do as soon as I come back, because if I don't I'll forget about it. So, I'm really bad about it. They make fun of me about that and they say, you know, it's always, "gonna try it, she'll do it." And so I will see and some things are not good, some of the different, you know, whenever the tech people come out and say, oh try this we you know hit some roadblocks but, I think it's great.

Theme Five: Perceived Student Needs

The fifth emerging theme that emerged in this study was the participants' perception of student needs. Although the participants expressed the need for students to be proficient in the use of technology, they also talked about the importance of students being engaged in hands-on activities. The participants shared non-technologically enhanced activities as being some of the best memories they had because the students were engaged and learning. The students' ability or

motivation to use technology to enhance their own learning was another perceived need that the participants discussed. These perceived needs emerged in both the individual interviews and in the focus group session.

Suzanne shared her thoughts student needs with the group by stating,

I think for math the one thing that I wish they would take advantage of for sure, kind of to piggyback on what Anne said is, you know when we did math homework, we had to wait till the next day to come into class to see if we did it right, and they know within a second of hittin that button, button whether they did it right or not and they don't take advantage of the fact that "it's telling me an explanation of what I did wrong," they just want to go to the next one and keep guessing. They're not really utilizing, sometimes the resources that they have at their fingertips.

Jessie was quiet for a minute before sharing the following about how one-to-one technology influences her pedagogical decisions,

It really makes me evaluate what is in their best interest? Especially now, not only with the kids in my classroom, but my kids at home. I'm seeing a huge shift in their abilities to communicate and sometimes I think that if we rely too heavily on one on one technology that we are feeding that problem. So, I really try to look at the look at whatever my goal is. What is my standard? What is my goal? What's, what I can do? I want, do we have to use technology to get there? Is it okay sometimes to just talk about stuff? I do try to use it as much as I can, but it's nice when they, when it's not every single day the same exact thing. Okay, now we're going to do this and we're going to do that. I think that it's good to not stick to such a strict routine because they get bored.

Robin also shared that students need time away from the Chromebooks when she shared her thoughts in this way,

> make sure you don't overdo it because I've heard a lot of my kids complain that certain
>
> teachers use their Chromebook from the time they get in there to the time they leave and
>
> they are very bored, you know, and they can't focus because they're just sitting there
>
> staring at a screen so they enjoy other things besides Chromebooks.

Hope also shared that she felt students need time away from technology. She shared her personal experiences and how she related them to her classroom by stating,

> I mean, I would just say again like I have found with this age group a lot of the time they
>
> actually do a lot better if you don't stick them behind a Chromebook because they, these
>
> kids lack problem solving skills now. I am, I was their age when they were born but like
>
> if my car won't start, I go I run through a mental list in my head. Okay, do I have gas, did
>
> I do the, what do I need to check? My brother is their age. If his car won't start, "Siri,
>
> why won't my car start?" He doesn't like, they, they need opportunities to use that
>
> technology as like an extension for them to do research, but don't let them just Google
>
> stuff they need to learn problem-solving skills because lots of them are very lacking in
>
> that.

Erika also shared that, though she liked one-to-one technology, she felt that students sometimes need a break from it. When I asked her if there was anything else she wanted to share, Erika told me,

> We have some teachers have been teaching a long time that are like they hate it they don't
>
> want to do it. And I you know, like I said Math teachers, we have a few that refuse, don't

even turn your Chromebooks on in there like at all and that's you know, that's fine because their scores are awesome. So, it's you got to do what, what works. I think that if you overdo it, and that's, that's the part that I'm kind of worried about, is the kids like complain being with computers all day. "My eyes are killing me. I've got a headache." You know, we have to keep that in mind too. So, I think just like break it up. There's got to be a balance.

Camilla shared her perception of how student needs have changed by sharing the following,

I've had sarcophaguses made in my classroom where we actually made them. Students made totem poles when I taught eighth grade, but they actually, physically made things and it was so much fun. And we played the "China's Silk Route Simulation" and "Warlords of Japan Simulation." It was, my kids were very much out of their seats, very much involved, very much in groups. And there just wasn't the stress of thinking about the tests all the time, and we read novels to learn our curriculum, but it has changed now and so that kind of teaching doesn't work.

Although Peggy shared that she was not completely comfortable using technology in the classroom, she shared how important it was to student motivation by stating,

So I feel like it's more demanding of my time, but I could tell that the students are more engaged because they love technology. They're already using the technology their already, you know playing on their computers and using their smartphones. So, it's just a matter of utilizing it in a, in an educational format.

Theme Six: Technology is a Tool

The next theme that emerged in this study was the participants' belief that technology is only a tool and cannot replace good teaching practices. This was echoed by many of the participants. During the focus group, Irene stated,

Don't throw out the baby with the bathwater. If you've been doing things that worked without your Chromebook or without your iPad or without whatever piece of technology they have, if you can use the technology to enhance the project or the learning do that. But if it's a, if it's a phenomenal project that kids are learning from keep doing it and insert your technology somewhere else.

When asked if he wished to add anything regarding one-to-one technology in the classroom, Robbie added, "Don't see it as taking, as taking the place of a textbook or taking handwritten notes. Look at it as something that adds to it." This was echoed by Robin in her interview when she said she would advise a teacher using one-to-one technology for the first time, "Don't leave out the important stuff. Don't rely on that Chromebook for everything. It's still just a tool. It is not your curriculum."

Matilda emphasized that technology is just a tool three different times during her interview. When I asked Matilda how one-to-one technology influenced her pedagogical decisions, she told me, "It enhances learning and like maybe you know increases those aha moments, but I don't want it to try to replace me. I don't want it to replace our relationship."

When asked how one-to-one technology influenced the way she presented information to her students, Matilda stated, "I mean, I don't have to use it for every single thing but it's it is a, it

is a very good tool. I'm very thankful for it." She reiterated this theme when I asked what advice she would give a teacher using one-to-one technology for the first time,

>I would tell them that it's an awesome tool just make sure you don't let it replace you.
>
>Don't just give them an assignment and then you sit at your desk and play on your phone.
>
>Like that's not what we're here for.

Theme Seven: Professional Development

The final emerging theme was a positive experience with professional development. This theme was seen in all areas of data collection.

When answering the questionnaire, Matilda wrote about where she was when she first learned that the school was going to one-to-one. She claimed, "I was a grade-level meeting with several people and a person from the county office. We had a chance to ask questions and they told us how they were going to support us as we tested it." When she was asked directly about professional development during her interview, Matilda shared,

>Okay, so we've had lots and lots of PD on this. So we've I would mean we had it here. I
>
>get like whole school, we've had team meetings, or it's grade level meetings. We've had
>
>it at the county office, where it was like the district people from the whole grade level. I
>
>think some of it was good. I think some of it was really good. Some of it was like
>
>redundant like we'd already been on it and I'm not really sure why they purposely, like
>
>went over this exact thing again, but maybe that's just I don't, I guess maybe there were
>
>some people that weren't so, they had to cover all their bases. I don't really know. But I
>
>mean, there's definitely like a lot of stuff available and the people that always presented
>
>are always like yeah, you can tell they're excited about it and they always try to do a good

job to try to get people excited. Sometimes there's a lot of people in the room that aren't excited and kind of hard.

Megan shared her experiences during the interview by stating, "I feel it has been sufficient. I have learned a lot. The workdays prior to school beginning this year, showed me a lot of ways to integrate technology into my classroom."

During the focus group session Suzanne talked about the support teachers receive from their peers and the training teachers receive,

I think we have a lot of support. We get a lot of training and we have a lot of colleagues that share what they know and um, how to use anything you might want to use for lessons or, or data or anything else.

Research Question Responses

Central Research Question

The central research question was, "How do middle school teachers describe their daily experiences using one-to-one technology in schools in rural North Carolina?" To better explore the central research question, five sub questions were developed using the TPACK theoretical framework. The interview and focus group questions were designed to help me gain a deeper understanding of the teachers' perspectives by having the teachers describe their individual experiences.

Supporting Research Question One

Supporting research question one asked, how do middle school teachers describe their self-efficacy regarding technology. According to TPACK theory, it is important to understand

teachers' comfort levels with technology as it influences teachers' willingness to use technology and their attitudes when using technology in the classroom (Mishra & Koehler, 2006).

Table 3 below list the age range, years of teaching experience, subject taught, and reported comfort level using technology by the participants.

Table 3

Reported Comfort Level Using Technology

Pseudonym	Age Range	Teaching Experience	Subject	Reported Comfort Level
Camilla	51-60	28	Social Studies	Very Comfortable
Erika	41-50	10	English	Very Comfortable
Hope	21-30	2.5	Science	Very Comfortable
Irene	31-40	22	Math	Very Comfortable
Jessie	41-50	4	English	Very Comfortable
Kim	21-30	5	Science	Very Comfortable
Matilda	41-50	6	Science	Very Comfortable
Meagan	31-40	9	English	Very Comfortable
Peggy	51-60	15	English	Not Comfortable
Robin	41-50	28	Math	Very Comfortable
Suzanne	31-40	10	Math	Very Comfortable
Todd	41-50	20	Social Studies	Very Comfortable

The reported comfort level using technology did not seem to be affected by age, teaching experience, or subject that was taught. Teachers in each subject area and grade level reported

being very comfortable using on-to-one technology in the classroom. Veteran teachers and new teachers both also reported being very comfortable using technology in the classroom and were able to share successful lessons that used one-to-one technology.

When the veteran teacher, Camilla, was asked about her comfort level using technology, she shared,

> Two years ago, I would say my stress level from one to 10 was about nine every day. With the workshops that the county has given us, it has allowed my stress level to be about a three or four depending on what we're doing and depending on are we at the beginning of the year where the kids have forgotten how to like tile their pages or, or how to get to website or they can't type it email address incorrectly and they keep saying well I've sent it to you. I've sent it to you, and it doesn't come, and you say "bring your Chromebook up and I'll help you. Let me show you how to send this document out of Doc Hub to me" and they say "well there's your email address," and then it's wrong so, you know just simple things I think now that two or three years ago would have been seven, eight, nine is now a two or three for me.

