TEACHER IMPLEMENTATION OF MOBILE LEARNING INITIATIVE
AT A SIXTH GRADE SCHOOL: A PHENOMENOLOGICAL STUDY

by

Tina Hemphill Fitts

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 qualitative, phenomenological study was to investigate teachers’ perceptions of and experiences with the adoption and implementation process as teachers at Tops Sixth Grade School (all participant and institutional names herein are pseudonyms, unless otherwise specified) transition from a one-to-one laptop initiative to a school-wide adoption of mobile learning. Using Rogers’s IDT and Wenger’s CoP theories, this study defined the adoption process as the manner through which an individual or group seeks and processes information about an innovation and then forms an attitude that leads to adoption or rejection. Participants included eight sixth-grade teachers whose students utilized a variety of mobile devices across multiple platforms to enhance learning. Using phenomenological reduction to analyze data gathered through in-depth, semi-structured interviews, observations, and an online focus group, the study revealed several overarching lessons. Participants experienced feelings of frustration, anxiety, and uncertainty because of lack of 24/7-student access, computer and connectivity issues, and time constraints resulting from a perceived learning curve for students and the implementation of more rigorous CCSS. Possibly marginalizing at-risk students, teachers planned more remediation and lower-level thinking skills because they perceived students from lower SES homes without at-home access or students with lower achievement levels as less able to develop ICT literacy skills. Needing more time for developing best practices and digital citizenship, teachers also desired additional collaboration between schools and job-embedded professional development.

Keywords: mobile learning, BYOD, Communities of Practice, Diffusion of Innovations, mobile technologies, technology adoption, professional learning communities
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Dedication/Acknowledgments Page

I would like to dedicate my work to my husband, Nathan, and my children, Bradley, Bethany, and Bailey, who have supported me throughout this journey. Additionally, I would be remiss if I didn’t thank my mom and dad who worked diligently to instill in me a lifelong love of learning. My father, Sir Robert (nickname), would have been proud to see all my hard work come to fruition. God has blessed me with friends, both old and new, who have supported me through moments of confusion, laughter, and tears. Specifically, I have depended on the prayers and knowledge from my great friends and colleagues, Kristy Luse, Lindsay Brett, and Karma Brown. No matter how late or early I called or texted, they were always there. Life has also brought me friends in unexpected places. One of these places is Liberty University. The EDUC 919 class developed and has continued to share an unusual bond. We have supported and encouraged each other and will continue to pray for each other as we seek to accomplish all that God has purposed in our lives. One particular close friend I found at Liberty University is Martha Plumlee. Though we did not meet in person until late in the degree program, we quickly developed a “David and Jonathan” type of friendship. I thank God for the rich blessing of her life as she encouraged me to move forward even when I wanted to throw up the white flag in surrender. Thank you to Dr. Dunn, who allowed me to pepper him constantly with questions. I appreciate his guidance and words of encouragement throughout the dissertation. Additionally, I would like to thank Dr. Yocum, Dr. Holubz, and Dr. Luse – your feedback was valuable as well. Above all, I am so thankful for my Heavenly Father who has blessed me with the most perfect gift ever—His Son, Jesus Christ, my Lord and Savior. It is through Christ and with His strength that I have been able to reach this goal.
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List of Abbreviations

English Language Arts (ELA)
Bring Your Own Device (BYOD)
Communities of Practice (CoP) (Wenger, 2007)
Common Core State Standards (CCSS)
Diffusion of Innovation Theory (IDT) (Rogers, 1995; Sahin, 2006)
Institutional Review Board (IRB)
Mobile learning (M-learning)
National Educational Technology Plan (NETP)
Partnership for Assessment of Readiness for College and Career (PARCC)
Personal Learning Network (PLN)
Professional Development (PD)
Professional Learning Communities (PLCs)
Research Question (RQ)
Technological Pedagogical Content Knowledge (TPCK) (Mishra & Koehler, 2006)
CHAPTER ONE: INTRODUCTION

Overview

With over 4.8 billion mobile phones worldwide (Norris & Soloway, 2011) and demands for new teaching and instructional approaches in education, the urgency to determine the impact of m-learning environments has never been greater (Clark, 2013). Mobile devices are utilized for learning in the classroom and laboratory, at home and on field trips, and in distance learning environments (Adiguzel, Vannest, & Parker, 2009; Cakula, 2008; Elmorshidy, 2012; Goh & Kinshuk, 2006; Maddin, 2011; Solvberg & Rismark, 2012). As mobile technologies have become more popular and affordable, and as school districts face budget cuts for funding of one-to-one laptop initiatives, many schools have begun to implement m-learning initiatives as a strategy for meeting the diverse needs of 21st century learners (Ross, 2013; Ting, 2012).

Background

In the past decade, technology has led reform efforts for K-12 schools by providing students with opportunities to attain 21st century learning skills. According to Petzke and Lopez (2010), “technology is a powerful tool with enormous potential for paving highways from outdated educational systems capable of providing learning opportunities for all, to better serve the needs of 21st century workers, communications, learning, and life” (para. 6). Increasingly, researchers and educational leaders believe technology will lead to higher student achievement, efficiency, and critical thinking skills (Bebell & O’Dwyer, 2010). Schools nationwide have reported practical benefits for students participating in technology immersion initiatives. Many programs have reported lower absentee rates and fewer behavioral referrals (Intel Inc., 2008; Texas Center for Educational Research, 2008). Likewise, several studies reported that students
who participated in these programs had better attitudes toward learning than their counterparts (Bebell & O’Dwyer, 2010; Gulek & Demirtas, 2005; Holcomb, 2009).

Conversely, teachers in technology immersion environments have responded with skepticism. Misuse of computers and mobile devices, including cheating, taking and sharing inappropriate photos and videos, bullying, playing games, and participating in social networking sites during school have been reported (Garland, 2010; Holcomb, 2009; Roblyer & Doering, 2013; Walker & Shepard, 2011; Weston & Bain, 2010). Furthermore, many teachers view technology as a distraction and a hindrance to standards-based instruction (Holcomb, 2009).

Predicting that by 2014, more people will likely use mobile devices to access the Internet than computers, Norris and Soloway (2011) posited that most K-12 students would begin using mobile devices for learning by the year 2015. While m-learning has become more commonplace in higher education and secondary environments (Brett, 2011; Liu & Han, 2010; Thomas & Orthober, 2011; Tremblay, 2010; Unal, Bodur, & Unal, 2012), the innovation of school-wide mobile devices to enhance learning in elementary and middle schools is relatively new.

**Situation to Self**

This study is significant to me as an eighth grade Advanced English Language Arts (ELA) teacher and curriculum coordinator in my district. Starting in 2009, I began using a laptop computer to integrate technology into lessons, and in 2010, all students in the district received an Apple MacBook computer. The implementation of the program has provided opportunities for personal and professional growth. As a teacher-leader for the eighth grade ELA program and district, I provide assistance and resources to teachers as they try to integrate technology and ubiquitous computing into classroom content. Working with teachers who have struggled to effectively integrate technology developed a curiosity about teacher perspectives
during the adoption and implementation process. Particularly, I wondered how they felt about utilizing mobile devices in their classrooms and how their perceptions impacted the adoption process. I hoped to gain valuable insight into the successes and struggles teachers experienced so that I could more effectively mentor new and experienced teachers. As a teacher in the one-to-one laptop program, I also hoped to be able to provide in-depth analysis of the program in comparison to the m-learning initiative. As such, axiological philosophical assumptions were used in this study because some of the stories represented my interpretation and presentation of the research topic. As I investigated participants’ experiences, I studied the phenomenon through the lens of a social constructivist framework (Creswell, 2013).

**Problem Statement**

As technological innovations rapidly change and impact society, these same tools impact how teachers challenge 21st century learners to develop global communication and critical thinking skills. The adoption of these innovations is occurring at an ever-increasing rate, as there is a rapid explosion of new technology. Many teachers who continue to struggle with technology integration have been bombarded with constantly changing technology initiatives, including m-learning (Ross, 2013; Ting, 2012). Since the learning of new innovations is equated with the complexities of learning a new language (Migliorino, 2011), school districts are spending large sums of money in professional development to prepare teachers for effective integration (An & Reigeluth, 2011; Ertmer et al., 2012; Kopcha, 2010). Still, teachers remain uncertain about the relative advantage of m-learning (An & Reigeluth, 2011; Lui & Han, 2010); therefore, a gap continues to exist in the available technological tools and the effective adoption and integration of these devices. As teachers educate 21st century students, they must become facilitators of instruction who utilize a variety of technology tools so that students not only develop digital
literacy, but also attain essential communication, collaboration, critical thinking, and problem solving skills that will help them succeed in a global economy.

**Purpose Statement**

The purpose of this qualitative, phenomenological study was to investigate teachers’ perceptions of and experiences with the adoption and integration process as teachers at Tops Sixth Grade School (all participant and institutional names herein are pseudonyms, unless otherwise specified) transition from a one-to-one laptop initiative to a school-wide adoption of m-learning. M-learning environments were generally defined as classrooms where students utilized a variety of devices across multiple platforms to enhance their learning. Additionally, the adoption process was defined as the manner through which an individual or group sought and processed information about an innovation, then formed an attitude and decided to either adopt or reject the innovation (Rogers, 2000).

**Significance of the Study**

Research has indicated that teachers use technology for routine tasks; however, they feel unprepared for integrating technology across content areas in order to enhance learning (Koehler & Mishra, 2009). While much research has been conducted on one-to-one laptop initiatives (Bebell & O’Dwyer, 2010; Holcomb, 2009; Weston & Bain, 2010) and on m-learning in academic settings for higher education and lower-elementary schools, there is a gap in the literature for studies conducted for grades six through eight (Ross, 2013; Ting, 2012). Since mobile devices, relatively new cognitive tools, are not being utilized to their fullest potential by students and teachers (Goh & Kinshuk, 2006; Solvberg & Rismark, 2012), and professional development on the implementation and utilization of mobile devices in classroom learning is lacking (Attard & Northcote, 2011; Ting, 2012), more research is needed on teacher perceptions...
of m-learning in school settings (Guerrero, Ochoa, Pino & Collazas, 2006; Lui & Han, 2010; Pozzi, 2007; Tutt & Klein, 2008). Overall, this study is important because students will be expected to compete in a global market where these tools will be essential to their success.