Camilla was excited and smiling when she shared the following positive experience using technology and how she planned to move the lesson to next level in the future.

> Well, one of the things that I have enjoyed doing is teaching the Holocaust and every year I have my kids read a novel historical fiction novel biography autobiography and journal about it. And I think that since they type their responses now I get more of a response to it because they're actually typing and it goes faster for most of them, and it's faster much faster for me to read because I'm not trying to decipher their handwriting. I

can read and I can make comments on their paper very easily by simply highlighting it and writing my comment, comments they get back faster for that. Activities that I hope to do this year and talk about that, is that I hope to add into my curriculum this year to go to the National Holocaust, um, Holocaust website and have them actually research the new part of the Holocaust Museum where they will look up, "What did American know when did we know, what, how did we find out, what did we do," and have them kind of really get a picture of why did we stay out of World War II for so long, even though we knew the atrocities that were happening? Why did we stay out? What caused us to stay out of World War II? I want them to be able to do research and learn how to do the research because my kids who are going to college will have to know how to do research on this, and I think it's so important to learn now.

When asked about her comfort level using technology, Jessie stated, "I'm very comfortable with it." In the following experience she shared, Jessie was able to take a problem with technology and turn it into a successful lesson.

Last year they had to do their research. We did a research project instead of writing the full out research paper. They had to take that information and extrapolate what they wanted to and turn that into a digital presentation and that was a great experience, because the whatever, whatever reasons, the Chromebooks that they had last year compared to the Chromebooks that the eighth graders have, I don't know what it was, but they were a different set of Chromebooks and they really struggled to work with getting video embedded into their presentations, which was one of the components they had to use video and we just talk about how this is real life. And sometimes you got to, you got

to be flexible, adopt your plan and it was great to see them work through that. They

worked in groups and it was great to see them work like that.

Peggy was the only one of the 12 participants who reported that she was not comfortable

using technology. When she was asked on the questionnaire about her thoughts when the

integration of one-to-one technology was first introduced to her, Peggy typed, "I was really

nervous because I am not used to using technology." Peggy was also the only participant who

was unable to share a successful lesson she had used in her classroom that incorporated one-to-

one technology. When she was asked to share a successful lesson that incorporated one-to-one

technology, her nervousness with technology was apparent. Peggy thought for a few minutes,

looked around her room, and then requested, "Can we come back to that one, because I can't

think of an example right now?"

Supporting Research Question Two

Supporting research question two asked, how do middle school teachers describe their

experiences regarding technology and its integration with pedagogy. This question ties into the

technology and pedagogy portions of TPACK theory. The answers to this supporting research

question was also a source for theme five, Perceived Student Needs, and theme six, Technology

is a Tool.

Teachers shared how they used technology to present information to students,

differentiate instruction, and assess student knowledge using one-to-one technology in the

classroom. Camilla, Erika, Jessie, Meagan, and Todd all talked about how having the

Chromebooks allowed them to share readings and other information with students. Irene,

Matilda, Robin, and Suzanne all talked about how it made it easier to differentiate instruction for

students. Teachers also shared the use of technology at home was available to all students because Chromebooks could be taken home and the school district offered free hotspots for students who did not have internet access at home through the county's K64 partnership with local businesses. When asked how one-to-one technology influenced her pedogeological decisions, Kim told me,

> The flipped classroom approach is more open to me now than it was because, you know now every kid has a Chromebook and even if they don't have Wi-Fi the county has a thing where they, you know can purchase Wi-Fi or something, or they give them Wi-Fi so they can use that stuff at home. So now it's so much easier to have everything available to them. So, everything that we do in class can go online so they can always go back and look at it.

Participants also shared their belief that technology is only a tool and cannot be used to replace good teaching practices. Participants shared a fear that an increased use of technology will hurt relationships and cause the loss of activities that are engaging and informative. Matilda shared her fears of technology taking the place of relationships by telling me, "So, I think that you know, we need to make sure we continue to build a relationship part and just use it as the awesome tool that it is, but don't like use it as a replacement."

Jessie shared a need to balance instruction, "Don't feel like you have to dive in and abandon everything you've done. I think that most teachers that are successful with it have balanced one-on-one technology with traditional paper and pencil."

Robin stated, "Don't leave out the important stuff. Don't rely on that Chromebook for everything. It's still just a tool. It is not your curriculum; it is not you." Robin also claimed,

I'm going to say the, with math because, I feel like math is just a different beast than some of the other ones. It doesn't lend itself quite as well to the technology piece as we talked about, but I do, my thought is that paper pencil, because that's a math teacher in me that's old school, but I have learned that if I give them other things other ways to show me that they know how to get that answer then I'm okay to use it on the computer.

Supporting Research Question Three

Supporting research question three was, how do middle school teachers describe experiences regarding technology and its integration with the content they teach. This question ties into the technology and content knowledge portions of TPACK theory. The answers to this supporting research question was a source for theme three "Influencing Teacher Instructional Practices" and theme four, "Willingness to Learn New Technologies." All participants were able to discuss ways they integrated technology to help students gain a deeper understanding of content. The participants reported using technology to introduce new content, tie together aspects of content, and to review content. This was not dependent upon reported comfort level using technology. Todd, who reported being very comfortable using technology, shared how he integrates technology with his content during his daily bell ringers,

The class is, uh, every day when students come in, the first thing we have is our bell ringer, which is we watch CNNTN or CNN Student News. It's our bell ringer. It covers the current events and keeping one of the criteria of eighth grade social studies is understanding the Earth, uh good citizenship and one of the tenants of good citizenship is being informed.

Peggy, who reported not being comfortable using technology, shared how technology integration influences her instructional practices in this way,

I, I mean I feel like it takes a lot more preparation on my part because I feel like honestly since I'm not as tech savvy as some of these students because I'm so old and feel like I'm late to the party because so much changed while I was out of the classroom. I feel like you know, I have to say several steps ahead of them. Like I'm good with this unit. Like I understand what the central question is, and you know what the authors are trying to teach.

During the focus group session, Anne, Hope, Irene, and Kim, shared how technology influences their instructional practices when they had the following conversation,

Anne: Well, I was thinking just recently that it's helped a lot as far as all the reports we can run for grading and keeping up with our grades and even you know, that kind of thing. It has been a, a big time saver keeping up data.

Irene: I think it's made it easier too, to make decisions based on that data because you don't have to spend all the time putting it together. You can just, the computer does it for you. You can just look at the data and say "hum, they did really good on this. They didn't do good on this. So we need to go back and do that again." So, it's a lot easier to do that now.

Anne: That's very helpful.

Kim: I don't know if I would ever know how to teach without it,.. because, when I started teaching, I … I mean the middle school that I was at was already one-to-one and so I'm not sure that I would know how to go, like how to go back. I mean, of course, you know,

there are things that we do that don't require the technology, but I rely on it so much that you know, like we have a kid that broke his Chromebook and doesn't have it and I'm like, "Okay, well, what do I do now?" because I feel like he's such, he's at a disadvantage, because he doesn't have it … now. And so I don't know, because I've only been teaching five years, so I don't know if I would know how to not teach without you know, without it.

Suzanne: I think to piggyback on what Kim said, was the fact that it's immediate feedback. You know, we get spoiled by that because I was thinking when you were talking. I like the immediate feedback (everyone laughs together because Suzanne starts laughing). I mean it's just so, right there.

Hope: I think though, in some ways it's like, I can see like, that they have like, this knowledge, that they do. Like it gives me tools to see that, but it doesn't let me actually see their depth of knowledge, because they live in a Googleable world and so a lot of times it is like do you actually know this or did some search engine tell you that you know this.

All the teachers shared a willingness to learn how to use new types of educational technology regardless of their reported comfort level related to one-to-one technology. During her interview, Erika, who reported being very comfortable using technology, described her willingness to learn new ways of one-to-one integration,

I think that you got to do what works for you and do what you're comfortable with and go watch people like if somebody's using something like Mr. Asher is amazing. Okay, he's the one, he was using Pear Deck before I heard of it, and I didn't know what it is.

Something so you've got people out there that are doing it go watch or go ask them to video the class. We can see what they're doing.

Erika's response to the questionnaire prompt, "Describe your thoughts when the integration of one-to-one technology was first introduced to you," also showed her willingness to learn new technologies. She responded, "I was excited about the prospect of learning something new and a little apprehensive because I wasn't sure exactly what it was going to entail."

Peggy, who claimed she was not comfortable with technology, shared her willingness to learn new technology by describing her professions development plan (PDP) related to technology integration. She stated,

> Anything else I one of my goals on my PDP ,we've been working on PDP's, or I have, is to become more comfortable with using technology, whether that's you know, taking workshops or sitting down one-on-one with someone who's very computer literate after school or in the mornings. I had someone from the county come Tuesday morning and show me how to do something with technology. I mean, I, I'm going to make myself available early morning late afternoon on the weekends. I'm trying to become more comfortable with technology so that I can feel more successful in the classroom that I can easily navigate from one piece of technology to another because I feel like if I get so hung up on the pieces that I'm struggling with then I feel like my lessons are not smooth.

Peggy also shared her excitement over learning how to cast the screen from her Chromebook to desktop so it could be projected to the students. She the following experience,

> I guess, I'd been asking for several weeks. Maybe I didn't ask the right people. I probably should have come to ask you to teach me how to cast from my Chromebook to

my desktop computer so that I can walk around the room with my Chromebook and show them then kind of notes that I am taking, annotating text, and nobody could give me the right answer. So, I ended up being in a workshop with a girl from Rural High School, and she heard me ask that question to the presenter, to Diane. I'm sorry, and the girl from Rural High School said, "oh I know how to do that. I can show you. I'll come to your room after the workshops over" and she showed me. I mean, I've asked, asked like everybody that I could think of here at the school. It was tech savvy, so long story short, I'm glad I got the answer now. And so now I can do that and what makes me feel really good and a lot of people have asked me on my team, "ooh can you show me how to do that now that you know how to do it?" Me show somebody else how to use technology. This is crazy, I've never been asked, like I know this much.