With fast-paced changes in technology initiatives, additional research may benefit teachers who seek to adopt and implement m-learning initiatives in ways that may enhance student learning. As teachers face the task of teaching 21st century learners using ever-changing technologies, it is important to determine ways to help teachers become more proficient with using mobile technology to enhance learning. To determine ways to aid teachers in the adoption and implementation of mobile technologies, educational leaders must initially attempt to understand how teachers feel and what they think throughout the process. By hearing the voices of teachers during the adoption and integration process, educational leaders may be more capable of providing assistance to teachers in effective use of the innovation.

**Research Questions**

The following research questions were used to guide this study and to provide information about teacher perceptions and experiences during the transition from a one-to-one laptop environment to a m-learning environment:

**Research Question One:** What are middle education teachers’ experiences with and perceptions of the mobile learning adoption and integration process? Due to time constraints and assessment demands, many teachers have doubted the usefulness of mobile devices (An & Reigeluth, 2011; Liu & Han, 2010). With small screen sizes, poor resolution, and lack of data input restricting the use of mobile devices, many teachers have continued to doubt the value of m-learning because the perceived task value is low (Liu & Han, 2010). Even though familiarity with mobile devices exists, teachers and students may doubt their usefulness for teaching and
learning (Ertmer et al., 2010; Liu & Han, 2010; Inan & Lowther, 2010). This perceived usefulness then impacts adoption of mobile technologies.

**Research Question Two:** *In what ways do teachers’ values, beliefs, professional needs, and past experiences with technology impact the adoption and integration process?* Previous research on the impact of technology integration on teacher pedagogy has indicated that teachers have not necessarily changed their practice to more student-centered instruction. Instead, they have continued to use a teacher-centered approach while reporting the use of technology to facilitate student engagement and learning (Holcomb, 2009; Weston & Bain, 2010; Ottenbriet-Leftwich, Glazewski, Newby, & Ertmer, 2010). Additionally, many teachers doubt the usefulness of mobile devices for teaching and learning (An & Reigeluth, 2011; Ertmer, Glazewski, & Newby, 2010; Hew & Brush, 2007; Inan & Lowther, 2010; Kopcha, 2012; Mouza, 2008). Despite research that has reported positive outcomes for students in technology-rich environments and school districts’ significant investments in technology and professional development, many teachers remain uncertain about the benefits of adopting technology initiatives (Holcomb, 2009; Roblyer & Doering, 2013; Shapley et al., 2009; Weston & Bain, 2010).

**Research Question Three:** *What are teachers’ perceived obstacles and/or benefits for mobile technology integration?* In order for mobile devices to be fully and effectively integrated into classroom instruction, educational leaders must have an understanding of the obstacles encountered by teachers in the adoption process (An & Reigeluth, 2011; Hew & Brush, 2007; Kopcha, 2012; Serin, 2012). Not only must teachers possess the required knowledge and ability, but district leaders must also understand the barriers teachers encounter. This understanding may lead to solutions that will aid in the adoption and integration process.
Research Question Four: What collaborative sources do teachers use to create and share information about mobile learning? Adoption of any innovation requires communication channels to provide and process information. It is this sharing of information that reduces uncertainty about the innovation (Rogers, 2003). Despite the importance of collaboration for improving teacher practice with technology, the norm in teachers’ cultures is isolation (Dufour, Dufour, & Eaker, 2008). “The most persistent norm that stands in the way of 21st-century learning is isolated teaching in stand-alone classrooms” (Fulton, Yoon, & Lee as cited in Dufour, Dufour, & Eaker, 2008, p. 169). Due to teacher isolation, teachers have little time or opportunity to discuss their concerns about technology integration. Professional learning must be embedded in social and educational practices. Triggs and John (2004) asserted that isolation among educators is “powerful” and is “fueled by external and internal pressures, of no time or opportunity to reflect on or discuss teaching with colleagues” (p. 437). Cifuentes, Maxwell, and Bulu (2011) argued that effective technology integration must include social activity within a community of learners. This community, which can include intentional or incidental outcomes, provides opportunities for educators to engage in collaborative activities and discussions, build trust relationships, and learn from each other’s practice (Wenger, McDermott, & Snyder, 2002).

These questions were appropriate for this study as Creswell (2013) contended, “Qualitative research questions are open-ended, evolving, and non-directional . . . restate the purpose of the study in more specific terms . . . start with a word such as ‘what’ or ‘how’ rather than ‘why’. . . and are few in number (five to seven)” (p. 138).

Research Plan

This study used a qualitative, phenomenological design, which was appropriate for studying the lived experiences or phenomenon of a group of people (Creswell, 2013). Collection
of data included observations, semi-structured interviews, and an online focus group. In addition to strengthening the study by using combined methods (Patton, 2002), these methods provided a rich, thick description of the experiences and perceptions of the teachers as they participated in the adoption and integration of a m-learning initiative (Creswell, 2013).

Participants for this study were eight teachers at Tops Sixth Grade School in a rural northeast Mississippi town. Creswell (2013) asserted this sample size is considered appropriate for qualitative studies. Additionally, Patton (2002) posited that small sample sizes are appropriate for qualitative studies because the sample provides “information-rich cases” about the phenomenon (p. 230). Participants were selected using purposive sampling. According to Patton, this sampling method solicits participants who have experienced the phenomenon being studied and meet the inclusion criteria being researched.

For data collection, initial interviews were conducted using closed-response questions. Teachers were selected based on closed-response questions at the beginning of the interview. These closed-response questions ensured all participants met the criteria of being involved in the adoption and integration of the m-learning initiative. Once participants were selected and informed consent had been obtained from each participant, I conducted initial interviews. Throughout the next five weeks, more in-depth, semi-structured interviews and teacher observations were conducted. At the end of five weeks, I conducted an online focus group to collect shared understandings about the m-learning adoption and integration process. According to Patton (2002), focus groups are advantageous when researchers are attempting to increase confidence in the patterns that emerge from individual interviews. Additionally, as participants interacted with each other’s responses and considered each other’s views, I was able to obtain
richer descriptions of the phenomenon (Patton, 2002). After the focus group was conducted, data from all three methods was analyzed using phenomenological reduction methods.

**Delimitations**

Participants in this study were limited to eight teachers who were participants of the m-learning initiative. Only teachers who participated in the m-learning initiative were chosen, as they were able to provide detailed descriptions of the initial experience, including barriers, needed resources, and impact on planning and teaching. Additionally, teachers from only one school in the district were chosen because this was the only school that was participating in the m-learning initiative at the time.

**Definitions**

To aid in the understanding of the study, this section contains important definitions of key terms used throughout this study.

*Adoption* – the decision to fully incorporate the innovation into one’s ongoing practice (Rogers, 2000)

*Mobile learning environments* – classrooms in which teachers utilize a variety of devices, both school-issued and student-owned, to enhance learning and create a philosophical change in instruction

*Communication* – a process in which individuals or groups reach a mutual understanding by creating and sharing information with each other (Rogers, 2003)

*Collaboration* – a process in which individuals work interdependently for the purpose of analyzing, impacting, and improving professional practice (Dufour, Dufour, & Eaker, 2008)

*Communication channels* – the ways in which messages are transmitted from one person or group to another (Rogers, 2003)
Diffusion – a social process in which an “innovation is communicated through certain channels over time among the members of a social system” (Rogers, 2003)

Innovation-decision process – gradually reducing uncertainty, this is the process through which an individual or group seeks and processes information about an innovation, then forms an attitude, and decides to adopt or reject the innovation (Rogers, 2003)

KAP-gap – a term used to describe the discrepancy between knowledge, attitudes, and practice when adopting an innovation (Rogers, 2003)

Knowing-doing gap – “the disconnect between knowledge and action, the mystery of why knowledge of what needs to be done so frequently fails to result in action or behavior consistent with that knowledge” (Dufour, Dufour, & Eaker, 2008, p. 467)

Mobile learning – a learning strategy concentrating on the instructional approaches utilized with the use of a variety of multiple devices and platforms

Professional learning communities – in continuous job-embedded learning, educators work collaboratively in “ongoing processes of collectively inquiry and action research to achieve better results for students” (Dufour, Dufour, & Eaker, 2008)

Relative advantage – the degree to which an individual or group believes the innovation is better than the idea it replaces (Rogers, 2000)
CHAPTER TWO: LITERATURE REVIEW

Overview

This chapter is comprised of four sections, including an introduction, theoretical framework, related literature section, and summary. Because the goals of a literature review are to “provide a comprehensive and up-to-date review of the topic” (Galvin, 2009, p. 13) and to outline a rationale for the research study, this literature review focused on the background of technology immersion and how this integration has evolved from one-to-one laptops to m-learning. An understanding of the history and evolution of technology immersion is important for educators as they encounter ever-changing technology innovations. Specifically, what have been the adoption practices in the past, and what barriers and outcomes have resulted? This literature review examined the background of 21st century educational technology, as well as the outcomes and barriers of technology initiatives and the adoption and implementation practices of educators. Additionally, it examined laptop initiatives and the emergence of mobile devices in education.

Introduction

Over the past decade, educational researchers have proposed that active engagement, social learning, continuous feedback, and real-world application are instructional approaches best suited for instructional environments rich in digital technology tools (Mouza, 2008). Active engagement, social learning, continuous feedback, and real-world application together represent constructivist pedagogy. Students who are involved in technology-rich environments with authentic and active learning become independent thinkers who can then transfer understanding to useful real-life settings (Mouza, 2008).
According to the National Educational Technology Plan [NETP] (2010), educators must make use of 21st century technologies because they are a pre-requisite for global readiness. Learning in the 21st century should not replicate learning that occurred in the 20th century (Ross, 2013). Instead of having students sit in rows of desks with teachers standing at the front of the classroom to impart knowledge, teachers should become facilitators of learning as they provide students the opportunities to collaborate, problem solve, and think critically (Mouza, 2008; Solvberg & Rismark, 2012). According to Crescente and Lee (2011), “the push for m-learning and revamping education methodologies has come from the idea that the current and future generations will not know life without elaborate electronic technology” (p. 117). For this reason, teachers must create “meaningful, memorable, and motivational” learner tasks (Crescente & Lee, 2011, p. 118). When mobile technologies are integrated effectively, students are given a foundation to be successful in a wide variety of careers (Dettelis, 2010).