The focus group participants also shared their willingness to learn new technologies. When asked the question, "How would you describe the support offered by your peers regarding technology integration," they had the following conversation,

> **Anne:** I think we have a lot of support. We get a lot of training and we have a lot of colleagues that share what they know and um, how to use anything you might want to use for lessons or, or data or anything else.

> **Todd:** I would agree, everybody, everybody knows a program or an application that's a little bit different than others and, if they really like it, they're willing to share and that, you know, not every tool is going to work great for every person.

> **Irene:** The kids, the kids know which ones of us know what, because if I'm struggling with something, like if I'm fighting with Doc Hub, they'll say why don't you just ask Kim.

(Everyone giggles.) I'm like, oh, yeah, and I can just pick up the phone and call Kim and say, 'Kim can you help me with this?' (Everyone giggles again.) And it's just like they know the tools that we use regularly and so they become an asset too. Or you know, if um, if I'm, if I'm struggling with something, sometimes I'll just throw it out to the kids and say does anybody know how to do this (she giggles) and they'll run over to my computer and somebody'll show me how to do it because of the things that they learned in their other classes. So that's kind of nice, too.

Supporting Research Question Four

Supporting research question four, how do middle school teachers describe the challenges and benefits of having one-to-one technology in the classroom. The participants shared their experiences in the individual interviews and focus group session. These experiences were the source for theme one, Comfort Level with Technology Influenced Shared Experience, and theme two, Frustration with Technology Failures.

Although all teachers were able to share both challenges and benefits, the majority of the experiences that were shared by the participants were related to the participants' level of comfort regarding the use of technology. Teachers who reported a lower comfort level when using technology shared fewer positive experiences and talked more in depth about the challenges faced using technology in the classroom. Teachers who claimed to be very comfortable using technology shared fewer challenges and talked more in depth about the benefits of using technology in the classroom.

In describing the benefits and challenges of having one-to-one technology, some emerging themes were frustration when the technology did not work. Peggy shared an in-depth challenging experience,

> For example, Tuesday, there was an example, the videos are embedded in Pearson, the media piece, and it was on, we've been talking about "how can your life impact someone from another generation?" It's all about generations for this Pearson Unit, it so it's a video on teenagers teaching technology to senior citizens, which has been awesome. It's, I, the kids have loved learning about it. But when I put up the video and we were watching, and it was like a two and a half minutes, and it got to like the two-minute mark and stopped working. So, I refresh the page, I went back a little bit and then tried to catch back up where I went past the point where it got stuck. I tried like three different times. I even closed out a Pearson logged back in, it still would not work. So, then I told the kids then try to because I was trying to show it on the projector, and they still, own their own it would get to the same point and stop. I think it may have been a site-based internet issue that day. I don't know but I challenge them and encourage them to watch the video outside of class on their own.

Teachers shared many ways that one-to-one technology was beneficial as a tool in the classroom. When asked on the questionnaire about his thoughts when the integration of one-to-one technology was first introduced to him, Todd responded, "I was glad to have the resources available for my students." His positive attitude when relating a failed lesson is evident in the following response, "My first hyperlink doc where the links for whatever reason wouldn't work that, that turned out not so great, but we learn from our mistakes and we move on."

Supporting Research Question Five

Supporting research question five was, how do middle school teachers describe the professional development opportunities they have or desire to have regarding the use of one-to-one technology in the classroom. According to Mishra and Koehler (2006), professional development opportunities need to be provided if teachers are going to be comfortable using technology in the classroom. This supporting research question was the source for theme four, Willingness to Learn New Technologies. The participants in this district all felt that there were many opportunities for professional development related to technology integration. Although they felt there were many opportunities for professional development, Erika, Kim, Matilda, and Peggy all felt that they would benefit from professional development sessions that were hands-on and not rushed.

Erika shared her view of the professional development opportunities offered in her school district this way,

> You know, I think it works better to do it sporadically, you know just kind of like filtered out through the month so that oh, yeah, Okay, let me use this one see how it goes and then try something different see how that you know, I don't know. I just see it more applicable that way but that would be better.

Hope felt she would benefit from advanced professional sessions because of her existing knowledge of using one-to-one technology in the classroom. She shared,

> I wish that there was an option like when you sign up for like, like PD and GCT [GCT is Google Certified Training] how they have like beginner intermediate and advanced users. I wish that there was an option for that where you could sign up for an advanced user

because I don't need to know how to upload an assignment to Canvas. I already know how. To me something worthwhile because I understand how technology works. Stick the people who need it in beginners' classes.

Summary

This chapter first introduced the participants for this study through their answers to the demographic questionnaire. There were 11 female participants and one male participant. Four of the participants taught English, three taught math, three taught science, and two taught social studies. The themes that developed using Moustakas' transcendental phenomenological approach, the following themes were Comfort Level with Technology Influenced Shared Experience, Frustration with Technology Failures, Influencing Teacher Instructional Practices, Willingness to Learn New Technologies, Perceived Student Needs, and Technology is a Tool. I used significant statements to show how the themes emerged. After describing the themes using significant statements, I briefly discussed how the study addressed the central and supporting research questions. This chapter used the questionnaire, individual interviews, and focus group to meet the purpose of this transcendental phenomenological study, to describe the experiences of middle school teachers using one-to-one technology in schools in rural North Carolina.

CHAPTER FIVE: CONCLUSION

Overview

The purpose of this transcendental phenomenological study was to describe the experiences of middle school teachers using one-to-one technology in schools in rural North Carolina. The 12 participants who participated in this study all work in middle schools in the same rural district in the foothills of North Carolina. These teachers have a combined 183 years of experience teaching in the middle school setting. This study used purposeful sampling as a means of choosing participants. I used a demographics questionnaire, individual interviews, and a focus group interview as a means of data collection. A pilot study was used to screen the individual interview questions. The study used the modified van Kaam method for data analysis that was suggested by Moustakas (Moustakas, 1994). This chapter compares references from the literature review with the study's findings. This chapter discusses implications of the findings regarding how they can be used to inform teaching practice. This chapter also discusses assumptions, limitations, and recommendations for future research. The chapter ends with a summary of final conclusions.

Summary of Findings

This section consists of a concise summary of the findings of this study. The central research question, how do middle school teachers describe their daily experiences using one-to-one technology in schools in rural North Carolina, was explored using five sub questions.

Supporting research question one asked, how do middle school teachers describe their self-efficacy regarding technology. All but two of the participants reported a high self-efficacy

regarding the use of one-to-one technology in the classroom. Age, subject, and years of teaching experience did not seem to have any impact upon the self-efficacy of the participants.

Supporting research question two asked, how do middle school teachers describe their experiences regarding technology and its integration with pedagogy. All the participants reported that the availability of one-to-one technology changed the way they presented information to students. Teachers claimed they used technology to post readings, record lectures, post assignments, introduce and review vocabulary, and to review for assessments. In addition to presentation of data, Matilda and Robbie described using technology to differentiate instruction to meet the needs of all their students.

Supporting research question three was, how do middle school teachers describe experiences regarding technology and its integration with the content they teach. The answers to this question were typically related to the participants' comfort level regarding the use of technology. The participants who described themselves as being very comfortable using technology also shared more positive experiences using technology in the classroom.

Supporting research question four was, how do middle school teachers describe the challenges and benefits of having one-to-one technology in the classroom. The participants shared many ways that technology was beneficial including presenting information, analyzing data, differentiating instruction, and increasing collaboration among students. The participants also voiced their frustration when technology did not work correctly.

Supporting research question five, how do middle school teachers describe the professional development opportunities they have or desire to have regarding the use of one-to-one technology in the classroom. The participants in this district all felt that there were many

opportunities for professional development related to technology integration. Several participants shared that they felt they really needed more time to practice with the technological tools that were being introduced.

<div align="center">**Discussion**</div>

The information in this section discusses the findings of this study in relation to the empirical and theoretical literature reviewed in the second chapter of this dissertation. The discussion will review the themes which emerged from the study and their relationship to existing literature. The discussion will also include how the themes fit within the TPACK theoretical framework designed by Mishra and Koehler (2003).

Empirical Literature Discussion

Theme one: comfort level with technology influenced shared experience. This study found a relationship between teachers' comfort level with technology and the experiences that they shared. Other studies have also found that self-efficacy is important to successfully integrating technology into the classroom (Burns & Polman, 2006; Ciampa, 2014; Davies, 2017; Grant, et al., 2015; Greiff, et al., 2014; Ingram, 2015; Lefter & Petrovici, 2016; Orlando & Attard, 2016).

Theme two: frustration with technology failures. Existing literature has shown that teachers often become frustrated when technology does not work correctly (Acai, et al., 2014; Dekhane, et al., 2013; Rice & Wilson, 1999).

Theme three: influencing teacher instructional practices. There are many ways that teachers can integrate technology in the classroom (Beeson, et al., 2014; Mishra & Koehler, 2006; Yim, Warschauer, & Zheng, 2016.)

Theme four: willingness to learn new technologies. Past research has shown that issues with technology can cause teachers not to use technology in the classroom (Ciampa, 2014, Heath, 2015; Kennedy, Rhoads, & Leu, 2016; McEwen & Dube, 2015). Despite having experienced technological failures during lessons, the teachers in this study all shared Suzanne's willingness to learn how to use technology to enhance their lessons. Todd and Jessie both considered these times to be learning opportunities. Camilla and Peggy voiced their frustration when things did not work correctly; however, they both expressed a desire to learn more do that they would know what to do when issues arise in the future.