**Theoretical Framework**

With the emergence of educational technology, educational leaders and teachers have been assigned the challenging task of educating students with 21st century learning skills. Technology should be integrated into the curriculum in an effort to keep up with the technological environment that society lives in outside of the educational setting. As Parkay, Hass, and Anctil (2010) advised, “Technology has transformed teaching and learning in our nation’s schools” (p. 322). Just as quickly as technology has evolved over the past decade, teachers have been required to make rapid adjustments to the types of technology used in their classrooms and the strategies used to immerse technology.

Professional development for educational leaders and teachers is essential when technology is integrated into the curriculum (Ertmer & Ottenbreit-Leftwich, 2010). In order to
use technology for the purpose of developing students’ higher-order thinking, creativity, and problem-solving skills, educators must be able to understand how to use the technology during instruction, but often lack the knowledge required to do so (Ertmer & Ottenbreit-Leftwich, 2010; Kopcha, 2010). As the educational landscape continues to change from one-to-one laptop initiatives to m-learning, it is imperative to understand how the adoption of new technology initiatives impact teachers and the pedagogy used in the classroom. As such, the theoretical framework for this study included Rogers’ (1995) Diffusion of Innovation Theory (IDT) and Wenger’s (2007) Communities of Practice (CoP) theory.

**Diffusion of Innovation**

Agreeing that individuals learn about or become aware of innovations arbitrarily (Rogers, 1995; Schauer-Crabb, 2002; Sherry & Billig, 2000), Rogers (1995) contended potential adopters learn about innovations through three sources: their own research, interaction with others, and change agents.

**Adoption rate.** Measured by how long it takes for a percentage of the social system to adopt an innovation, the adoption rate is the speed in which an innovation is adopted (Rogers, 1995; Sahin, 2006). According to Rogers (1995), the rate of adoption may increase when the innovation is deemed superior to earlier adopted innovations. Five characteristics are essential to the adoption process: relative advantage, compatibility, complexity, trialability, and observability (Rogers, 1995; Sahin, 2006; Schauer-Crabb, 2002). Table 1 describes each characteristic.
### Essential Characteristics for Adoption

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
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<tbody>
<tr>
<td>Relative advantage</td>
<td>Perception of the innovation is superior</td>
</tr>
<tr>
<td>Compatibility</td>
<td>Innovation meets needs of user; matches cultural norms</td>
</tr>
<tr>
<td>Complexity</td>
<td>Difficulty of innovation to understand or use</td>
</tr>
<tr>
<td>Trialability</td>
<td>Degree of experimentation with innovation</td>
</tr>
<tr>
<td>Observability</td>
<td>Dissemination of results</td>
</tr>
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</table>

Source: Rogers (1995)

**Adopter categories.** Contending that relative advantage and observability are essential elements in the adoption process, Rogers (1995) posited that there were four adopter categories in a social system: early adopters, early majority, late majority, and laggards (Figure 1).
Adoption process. Rogers’s (1995) IDT theory described the process of adopting innovations over time. Four main elements included in this theory are innovation, communication channels, time, and social system (Sahin, 2006). The innovation-decision process involves five steps that are attained in a time-ordered manner: knowledge, persuasion, decision, implementation, and confirmation (Rogers, 1995).

The process begins with an individual inquiring about the innovation by asking what, how, and why questions. Knowledge gained in this step includes awareness-knowledge, how-to-knowledge, and principles-knowledge (Sahin, 2006). The persuasion stage, a more affective-centered process, occurs as the individual develops positive or negative attitudes about the innovation. Next, the decision stage occurs where the individual chooses to either adopt or reject
the innovation. Two types of rejection can occur in this stage—active or passive rejection. Additionally, a discontinuance decision, which occurs when a previously adopted innovation is later rejected, can be seen as an active rejection (Sahin, 2006). The following stage, the implementation of the innovation, may bring about new concerns or uncertainties. During the implementation, reinvention, “the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation,” (Sahin, 2006, p. 14) is a focal element and can determine the speed in which an innovation is adopted. Finally, the confirmation stage occurs where the individual may have already made a decision about adoption but seeks support for his or her decision (Sahin, 2006).

Similarly, Damanpour (1998) and Schauer-Crabb (2002) contended that the adoption process occurs in stages that occur over time. These stages include initiation and implementation. Initiation occurs as social systems gather information and conceptualize and plan for adoption. The initiation stage continues and leads up to the adoption decision (Damanpour 1998; Schauer-Crabb, 2002). Once the decision to adopt the innovation is made, implementation begins (Damanpour, 1998; Rogers, 1995; Schauer-Crabb, 2002). This stage includes any decisions made along with the events and actions that occur (Damanpour, 1998; Schauer-Crabb, 2002). Sequentially occurring during implementation, three phases are observed: restructuring or redefining the innovation, clarifying the innovation to determine its advantages and usefulness for multiple tasks, and routinizing the innovation as the innovation is used regularly (Rogers, 1995; Schauer-Crabb, 2002).

Positing that change takes time and that communication about an innovation occurs through channels in social systems, Rogers (1995) asserted that an innovation can be rejected or adopted at any point during implementation. According to Kopcha (2010), the “process of
technology integration is an evolutionary one and…teachers’ beliefs, pedagogy, and technology skills slowly build upon each other and co-evolve as technology is introduced and assimilated into the school culture” (p. 176-177). This theory was appropriate for my study because teachers utilize mobile devices across multiple platforms in new, innovative ways. Also, the channels of communication that occur along the way may change the perceptions and beliefs about the innovation.

**Communities of Practice (CoP)**

The second theory that framed this study was Wenger’s Communities of Practice Theory (CoP), which suggested that groups of people with shared concerns, beliefs, and knowledge work together to accomplish a purpose and improve their practice (Wenger, 2007). Considering the social theory of learning as the foundation of CoP, one’s learning takes place within the context of one’s experiences (Wenger, 1998). Additionally, CoP assumes learning is a social phenomenon and focuses on social participation, which is an “encompassing process of being active participants in the practices of social communities and constructing identities in relation to these communities” (Wenger, 1998, p. 4). Wenger (1998) contended that communities of practice are an integral part of life; as such, they are informal and not always identified or explored systematically. Learning that takes place not only within an individual but also within a community and organization involves mutual engagement and shared practices. By sharing practices, one’s understandings are further developed and negotiated and consequently become the basis of unity (Wenger, 1998).

Fitzsimmons (2007), Kahan (2004), and Wenger (2007) proposed the following important reasons for the development of CoPs to improve professional practice: identity, engagement, and innovation. Maker (2012) stated that the reason for developing CoPs is clear:
“The creation of an environment [that] supports collaboration, mutual engagement, and innovativeness must be provided…if teachers [are] to learn how to effectively integrate technology into lesson plans and provide opportunities for students to acquire 21st century skills” (p. 3).

**Identity and human interaction.** Kahan (2004) described CoPs as “vectors of learning and knowledge sharing because they are driven through social interactions” (p. 31). Wenger (2007) contended human interaction was vital for the establishment of one’s identity, usually occurring first within a family. However, these interactions can occur anywhere and anytime; thus, CoPs can exist wherever people meet together, share knowledge, and learn to improve practice (Fitzsimmons, 2007). Because of today’s global society, the concept of identity has changed (Fitzsimmons, 2007; Kahan, 2004). Accordingly, interactions occur informally during lunch breaks or virtually through social networking, blogs, and discussion boards (Fitzsimmons, 2007; Kahan, 2004; Wenger, 2007). As interaction expands, an individual’s social circle enlarges as well (Kahan, 2004).

**Engagement.** According to Wenger (2007), the identity of individuals or groups is directly related to their engagement in society. As a result, the goal of a CoP is to obtain active engagement (Fitzsimmons, 2007). With this engagement, individuals or groups are able to problem-solve and share stories about their practice (Kahan, 2004; Wenger, 2007). The resulting interactions bring forth the identity of the engaged individuals or groups (Fitzsimmons, 2007).

Wenger (2007) claimed that the value of CoPs can be found in their collection of stories. The elements of a good story include the following:

- The activity used to develop knowledge, learn about a skill, or solve a problem;
- The resources gained, including new methods for or insights about the practice; and
• The value created when using the new resource (Wenger, 2007).

**Innovation.** As stories are shared, they become a powerful part of the culture of the community. Through story telling, the developing community begins to value the sharing of knowledge and innovation as members begin to make their practice more visible (Wenger, 2007). In order to do this, however, engagement and story-telling must occur as they encourage participants to “act out these stories” (Wenger, 2007, p. 170) to improve their practice. Kahan (2004) contended that the key to engagement is “to learn what kind of community activities would allow them to engage their professional identities in the process of knowledge sharing and knowledge creation” (p. 31).

Kopcha (2010) researched the benefits of mentoring and CoPs during adoption of technology initiatives and found that both offer several benefits to teachers. The study indicated that mentoring and teacher-led CoPs motivated teachers to explore new uses of technology, while also helping them to overcome barriers. Furthermore, decisions on whether to adopt the new technology were based not only on their own beliefs about technology, but also on how their peers reacted and accepted the new technology (Kopcha, 2010). This theory was appropriate for this study because teachers spontaneously worked together during planning meetings and professional learning communities to discuss problems and offer solutions.

**Related Literature**

The purpose of this chapter is to review literature related to educational technology and its evolution from laptop initiatives to m-learning. Along with m-learning theories and models, the review of the literature will focus on teacher attitudes and perceptions during the adoption and implementation process of both laptop and m-learning initiatives.
Background of Technology Immersion

Educators have been given the task of preparing 21st century learners with the necessary skills for success in today’s global society. For this reason, millions of dollars are spent on teacher professional development, hardware and software, and required technology infrastructures. Increasingly, schools have begun implementing one-to-one laptop programs in order to improve student achievement and motivation. In 2006, 25% of school districts in the United States began implementing one-to-one laptop initiatives (Hayes, 2006). Such programs have “captured the imagination of many educational and political leaders who are looking to reform educational practices and improve underperforming schools” (Bebell & Kay, 2010, p. 7). During the 2011 school year, nearly 50% of the nation’s school district superintendents were expected to purchase a computer device for each student (Bebell & Kay, 2010; Hayes, 2006). One-to-one laptop initiatives have the potential to significantly affect student outcomes in K-12 education.