Theme five: perceived student needs. It is imperative to provide students with authentic, relevant learning experiences (NMSA, 2010; Schunk, 2017; Smith, 2011) and technology can potentially help educators provide these experiences (Beeson, et al., 2014; Mishra & Koehler, 2006; Yim, Warschauer, & Zheng, 2016). Existing literature discussed the need for teachers to find ways to keep students engaged (Lee, et al., 2016; Lemley, Schumacher, & Vesey, 2014; Quinn, 2015; Rentfro & Mann, 2017; Zhao, 2015). Existing literature also emphasized the fact that young adolescents seek relevant, authentic, and engaging academic activities (NMSA, 2010; Sadowski, 2008; Smith, 2011; Thornton, 2018). The participants in this study also described the need to provide students with relevant, authentic, and engaging activities in the classroom. When asked about favorite teaching memories, Camilla, Hope, Kim, Matilda, Robin, Robbie, and Todd all shared memories of students learning through hands on activities. Anne, Jessie, and Peggy shared memories of relevant lessons that had authentic audiences for students.

Theme six: technology is a tool. Existing literature discussed the need for teachers to recognize technology as a tool that cannot replace good teaching practices educators (Acai, et al., 2014; Ciampa, 2014; Dekhane, et al., 2013; Grant, et al., 2015; NCDPI, 2016; Rice & Wilson, 1999). Technology should be used to enhance learning and not just for the sake of using technology. Erika shared her view on technology being a tool when she claimed,

> So like where you know, sometimes they'll send, they'll say oh you need to do this. I'm like, wait, how am I going to do that instead of just you know what? Is it like, like talk about it we'll just go in with it. I try to think about, okay, well, what's the end goal and I think that's something that like with LDC *(Literacy Design Collaborative)* and stuff, you know, they've come back and said, you know, that's fine and everything, but what are you trying to get out of it? Sometimes I think that it's the technology for the technology's sake.

Theme seven: professional development. Many articles, both inside and outside the United States, have discussed the importance of professional development (Burns & Polman, 2006; Ciampa, 2014; Davies, 2017; Grant, et al., 2015; Greiff, et al., 2014; Ingram, 2015; Lefter & Petrovici, 2016; Orlando & Attard, 2016.) This need for targeted professional development related to technology integration includes all subjects and grade levels (Ingram, 2017; Lefter & Petrovici, 2016; McEwen, 2015; Ngan, 2012; Orlando & Attard, 2016; Rice & Wilson, 2010). It is important to train teachers on a gamut of applications and programs. Camilla offered an example of this importance when she shared one of her experiences with professional development and how it helped her to implement technology in her classroom.

Well, I was thrilled last year to find out that my County was offering Google level 1 certification so that you would know how to use not just Google Docs but Google Sheets forms classroom emails everything that Google offers YouTube how to make things with it. I was thrilled that on year three think three of having Chromebooks that we finally got that kind of intensive training not just on a specific. app, but on the whole gamut of Google to help us to really have a much better idea of how to use it how to implement it and it has made teaching not so stressful for me to actually know how to use some of the Apps and programs in Google I didn't say that very well.

Theoretical Literature Discussion

Theme one: comfort level with technology influenced shared experience. Mishra and Koehler (2009) found that there was "was the positive correlation between teachers' TPACK and teaching experience" (p. 272). This study also found a relationship between teachers' comfort level with technology and the experiences that they shared. Mishra and Koehler (2009) stated,

Many teachers earned degrees at a time when educational technology was at a very different stage of development than it is today. It is, thus, not surprising that they do not consider themselves sufficiently prepared to use technology in the classroom and often do not appreciate its value or relevance to teaching and learning (p. 61).

However, this statement did not apply to the participants in this study. Camilla and Robin have been teaching for 28 years and claimed to very comfortable using one-to-one technology in the classroom. In her interview, Camilla credited her comfort level using technology in the classroom with professional development. Camilla shared,

Two years ago, I would say my stress level from one to 10 was about nine every day.

With the workshops that the county has given us, it has allowed my stress level to be

about a three or four depending on what we're doing and depending on are we at the

beginning of the year where the kids have forgotten how to like tile their pages or, or how

to get to website or they can't type it email address incorrectly and they keep saying well

I've sent it to you. I've sent it to you, and it doesn't come, and you say "bring your

Chromebook up and I'll help you. Let me show you how to send this document out of

Doc Hub to me" and they say "well there's your email address," and then it's wrong so,

you know just simple things I think now that two or three years ago would have been

seven, eight, nine is now a two or three for me.

Robin claimed, "I actually feel better inside the classroom than I do outside the

classroom."

Irene has been teaching for 22 years and Todd has been teaching for 20 years. These

teachers also reported being very comfortable when using technology.

Irene states, "I have a master's degree in technology, so I am very comfortable with it."

Todd stated, ""I like technology. I'm kind of a tech nerd so it doesn't bother me. Uh

again, I enjoy using technology in the classroom."

There was only one participant who reported that she was not comfortable using

technology in the classroom. Peggy, who has been teaching for 15 years, reported that she was

not completely comfortable with technology and struggled when things did not work right.

When considering the fact that she was the only participant who reported a low self-efficacy

using technology in the classroom, the number of years of teaching experience did not coincide with self-efficacy.

Peggy stated,

"I... I mean I feel like it takes a lot more preparation on my part because I feel like honestly since I'm not as tech savvy as some of these students, because I'm so old, and feel like I'm late to the party because so much changed while I was out of the classroom."

Theme two: frustration with technology failures. According to Mishra and Koehler (2008), frustration with technology failures may cause teachers to choose not to integrate technology into their classrooms. The teachers in this study also reported that they became frustrated when technology failed to work correctly. Jessie shared the frustration she felt during a failed lesson.

There have been many times where I'll post a video, and I want them to their get videos to teach figurative language, and what they'll have to do is they watch a movie clip and then they have to tell me what type of figurative language it was and their proof of why they think it's that. And there have been times where this video won't play it's blocked. Students were not allowed to watch this. That is very frustrating. And when I go back to their presentations that way, I mean that was it was great to see them work through that, but it's very frustrating because some kids had different model Chromebooks and they could do it and then some kids got, they couldn't do it on theirs just because of the year of the Chromebook and whatever technology or software I had it would allow some kids to do it and some kids not to do it.

Theme three: influencing teacher instructional practices. Mishra and Koehler (2006) discussed the importance of using technology to enhance learning through engaging and relevant lessons. The participants in this study shared ways they were able to successfully integrate technology into their instructional practices. All of the teachers shared that they use technology to share information with students. Anne claimed, "Well technology makes it very easy to share lessons with students, especially when they are out of classroom. It's made it very easy to, as a platform to give them what the lesson is."

Technology integration for instructional practices goes beyond student instruction (Mishra and Koehler, 2006). The participants also integrated technology for data assessment, differentiation, and quicker grading. Robin stated,

> I'm able to do with technology. I can isolate maybe one kid based on their learning
>
> levels. And that do something very specific one kid versus the other class or group of
>
> kids. I can, I can differentiate a lot better than I could whenever just nobody had, nobody
>
> having access to technology.

Theme four: willingness to learn new technologies. Mishra and Koehler (2009) claim that in order for a technology integration to be successful, the principal must be excited about it. Most of the teachers in this study first learned about the integration of one-to-one technology in grade-level meetings that included the principal. Suzanne talked about the excitement in the room by stating, "It was a grade level meeting. Everyone else was excited too!" Her excitement continued with her first thoughts about wanting to learn how to successfully integrate one-to-one in her classroom, "That will be amazing! I was also hoping we would have content specific training on how to use the Chromebooks in the classroom."

Theme five: perceived student needs. When taking about the needs of students, it is important to understand that the technology used impacts the content that can be taught.   Mishra and Koehler (2009) stated,

> Understanding the impact of technology on the practices and knowledge of a given discipline is critical to developing appropriate technological tools for educational purposes. The choice of technologies affords and constrains the types of content ideas that can be taught. Likewise, certain content decisions can limit the types of technologies that can be used (p.65).

The teachers in this study also felt that content area was a factor in the type of technology that should be used to increase student success. Suzanne shared her view of how she uses technology in her classroom some of the programs she incorporates.

> All I do is, I think it creates more opportunities. I mean instead of me having to stand up there and they take paper notes the entire time, we can do videos we can do Edpuzzles we can do Desmos because, Desmos is still a learning environment. It's not just showing that you understand something it allows for a broader range of presentation. Yeah, so they're not seeing the same thing every single day.

Theme six: technology is a tool. According to *The Handbook of Technological Pedagogical Content Knowledge (TPACK) for Educators 2nd Edition* (2016), a teacher who is strong in TPACK will know when the use of technology is appropriate and when it is not. The participants also shared their view that technology cannot replace good teaching practices. Todd gave the advice, "You know, but technology is not the end-all be-all solution to all problems. It

doesn't replace good teaching. It doesn't replace good teaching practices. It's a tool it's a powerful tool but it's still a tool nonetheless."

Although the participants recognized technology can be a valuable tool in the classroom, they also felt that technology can be overused. This was one of the statements regarding overuse of technology was Robin's claiming,

> make sure you don't overdo it because I've heard a lot of my kids complain that certain teachers use their Chromebook from the time they get in there to the time they leave and they are very bored, you know, and they can't focus because they're just sitting there staring at a screen so they enjoy other things besides Chromebooks.