Questions and concerns. Researchers have addressed questions and concerns held by both critics and advocates of laptop initiatives. Advocates have asserted that laptop initiatives revolutionize teaching and learning; however, many critics continue to believe the initiatives do not meet their expectations and are simply the latest attempt of educators to viably impact educational outcomes (Weston & Bain, 2010). Furthermore, evidence indicated that few laptop initiatives illustrated the "existence of innovative, individualized, problem-based instruction" (Weston & Bain, 2010, p. 6). They also claimed the use of technology by both teachers and students was "uninspired" (p. 9). Weston and Bain (2010) concluded "the existence of scalable and sustainable effects from educational changes, innovations, and technology reforms remain an unrealized goal within education" (p. 9).
Furthermore, placing a laptop in the hands of every student and teacher may not improve student learning and achievement (Holcomb, 2009; Wagner, 2008). Holcomb (2009) asserted that “1:1 implementations must go beyond the technology and extend to the training, support, and strategies utilized by teachers and schools” (p. 52). Zucker (2005) argued that successful implementation of laptop programs requires time and planning and as such, should not be rushed. As planning is such an essential part of implementation, educational leaders must realize that a year or more may be needed for adequate planning. Lack of planning was found to be a major barrier in Bebell and Kay’s (2010) evaluation of the Berkshire Wireless Learning Initiative. As a result, teachers were not involved in the decision-making process as administrators and district leaders developed a plan for managing laptops. More successful implementation could have been achieved if district leaders would have included a planning year to build infrastructure that supported wireless technology, to provide professional development, and to allow teachers to plan for technology immersion (Bebell & Kay, 2010).

Holcomb (2009) suggested, “When entering a one-to-one laptop initiative, it is important to recognize that existing standardized assessments may be ill equipped to measure 21st century learning and often do not assess skills that are connected to one-to-one learning” (p. 54). Yet even recognizing problems in implementation of one-to-one laptop programs, Weston and Bain (2010) argued that “no other efforts have reached the impact point represented by every teacher and student in a school, district, or state having a laptop computer, receiving training, being evaluated, and getting media coverage” (p. 9). Technology immersion provides opportunities for students to be engaged in authentic performance environments. These environments allow the application of knowledge as it is applied to immediate problems presented through technology (Penuel, 2006; Weston & Bain, 2010). Additionally, technology immersion snare student
attention as they participate in self-directed, project-based learning that increases students’ intrinsic motivation to learn (Penuel, 2006). Weston and Bain concluded that one-to-one laptop initiatives provide “fertile ground for the creation of new-paradigm schools, schools that are self-organizing” (p. 14). Furthermore, they posited that the “widespread availability of laptop computers can be a driver for the more expansive efforts that must happen in order for schools to meet the education needs of all students” (Weston & Bain, 2010, p. 14). Researchers, however, concluded that while one-to-one computing did improve student interest and motivation, it only showed modest jumps in student achievement test scores (Holcomb, 2009).

**Student outcomes.** Several positive benefits emerged from one-to-one laptop initiatives. Grimes and Warschauer (2008) reported laptop usage among students enhanced motivation and increased opportunities for student-directed learning. Furthermore, their study revealed teacher, student, and family attitudes toward the initiative were positive because of an improvement in student-teacher and school-home interaction (Grimes & Warschauer, 2008). Similarly, Bebell and O’Dwyer (2010) concluded that computer access enhances students’ writing skills and technology literacy. Penuel (2006) and Holcomb (2009) investigated the effects of one-to-one laptop initiatives and reported an increase in student engagement, a rise in the use of technology for writing, analysis, and research, decreased discipline problems, and more student-centered classrooms. Overall, one-to-one laptop programs have provided opportunities for schools to meet the needs of today’s “digital natives” by providing more interactive, authentic, and student-centered learning experiences (Bebell & O’Dwyer, 2010; Trilling & Fadel, 2009).

While several studies have shown higher test scores and grades in some content areas (Bebell & Kay, 2010; Bebell & O’Dwyer, 2010; Dunleavy & Heinecke, 2007; Gulek & Demirtas, 2005; Holcomb, 2009; Judson, 2010; Keengwe, Schnellert, & Mills, 2011; Mouza,
many researchers have not found significant changes in overall achievement. Silvernail and Gritter (2007) posited that overall performance of 8th graders involved in the Maine Learning and Technology Initiative (MLTI) had not changed appreciably. Similarly, findings on the Texas Technology Immersion Pilot (TIP) showed technology immersion had mixed results. The TAKS reading achievement for 7th and 8th graders showed no statistically significant effect, while there were only marginal improvements for 9th graders (Shapley et al., 2009). In separate studies, Grimes and Warschauer (2008) and Hu (2007) found no evidence that laptops significantly increased student achievement as measured by state test scores in California and Maine. Furthermore, Grimes and Warschauer found that success of one-to-one laptop programs was affected by socio-economic status, which suggests that demographics “can play a pivotal role in the impact of one-to-one initiatives, as with any other educational endeavor,” (Holcomb, 2009, p. 52).