Theme seven: professional development. According to Mishra and Koehler (2005), "There is no "one best way" to integrate technology into curriculum. Rather, *integration efforts should be creatively designed or structured for particular subject matter ideas in specific classroom contexts*" (p.60). Teachers in this study also discussed the importance of professional development related to their content and the need to practice with the technological tools during professional development sessions.
Suzanne shared her thoughts in this way,

> I think they do fine. But again, you've got to learn it by doing it. If you don't do it you're never going to learn. It doesn't matter how many times they tell you about it, but I think a lot of the stuff we use are things we've gained from those like Kahoot and Quizzes and I don't know there's been so many I can't think of all of them right now, but they've done a lot of PD I felt like that was dead on to what we needed, especially whenever we were

first becoming the one-to-one. We all had a lot of learning to do. They helped to figure

out how, how does this change what our classes looks like.

The need for teachers to learn by doing is also emphasized in the TPACK framework,

Mishra and Koehler (2009) stated,

> In the learning-technology-by-design approach, emphasis is placed on learning by doing,
>
> and less so on overt lecturing and traditional teaching. Design is learned by becoming a
>
> practitioner, albeit for the duration of the course, not merely by learning about practice.

Implications

This transcendental phenomenological study suggests implications for teachers,

curriculum specialist, and administrators. This section discusses the implications for this study

through by describing the theoretical, empirical, and practical applications.

Theoretical

The theoretical framework that guided this study was TPACK. Mishra and Koehler's

(2006) TPACK theory stresses the importance of interweaving technology, pedagogy, and

content knowledge within the classroom. This interweaving allows educational technology to be

used as a tool to enhance learning, not as a means of replacing traditional instruction (Mishra &

Koehler, 2009).

Just as a teacher must know the content they are expected to teach, teachers must learn

how to use technology before they can be expected to teach students how to use it. Mishra and

Koehler (2006) also stress the importance of professional development that helps teachers

trouble shoot issues and find ways to incorporate technology for specific content needs. "Many

approaches to teachers' professional development offer a one-size-fits-all approach to technology

integration when, in fact, teachers operate in diverse contexts of teaching and learning" (Mishra & Koehler, 2009, p.62). Mishra and Koehler (2005) place specific emphasis on Learning by Design being necessary for exemplary professional development,

> Therefore, every act of design is always a process of weaving together components of technology, content, and pedagogy. The Learning by Design approach seeks to put teachers in similar roles as they work collaboratively in small groups to develop technological solutions to authentic pedagogical problems (p. 95).

Empirical

A review of existing literature showed a gap in information from rural middle schools in the Foothills of North Carolina. Unlike existing studies that focused on single subjects (Cayton-Hodges, 2015; Lee & Boyadzhiev, 2015; Lee & Chen, 2010; Ingram, 2017; Kennedy, Rhoads & Leu, 2016; Orlando & Attard, 2016; McEwen, 2015; Ngan, 2012; Soto, 2015; Tucker, Moyer-Packenham, Westenskow & Jordan, 2016), this study includes teachers from all four core subjects. This study also contributes to missing literature by focusing on rural middle schools unlike the existing literature that focused on urban schools, suburban schools, elementary schools, high schools, or colleges (Beeson, et al., 2014; Dekhane, 2013; Heath, 2017; Higgin & BuShell, 2017; Holen, et al., 2017; Luo & Murry, 2018; Varier, et al., 2017).

The existing literature discussed the use of technology in schools that did not have true one-to-one technology in the classroom or students were not able to take home the technology (Bartolo, 2017; Ciampa, 2014; Grant, et al., 2015; McEwen & Dube, 2015). The participants in this study taught in schools that provided a Chromebook for each student that could be used at home and provided internet hot spots for students who lacked internet access at home. The use

of true one-to-one technology for every student is another way this study is set apart from existing literature. This study can be used by school districts that wish to implement the integration of true one-to-one technology in their middle schools.

Practical

This study has several implications for teachers, curriculum specialists, and administrators. The implications were found through analysis of data from the personal interviews, focus group, and existing literature. These implications include the importance of using technology as a tool to enhance content, not overusing technology, not letting technology replace relationships, and provide time during professional development for teachers to practice with new technologies. These findings fit with the TPACK theoretical framework.

The participants shared the belief that technology is only a tool and should be used where it fits. Anne shared, "Sometimes I feel like using the technology simply to replace paper and pencil is not very effective as a as a lesson. It makes things easier, but it's not really any more effective in teaching than using paper and pencil." Todd stated, "You know, but technology is not the end-all be-all solution to all problems. It doesn't replace good teaching. It doesn't replace good teaching practices. It's a tool it's a powerful tool but it's still a tool nonetheless." The implication for this finding is that there is still a place for traditional practices in the modern classroom.

The participants shared that overuse of technology can lead to students becoming bored in the classroom. Robin shared "And to make sure you don't overdo it because I've heard a lot of my kids complain that certain teachers use their Chromebook from the time they get in there to the time they leave and they are very bored," Anne warned, "I would encourage the teacher to,

at least in my content area, to use it sparingly because a student can be disengaged when reading or distracted when reading." Overuse of technology can also lead to students suffering from headaches and eye strain. Erika shared, "I think that if you overdo it, and that's, that's the part that I'm kind of worried about, is the kids like complain being with computers all day. "My eyes are killing me. I've got a headache", you know, we had to keep that in mind too." This finding has implications for teachers and curriculum specialists when they are planning engaging lessons for students. The overuse of technology can have the opposite effect on student engagement.

Building relationships is very important for middle school educators (Alexander & Kealy, 1969; Lee, et al., 2016; NMSA, 2010; Smith, 2011; Thornton, 2018). The participants shared the desire to continue building relationships and not let technology take the place of the teacher. Matilda told me, "It enhances learning and like maybe you know increases those aha moments, but I don't want to try to replace me. I don't want it to replace our relationship." This has implications for teachers and administrators in schools that have implemented one-to-one technology in the classroom. Teachers and administrators need to find ways to focus on building relationships with students and not let technology be the only form of communication in the classroom.

The final finding from this study is the need for instructors to provide time during professional development for teachers to practice with new technologies. Anne stated, "I basically need time to devote to practicing it and using it and being able to write up the lessons to share it." When talking about a summer professional development "boot camp" Erika shared, "I'll just say I don't think that was the most effective way to do it because it was just too much it one time." This finding has implications for teachers, curriculum specialists, and administrators

who are providing PD on technology integration. Teachers need the time and opportunity to learn by design. Sitting in a lecture and hearing someone describe how to do something is less effective than allowing someone to use a hands-on approach to learning regardless of them being young adolescents or adults (Lee, et al., 2016; Lemley, Schumacher, & Vesey, 2014; Mishra & Koehler, 2003; Quinn, 2015; Rentfro & Mann, 2017; Zhao, 2015).

Delimitations and Limitations

This study took place in three rural middle schools in the foothills of North Carolina. I purposefully chose middle school teachers from three separate rural middle schools. Using more than one location allows more generalizability for rural middle schools incorporating one-to-one technology in the classroom. I also chose seventh and eighth-grade teachers from all four core subject areas. Incorporating the experiences of teachers from all four core areas and two grade levels also increases generalizability.

The locations for this study were majority Caucasian, lower-socioeconomic, rural middle schools; therefore, the findings for this study may not be generalizable to elementary schools, high schools, or urban schools. The findings for this study may not be generalizable to schools with a large minority population or schools in higher-socioeconomic areas. The locations chosen for this study did not contain sixth-grade classes. This study may not be generalizable to sixth-grade teachers.

Recommendations for Future Research

Although there are many existing studies on one-to-one technology in urban districts on other countries, there is a need for future research on the experiences of teachers in schools with true one-to-one technology in urban public schools in the United States. This transcendental

phenomenological study only focused on the experienced of core teachers in a rural middle school setting. Future studies focusing on the experiences of students using one-to-one technology in rural middle schools would help to develop a more complete picture of the one-to-one rural middle school experience.

Summary

The purpose of this transcendental phenomenological study is to describe the experiences of middle school teachers using one-to-one technology in schools in rural North Carolina. The guiding theoretical framework that guided this study was Mishra and Koehler's (2006) TPACK theoretical framework. The central research question and supporting research questions helped me to capture the meanings and the essences of the teachers using one-to-one technology in the classroom. The individual interviews and focus group interview allowed the participants to share their experiences integrating one-to-one technology with their pedagogical and content knowledge. Using the shared experiences of the participants, this study found that teachers believed in the importance of using technology as a tool to enhance content not to replace traditional teaching practices or relationships between teachers and students. The participants in this study also shared the importance of not overusing technology. Participants reported that when technology was overused students become bored, claim to have headaches, and complain of eye strain. The shared experiences of the participants in this study should be considered by rural middle school teachers, curriculum specialists, and administration when they are integrating technology within the academic setting.

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APPENDICES

Appendix A: IRB Approval Letter

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

August 28, 2019

Louise Cline-Caulder
IRB Exemption 3856.082819: A Phenomenology of Teachers' Experiences Using One-To-One Technology in Rural North Carolina Middle Schools

Dear Louise Cline-Caulder,

The Liberty University Institutional Review Board has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under exemption category 46.101(b)(2), which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:101(b):

> (2) Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if . . . the following criteria is met:
>
> > (ii) Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation;

Please note that this exemption only applies to your current research application, and any changes to your protocol must be reported to the Liberty IRB for verification of continued exemption status. You may report these changes by submitting a change in protocol form or a new application to the IRB and referencing the above IRB Exemption number.

If you have any questions about this exemption or need assistance in determining whether possible changes to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office

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Appendix B: Recruitment Letter

04/23/2019

Dear academic core content teacher,

My name is Louise Cline-Caulder. As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for an educational doctoral degree (Ed.D.). The purpose of this transcendental phenomenological study is to describe the experiences of middle teachers using one-to-one technology in schools in rural North Carolina. The research questions for this study will help me to capture the meanings and the essences of the teachers using one-to-one technology in the classroom, and I am writing to invite you to participate in my study.

If you are willing to participate, you will be asked to complete a brief questionnaire, participate in a personal interview, and participate in a brief focus group interview. It should take approximately one hour for you to complete the interview and 30 minutes for you to complete the focus group interview. Your name will be requested as part of your participation, but the information will remain confidential and a pseudonym will be used in place of your name in the study.

To participate complete the linked questionnaire. Once I receive your completed questionnaire answers, I will email you to set up a date and time that will be convenient for you to participate in the personal interview.

A consent document is provided as the first page you will see after you click on the questionnaire link. The consent document contains additional information about my research, please click on the survey link at the end of the consent information to indicate that you have read the consent information and would like to take part in the survey.

Please click this link to access the informed consent document and questionnaire.

Sincerely,

Louise Cline-Caulder
Doctoral Candidate Liberty University

Appendix C: Informed Consent Form

CONSENT FORM
A PHENOMENOLOGY OF TEACHERS' EXPERIENCES USING ONE-TO-ONE
TECHNOLOGY IN RURAL NORTH CAROLINA MIDDLE SCHOOLS
Louise Cline-Caulder
Liberty University
School of Education

You are invited to be in a research study of the experiences of teachers from rural schools in North Carolina who are using one-to-one technology in their classrooms. There is lack of research on the experiences of teachers who use one-to-one technology in rural middle school classrooms. The problem is that this void inhibits the ability of educators to benefit from the experiences of their peers. You were selected as a possible participant because you are a core subject teacher in a rural North Carolina middle School. Please read this form and ask any questions you may have before agreeing to be in the study.

Louise Cline-Caulder, a doctoral candidate in the School of Education at Liberty University, is conducting this study.

Background Information: The purpose of this transcendental phenomenological study is to describe the experiences of middle teachers using one-to-one technology in schools in rural North Carolina. The research questions for this study will help me to capture the meanings and the essences of the teachers using one-to-one technology in the classroom.

Procedures: If you agree to be in this study, I would ask you to do the following things:
1. You will be asked to complete a questionnaire at the beginning of the study to allow me to collect demographic information, describe your familiarity with TPAK concepts, and record your thoughts when the one-to-one concept was first introduced to you. The questionnaire should take approximately 30 minutes to complete and you will be able to complete it online at your convenience.
2. You will also be asked to participate in a single interview that will last approximately one hour. The interview will be recorded using two small recording devices. The recordings will be kept confidential. The interviews will take place in your classroom to allow me to experience the lived experience of the classroom setting. The interviews will take place during a teacher workday or your planning period and will not interfere with instruction time.
3. You will also be asked to be involved in a focus group at your site. The focus group sessions will be held in the media center, teacher lounge, or a conference room at your site and will last approximately 30 minutes to an hour. The focus group sessions will be recorded using two small recording devices. The recordings will be kept confidential.

Risks: The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

Benefits:

Participants should not expect to receive a direct benefit from taking part in this study.

Benefits to society include providing information that may help other teachers from rural middle schools prepare to incorporate one-to-one technology in their classrooms.

Compensation: Participants will not be compensated for participating in this study.

Confidentiality: The records of this study will be kept private. In any sort of report that I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records.

Include the following in this section:
- Participants will be assigned a pseudonym. I will conduct the interviews in a location where others will not easily overhear the conversation.
- Data will be stored on a password locked external drive in my safe at home and may be used in future presentations. After three years, all electronic records will be deleted.
- Interviews will be recorded and transcribed. Recordings will be stored on a password locked external drive in my safe at home for three years and then erased. Only the researcher will have access to these recordings.]
- I cannot assure participants that other members of the focus group will not share what was discussed with persons outside of the group.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

How to Withdraw from the Study: If you choose to withdraw from the study, please contact the researcher at the email address/phone number included in the next paragraph. Should you choose to withdraw, data collected from you, apart from focus group data, will be destroyed immediately and will not be included in this study. Focus group data will not be destroyed, but your contributions to the focus group will not be included in the study if you choose to withdraw.

Contacts and Questions: The researcher conducting this study is Louise Cline-Caulder. You may ask any questions you have now. If you have questions later, **you are encouraged** to

contact her at lclinecaulder@liberty.edu. You may also contact the researcher's faculty chair, Dr. Russell Yocum, at ryocum@liberty.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

Please notify the researcher if you would like a copy of this information for your records.

Statement of Consent: I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

☐ The researcher has my permission to audio-record me as part of my participation in this study.

_____
Signature of Participant   Date

_____
Signature of Investigator   Date

Please click this link to access the questionnaire if you wish to participate in my study.

Appendix D: Participant Demographics Questionnaire

1. Please choose your age range: 21 to 30, 31 to 40, 41 to 50, 51 to 60, 61 or older.

2. What is your gender?

3. What is the highest level of education you have received?

4. What subject and grade level do you teach?

5. How long have you been teaching this grade level?

6. Describe your thoughts when the integration of one-to-one technology was first introduced to you.

7. Describe the setting where the integration of one-to-one technology was first introduced to you.

Appendix E: Standardized Semi-Structured Open-Ended Interview Questions

1. Please introduce yourself to me, as if we had never met before.

2. Please walk me through a typical day in your classroom.

3. Please you tell me about some of your favorite teaching memories.

4. What made them special to you?

5. Please tell me about any particularly challenging moments you experienced while teaching?

6. What made them so challenging?

7. How would you describe your level of comfort using technology outside of the classroom?

8. How would you describe your level of comfort using technology in the classroom?

9. Please describe a successful lesson you have designed that uses technology.

10. What made this lesson particularly effective?

11. Please describe an unsuccessful lesson you have designed that uses technology.

12. What made this lesson particularly ineffective?

13. Please describe how one-to-one technology influences your pedological decisions?

14. Please describe how one-to-one technology influences the way you present content to your students?

15. How would you describe professional development related to one-to-one technology integration offered at your school or district level?

16. Please describe professional development related to technology that would be especially useful for you.

17. What insight could you offer to a teacher whose school is integrating one-to-one technology for the first time?

18. Please share anything that you would like to add regarding one-to-one technology in the classroom.

Appendix F: Tentative Focus Group Open-Ended Interview Questions

1. I would like each of you to tell me a little bit about yourself?

2. Please describe how technology has affected you as a professional educator?

3. How would you describe the support offered by your peers regarding technology integration?

4. How would you describe the support offered by your school administration or district regarding technology integration?

5. I would like each of you to offer insight into strategies that may be useful for other educators using one-to-one technology in the classroom?

6. Please add anything that you can regarding your experiences using one-to-one technology in the classroom?

Appendix G: Sample Transcript with Bracketing

Q1: Researcher: Please introduce yourself to me as if we had never met before.

Participant: I'm Camilla [name changed for autonomy]. I teach eighth grade social studies at Foothills Royal Middle School [name changed for autonomy]. I'm a national board certified teacher. We teach North Carolina history. This is my 28th year to teach.

Q2: Researcher: Please walk me through a typical day in your classroom.

Participant: Typical day would be for classes, for social studies classes, two hours for planning at the end of the day, but in my class, I would have a warm-up up on the board *[I use a bell ringer every day too.]* and this year I have decided that I'm going to use, I'm going to make a booklet that they can reference back to on topics. So far. we've done economics and we've done geography and we're beginning our Revolutionary War part of our of our notebook. So, they cut out a picture that I have for them and then I have a slide on the board and they copy what it says on the board about say the Constitution and then they paste the picture that goes with it, so that they have a visual reminder of what the words are talking about and then we begin our class. And I have put a textbook on their computer *[I also had an online text book when I taught science. Many of my students still preferred to get the printed book off of the shelves. Looking at her room, there were no printed text books.]*. I've also put another book that we use regularly in Google Classroom on their computer. And so they pull up their textbook, or the other book, or whatever materials. It is even, um, say that we use a worksheet, I don't have to run copies of worksheets *[In many schools copies are limited.]*. It's in Google Classroom so they can pull it up in Dock Hub and write on it *[Doc Hub allows users to type directly into a PDF. I personally have had limited success using it.]*.

An example of today, we read from another resource. I let them read paired share together in pairs and I have a SchoolNet test for them that's eight questions. And so they can tie in, they're reading for informational text. Like today, they can tell their pages so they can have the book up and they can have their quiz looking for the information as they read through it. And I think that that helps them to be able to do better because they can find the answer and search for the answer in the reading very much like it is on the NCFE or the EOG. *[NCFE stands for North Carolina Final Exam and EOG stands for End of Grade test.]*

And then after I gave them about 35 minutes for that, then we came back together as a class. We discussed the section that they read in their ... in their paired shared reading group and then we read the next very small chapter together in class, as a class, and then I assigned the quiz for them to take on their own.

Q3: Researcher: Tell me about some of your favorite teaching memories.

Participant: Some of my favorite teaching memories are when testing wasn't important or at least one social studies wasn't tested because I did more hands-on kind of things. We, I taught seventh grade Asia, Africa, Australia, and the Middle East, and that was before they redid the curriculum and we did projects in my class. All the time kids would bring their they would have a choice of activities they wanted to do. I would give them somewhere between 5 and 10 choices of an activity say we're doing Egypt they could make a mosaic either with tiles and grout and all that or they could take pieces of paper and they could draw them a mosaic it it didn't have to be the elaborate activities.

I've had sarcophaguses made in my classroom where we actually made them students made totem poles when I taught eighth grade, but they actually physically made things and it was so

much fun. And we played the China's silk route simulation and Warlords of Japan simulation. It was my kids were very much out of their seats very much involved very much in groups. And there just wasn't the stress of thinking about the tests all the time and we read novels to learn our curriculum, but it has changed now and so that kind of teaching doesn't work. *[These favorite memories are not related to technology. I also enjoy hands-on activities with my students.]*

Q4: Researcher: What made them special to you?

Participant: The kids were engaged; you know having fun while they learned. It made teaching exciting. *[She was smiling and looked excited when she shared memories of the students' engagement.]*

Q5: Researcher: Please tell me about any particularly challenging moments you experienced while teaching.

Participant: I think probably one of the most challenging times was when my school went to one-on-one computers. Chromebooks with our kids was very challenging because that first year when we got them in January, I did not feel prepared at all to be able to help my kids with their Chromebooks. I barely knew how to use it myself and frustration would be like creating a budget and I knew that certain websites worked and then all of a sudden they had been taken out of existence so they didn't work anymore and you're trying to tell 30 kids to go to this website. It's not there so they can't get the information that they need when you know that two months before when you were trying to put all this. together the website was there. So that's probably the kinds of frustrations that's been difficult. *[This mirrors previous research by Koehler & Mishra in their TPACK studies.]*

Q6: Researcher: What made them so challenging?

Participant: I barely knew how to use it myself and I didn't know how to help the kids. They just kept asking how to fix it, when you know there are 30 asking you at one time. *[Her frustration was visible in the way she was twisting her hands and frowning while discussing this.]*

Q7: Researcher: How would you describe your level of comfort using technology outside of the classroom outside of the classroom?

Participant: I don't do really difficult kinds of things. I mean, I have a smartphone and I send texts and emails and word is easy to use with some training. I've learned how to use most of the Google apps or at least be able to find my way through it. I think that I probably, for someone my age, has at least as good as most people or maybe a little bit better.

Q8: Researcher: How would you describe your level of comfort using technology in the classroom?

Participant: Two years ago, I would say my stress level from one to 10 was about nine every day. With the workshops that the county has given us, it has allowed my stress level to be about a three or four depending on what we're doing and depending on are we at the beginning of the year where the kids have forgotten how to like tile their pages or, or how to get to website or they can't type it email address incorrectly and they keep saying well I've sent it to you. I've sent it to you, and it doesn't come, and you say "bring your Chromebook up and I'll help you. Let me show you how to send this document out of Doc Hub to me" and they say "well there's your email address," and then it's wrong so, you know just simple things I think now that two or three years ago would have been seven, eight, nine is now a two or three for me. *[I too find the beginning or the year to more difficult. It can be hard to train students.]*

Q9: Researcher: Please describe a successful lesson you have designed using technology, or that uses technology. *[I added or uses because when I said "designed" she shook her head as if to say she had never designed one.]*

Participant: Well, one of the things that I have enjoyed doing is teaching the Holocaust and every year I have my kids read a novel historical fiction novel biography autobiography and journal about it. And I think that since they type their responses now I get more of a response to it because they're actually typing and it goes faster for most of them, and it's faster much faster for me to read because I'm not trying to decipher their handwriting. *[I also find it much easier to read student work when it is typed.]* I can read and I can make comments on their paper very easily by simply highlighting it and writing my comment, comments they get back faster for that. Activities that I hope to do this year and talk about that, is that I hope to add into my curriculum this year to go to the National Holocaust, um, Holocaust website and have them actually research the new part of the Holocaust Museum where they will look up, "What did American know when did we know, what, how did we find out, what did we do," and have them kind of really get a picture of why did we stay out of World War II for so long, even though we knew the atrocities that were happening? Why did we stay out? What caused us to stay out of World War II? I want them to be able to do research and learn how to do the research because my kids who are going to college will have to know how to do research on this, and I think it's so important to learn now.

Q10: Researcher: What made this lesson particularly effective?

Participant: I think when we learn about, whenever I teach the Holocaust my kids, it's not exactly knowledge of the atrocities. How many people died? Where did they die? When did

they die? How did they die? But for me, it's more my kids learn empathy and sympathy and how to have compassion for other people and how not to be a bystander when they see bullying happening that they stand up and they say something. *[There are antibullying posters on her wall and throughout the school. I also find it important to teach empathy and sympathy.]*

Q11: Researcher: Please describe an unsuccessful lesson you design that use technology.

Participant: A couple years ago, I do a budget every year, and a couple years ago. I tried to do the budget on the internet with them, and honestly, I tried to use somebody else's lesson plan format. All that, trying to get my feet wet into this whole using technology thing, and it was a total bomb kids couldn't get to the websites. *[This incident is the same one she spoke of earlier and she is visually bothered by the memory. She has stopped smiling.]*

Q12: Researcher: What made this lesson particularly ineffective?

Participant: They didn't understand I wasn't familiar enough with the websites to know how to actually kind of get around some of the things that, that was being blocked from, the you know, the county block for the internet? So, I didn't know how to get around it. I didn't know how else to, to get them to those kind of things. So that was a total disaster. *[I have also set up things at home that were blocked for students due to a web filter.]*

Q13: Researcher: Please describe how one-to-one technology influences your pedagogical decisions.

Participant: I think that it's helped me to think outside the box a whole lot more. I think that it's helped me to actually spend a little time researching, seeing what can we learn and to realize our kids are not just competing with Foothills Rural Middle School or Foothills Rural high school or Rural County, *[She named the acutal schools and district, so I changed the names for*

anonymity.] but when they go to college, they're competing with the whole country, and sometimes people outside of the country for that slot to go to that college. So, it's important for them to know how to research appropriately, know what is a scholarly source. What's not a scholarly source? How to site things, which was interesting to learn this summer, how to actually just click and it'll site it for you, which was awesome, and how to do good research. To put Grammarly on their computer. To hopefully help them actually use it and when it comes up and says something's wrong to click on it and fix it. And just teach them basic skills that really with or without college they're going to need to know how to do. *[I also have students use the site feature built into Google Docs.]*

Q14: Researcher: Please describe how one-to-one technology influences the way you present content to your students.

Participant: Oh, I never have to draw pictures on the board anymore. *[She has pictures drawn over the windows to her closet. These are part of her "word wall."]* I never have to write up there and them decipher my handwriting. I can type it all now and they can read it clearly. I can find pictures that actually show what I'm trying to teach and not have to draw my stick figures and try to decipher what some of those pictures, I mean because my drawings are horrible.

It has made teaching more thoughtful more. So if you think you're competing, what you really are you're competing with is those games that they like to play. And so, when you find videos that are educational, you don't want the boring documentaries that used to be there, now you can go to TED talks and you can go to the YouTube and there's Teacher Tube and there's all kinds of things out there that explain your curriculum a whole lot better. *[I also use video in my classes on occasion.]*

Q15: Researcher: How would you describe professional development related to one-to-one technology integration offered at your school or District level?

Participant: Well, I was thrilled last year to find out that my County was offering Google Level 1 Certification so that you would know how to use. not just Google Docs, but Google Sheets, Forms, Classroom, Emails, everything that Google offers. YouTube, how to make things with it. I was thrilled that on year three, think three years of having Chromebooks, that we finally got that kind of intensive training, not just on a specific app, but on the whole gamut of Google, to help us to really have a much better idea of how to use it, how to implement it and it has made teaching not so stressful for me, to actually know how to use some of the apps and programs in Google. I didn't say that very well. *[My background in computers makes it harder for me to make a personal connection to this issue.]*

Q16: Researcher: Please describe professional development related to technology that would be especially useful for you.

Participant: I would like to learn more about SchoolNet. When it messes up, you know it won't sync with gradebook, and I don't know how to fix it. It's, it is very frustrating. *[I have had to help several teachers get SchoolNet to work correctly.]*

Q 17: Researcher: What insight could you offer to a teacher who scores integrating one-to-one technology for the first time?

Participant: Take all the technology classes you can take.

Q18: Researcher: Was there anything else that you would like to add regarding one-to-one technology in the classroom?

Participant: I don't know of any. *[We shook hands and I turned off both devices.]*

Appendix H: Example Of Theme With Significant Statements

Participant	Theme One: Comfort Level with Technology Influenced Shared Experience
Camilla	" Two years ago, I would say my stress level from one to 10 was about nine every day. With the workshops that the county has given us, it has allowed my stress level to be about a three or four depending on what we're doing and depending on are we at the beginning of the year where the kids have forgotten how to like tile their pages or, or how to get to website or they can't type it email address incorrectly and they keep saying well I've sent it to you. I've sent it to you, and it doesn't come, and you say "bring your Chromebook up and I'll help you. Let me show you how to send this document out of Doc Hub to me" and they say "well there's your email address," and then it's wrong so, you know just simple things I think now that two or three years ago would have been seven, eight, nine is now a two or three for me." " Well, one of the things that I have enjoyed doing is teaching the Holocaust and every year I have my kids read a novel historical fiction novel biography autobiography and journal about it. And I think that since they type their responses now I get more of a response to it because they're actually typing and it goes faster for most of them, and it's faster much faster for me to read because I'm not trying to decipher their handwriting. I can read and I can make comments on their paper very easily by simply highlighting it and writing my comment, comments they get back faster for that. Activities that I hope to do this year and talk about that, is that I hope to add into my curriculum this year to go to the National Holocaust, um, Holocaust website and have them actually research the new part of the Holocaust Museum where they will look up, "What did American know when did we know, what, how did we find out, what did we do," and have them kind of really get a picture of why did we stay out of World War II for so long, even though we knew the atrocities that were happening? Why did we stay out? What caused us to stay out of World War II? I want them to be able to do research and learn how to do the research because my kids who are going to college will have to know how to do research on this, and I think it's so important to learn now."
Erika	"Pretty good. I think that that's where I'm at, that at, that years 20 sometimes. I've got some teachers who have been teaching little bit longer than aren't quite as comfortable with it, but just in general on that person that when I go to workshop and they say, oh try this I do as soon as I come back because if I don't I'll forget about it. So I'm really bad about it. They make fun of me about that and they say, you know, it's always, "gonna try it she'll do it." And so I will see and some things are not good some of the different, you know, whenever the tech people come out and say, oh try this we you know hit some roadblocks but, I think it's great. I think in language arts is one of the best things ever for us because of so many different things that we can use it for. I mean, it's just amazing what, how it's, how it's changed things because like before if you didn't have a book, or notebook, we don't have paper. I mean like we get a case of paper every year now, and so like we don't make copies we just don't have to. so it is like a game changer for me."
Hope	"I cut my teeth in a one-to-one school. So I am, I don't have issues with it, and I end up solving some issues that other teachers have at times." " I did a lot of, when I was at the high school, I did a lot of PBL kind of things and one of the ones that we did was. I had my students design and basically they worked with the drafting teacher and we designed an earthquake proof house."

Irene	"I am very comfortable with technology, its like,you know, I use it all the time at home and at school." "I did a really cool thing with my students this year. We used, used computers, we used Desmos to plot points on a graph. The kids used the graphs they made, they used their own points, to create cities. We hung them in the hall and our faculty and staff voted on their favorites. You know, it was really, it was really a fun thing."
Jessie	"I'm very comfortable with it." "Okay, I don't know if there are lessons that I designed specifically to just use technology but I use a lot of these techniques they use their Chrome books every day with me and we do that and many different ways. There are times where they will say, um, if we're having a test and it's not from the Pearson textbook and they have to submit their answers through a Google form and then I have to go through the Google form and analyze all that data. There are times where we use Edpuzzle video to either introduce a topic, connect, or give the video form of the text that we've read. We do a lot, a lot of my vocabulary I use Quizzes and they loved it because they get their grade immediately. They don't have to wait for me to grade that. We use a lot of NewsELA because it can level the text for them we use at times. We're getting ready to, last year they had to do their research. We did a research project instead of writing the full out research paper. They had to take that information and extrapolate what they wanted to and turn that into a digital presentation and that was a great experience, because the whatever, whatever reasons, the Chromebooks that they had last year compared to the Chromebooks that the eighth graders have, I don't know what it was, but they were a different set of Chromebooks and they really struggled to work with getting video embedded into their presentations, which was one of the components they had to use video and we just talk about how this is real life. And sometimes you got to, you got to be flexible, adopt your plan and it was great to see them work through that. They worked in groups and it was great to see them work like that."
Kim	"I'm saying pretty comfortable with it. I mean I usually am using technology on, I mean every day, outside the classroom whether it's my phone and social media or it's my computer and working on stuff for school or reading the emails or you know, I'm pretty comfortable with it." "I would say that it's very close to the same. I was almost less confident just because with the programs that I know I'm comfortable with, but when I use a program or something for the first time I get nervous, but I would say I'm pretty comfortable with using because I can troubleshoot pretty well." "Okay, I was pretty excited when I created a card sort online. And of course, I had to do research on what I wanted and how to how to make it what I want because teaching the new, you know teaching online this year that being new. I'm having to create like create things that I normally do in class that are hands-on and make them digital, and so that was fun. I was really excited, and the kids really liked it too, being able to drag and drop those things where they needed to go and sort those things out."
Matilda	"It's pretty good. I'm, I mean,like, I'm as good as I need to be for my class. Like I actually considered teaching online classes." "Yeah. Okay. So like I use a technology like there was there's this one Phet I would call it "fed" and it's like a simulation um, like with the Gizmos. We have simulators and stuff like that too. But I like the Phet stuff, like so, it was like a force in motion activity. And so they had to actually like, make like, you know, we kind of had to come up with a hypothesis beforehand and then we could actually like you move the little people and it would like work it out and then they had roller coasters there was all different like it was all based on physics like there was like, like force and mass versus x in an acceleration and stuff like

	that. Than they had roller coasters which has potential and kinetic energy. So there's all different ones there. So that was actually really fun because I like, you know, we totally were able to, I mean we can't go and do it on a real roller coaster and I don't have a big giant model roller coaster. So that was actually really good and they, you know, and the kids really enjoyed it and then they can invent like crazy roller coasters. It didn't work and they thought that was great to trying to make it, you know?"
Meagan	"I would say I am pretty comfortable with technology. I always try it out beforehand though. Students are usually very tech savvy as well, so I like to ask them things and let them teach me." "I really enjoy using interactive choice boards. I did one last year so students could gain prior knowledge on Anne Frank and the Holocaust prior to reading the play version.Since they had not studied WW2 yet in their social studies class, students were able to digitally explore a crucial piece of our history. This helped them understand the setting of what we were preparing to read. They also had choices on what activities they could go work on. Choice always increases interest I feel."
Peggy	"I don't use a lot of technology outside the classroom, I mean other than Skyping with my grandchildren." "I... I mean I feel like it takes a lot more preparation on my part because I feel like honestly since I'm not as tech savvy as some of these students, because I'm so old, and feel like I'm late to the party because so much changed while I was out of the classroom." "Can we come back to that one, because I can't think of an example right now."
Robin	"I actually feel better inside the classroom than I do outside the classroom, you know, my husband pretty much does everything else at home and you know, I don't mess with it. You know, I don't I really don't but in the classroom. I'm getting better and it's because I think we've had good people to kind of help us like last week, last week or the week before we did a session on Pear Deck. And so I had not been exposed to Pear Deck and it is phenomenal. I mean, it's great. I love it with my slides. Now my side shows, and it's now interactive and the kids, because I did a lot of slideshows with the kids, so they can have those to look back. Also because I don't use a textbook a whole lot. So they've got that to look back on, but I love it now. So that's something else I've added. So I try to add something new. My goal is like once a month to try to add something new. So that was my new theme for this month is Pear Deck. " "I love escape rooms and scavenger hunt type things. So I've done a lot. I've designed my own Escape rooms. Now when I first started doing them about four years ago. I started doing Escape rooms and I use the actual the the boxes with the locks and all that kind of stuff and our AIG department has those like they purchased them for our County. So we have a lot of those and I did those and then as the years progressed I thought I can put this online now. I looked at some on Teachers Pay Teachers, and I thought, I bought one that was okay. And I thought I can do these myself I can do this. So I've done those. I'd always do one at the beginning of the year about me and to help them get to know me and then I have them kind of create one as a group that we all do about them, so we can kind of get to know each other and they love it. So that's one of the best ones is that when I show them about me and then I give them thechane to do one themselves and they like that."
Suzanne	"I love it too because it provides immediate feedback for them and for me." "I don't know if you could say that I just designed it because a lot of the math curriculum is already pre-made, but Desmos offers a lot of cool technology Integrations to our lessons. So basically if I'm teaching Scatter Plots and I want something technology-wise from Desmos. I just go and I search, and I find something that maybe correlates to what I'm doing that day. And that would probably be the best opportunity. I have it something that would be technology-based for them because I have different screens I could put up there

	on the projector. And it will overlay all of their responses. Like if I say graph a line of 2x, they all graph there line and then I just click a little magic button over here and it will show up every single kid's graph on one graph on the screen for everybody else to see and they can pick out and say that kid's slope is negative that can't be a slope but 2X or something like that. So that's, I think fun. "
Todd	"I like technology. I'm kind of a tech nerd so it doesn't bother me. Uh again, I enjoy using technology in the classroom." "We do, we review, a lot of the hyperlink docks. I like those, creating, creating the, having students create interactive maps using Google Sheets and then populating it with information and in creating a map from it using Google Maps. I like that. It allows students to actually see visual representations of things were talking about. But again, I those are just a couple but there are others the biography projects that look like Facebook pages the students seem to enjoy those. So there are several."

Appendix I: Example Of Individual Textual Description

Participant: Todd	
Theme	**Significant Statement**
Theme One: Comfort Level with Technology Influenced Shared Experience	I like technology. I'm kind of a tech nerd so it doesn't bother me. Uh again, I enjoy using technology in the classroom. We do, we review, a lot of the hyperlink docks. I like those, creating, creating the, having students create interactive maps using Google Sheets and then populating it with information and in creating a map from it using Google Maps. I like that. It allows students to actually see visual representations of things were talking about. But again, I those are just a couple but there are others the biography projects that look like Facebook pages the students seem to enjoy those. So there are several.
Theme Two: Frustration with Technology Issues	My first hyperlink doc where the links for whatever reason wouldn't work that, that turned out not so great, but we learn from our mistakes and we move on.
Theme Three: Influencing Teacher Instructional Practices	Now some of the tools we have, especially with like showing video clips, with like things like Edpuzzle or the ability to put PDF files of readings and the access to short passages to have students read or the use of e-books in the classroom has changed a lot and then it gives us access to more things than we've had before which is, is a plus.
Theme Four: Willingness to Learn New Technologies	It's good. They, there's a great deal offered. I think a lot of it comes down to the person. Are you willing to go to these trainings and then actually apply what you've learned or do you just say hey, I got the PD and then you continue on any kind of PD whether its technology or not it all comes back to, are you willing, is the individual teacher willing to pursue it? Are they willing to put the time in to say, "can I adapt this to my classroom? Can I make this work for me?" Because if you just see it once and then don't use it. It will not help you very much.
Theme Five: Perceived Student Needs	I like one-to-one, it gives us a lot of options. We never had but the, the one-to-one can't be used all day every day. The kids burn out on it. It, it doesn't replace good teaching.
Theme Six: Technology is a Tool	It's altered how I do, It's altered how I have worked turned in now many times. I do have stuff that's turned into digitally because it always you have proof of that pedagogically though. Not a lot because technology just

	like everything is just a tool in terms of it can make certain things easier. You know, but technology is not the end-all be-all solution to all problems. It doesn't replace good teaching. It doesn't replace good teaching practices. It's a tool it's a powerful tool but it's still a tool nonetheless.
Theme Seven: Professional Development	You know in an hour-long PD, or two hour, however long it is, you're not going to be able to, you can see it and if it's something you like, that's fantastic, but the only way to truly apply something is, you're going to have to take the time and go back and play with it yourself and figure out how to make it work best for you. It's not, you're not going to go in and get a canned, this is the magic button to push and go. You've got to put the work in, figure it out, and then once you figured out, you can pass it along to your students.