**Teacher outcomes.** With researchers reporting mixed results of positive student outcomes related to increased test scores, many teachers have become uncertain about the benefits of implementing a laptop initiative (Bebell & Kay, 2010; Holcomb, 2009; Penuel, 2006; Weston & Bain, 2010). Inarguably, teachers are essential in the process of implementing successful laptop programs. Quite possibly they are the determining factor in such programs’ success or failure (Bebell & Kay, 2010; Holcomb, 2009; Penuel, 2006; Weston & Bain, 2010). Penuel (2006) posited that many teachers just adapt existing teaching strategies instead of embracing student-centered and project-based practices; therefore, teachers must have time to develop necessary technology skills, revise pedagogical strategies for teaching, and develop classroom management practices. Drayton, Falk, Stroud, Hobbs, and Hammerman (2010) also discovered that teacher preparation was an essential component of success in laptop initiatives.
In their study of laptop use in high school science classes, Drayton and colleagues reported that a “lack of time for professional development, especially in the form of teacher collaboration to develop best practices within the school, becomes a barrier to effective integration of computer and Web resources in the classroom” (Drayton et al., p. 41).

Conversely, Holcomb’s (2009) review of laptop initiatives illustrated that teachers have benefited from one-to-one laptop initiatives. Teachers who participated in Maine and Florida’s laptop programs reported feeling empowered to change and improve their instructional practices (Silvernail & Buffington, 2009). More importantly, these teachers became facilitators for learning as they encouraged their students to work collaboratively and learn through self-directed inquiry. Additionally, observations in schools which implemented one-to-one initiatives revealed a shift in teacher pedagogy as teachers began using more student-centered strategies and planned to achieve their curriculum goals through more individualized instruction to meet students’ needs (Holcomb, 2009).

Shapley et al. (2009) reported significantly different results in their study of the Texas Technology Immersion Pilot (TIP). The TIP, a state-sponsored one-to-one laptop program, was piloted in 22 schools during a four-year period. Shapley et al. (2009) concluded there was “no evidence linking Technology Immersion with student self-directed learning or their general satisfaction with schoolwork” (p. 83). Likewise, a study of Maine’s Learning and Technology Initiative (MLTI) indicated fewer than 40% of laptop teachers used the laptop to plan for and create individualized lessons to meet students’ needs, nor did they use it for instructional purposes (Silvernail & Gritter, 2007). In a later study, Silvernail and Buffington (2009) maintained that “providing teachers and students abundant access to laptop technology is only the first step toward using the technology as an effective instructional and learning tool” (p. 13).
Similarly, in a review of literature on the effects of technology instruction on academic achievement, Davis (2012) concluded that there was no empirical data that exhibited the positive impact of technology on student achievement. Davis asserted that the essential component of professional development for teachers was missing.

Equipping a classroom with technology does not insure teachers can teach 21st century skills (Holcomb, 2009; Wagner, 2008). Furthermore, Donovan, Green, and Hartley (2010) concluded that increased access to computers does not lead to increased student engagement. Students who used the laptops in project-based learning, cooperative learning tasks, and homework assignments were often found to be involved in an entirely different task than the one assigned. Donovan et al. also found that students who were off-task in classrooms that implemented complete integration of laptops showed they were cognitively and physically engaged, but many times in activities unrelated to the learning objectives. Analysis of data indicated that more than half of the teachers were intensely concerned about the impact the laptops would have on their time, planning, and instructional practices. The biggest concern expressed was how the computers could hinder students’ mastery of curricular goals (Donovan et al., 2010).

**Moving from One-to-One Laptops to Mobile Learning**

As society becomes more mobile, the transition from desktop and laptop computing to mobile devices is becoming more popular within the school setting. “Mobile devices include cell phones, smart phones, netbooks, laptops, tablets, iPods, iPads, ereaders, and other devices that are typically lightweight, portable, and connect to the Internet” (Franklin, 2011, p. 261). Mobile devices have become an integral part of students’ identities. As such, popularity and status among peers is tied to mobile phones (Harris Interactive, 2008). A recent survey indicated
78% of adolescents ages 12-17 own mobile phones (Lenhart, Madden, Duggan, Cortesi, & Gasser, 2013). Almost half (47%) of those with mobile devices owned smart phones (Lenhart et al., 2013). Additionally, 85% sent and received text messages (Thomas & Orthober, 2011), 23% owned a tablet computer, and 93% had a laptop or desktop computer at home (Lenhart et al., 2013). Thus, learning with mobile devices fits digital learners’ lifestyles.

With the demand for new teaching strategies that focus on personalized instruction for students (Milrad & Spikel, 2007), the trend in education is moving from desktop computing and one-to-one laptops to “anytime, anywhere” learning with mobile devices (Kissinger, 2013; Munawar, 2011). Kissinger (2013) defined m-learning as the “use of mobile, portable, and handheld computing devices in learning applications and environments” (p. 157). Since mobile technologies have become more popular and affordable, and as school districts face budget cuts for funding of one-to-one laptop initiatives, many schools have begun to implement m-learning initiatives as a strategy for meeting the diverse needs of 21st century learners (Ross, 2013; Ting, 2012).

With rapidly changing mobile technology, teachers are presented with even more challenges since “effective teaching depends on flexible access to rich, well-organized and integrated knowledge from different domains, including knowledge of student thinking and learning, knowledge of subject matter, and increasingly, knowledge of technology” (Koehler & Mishra, 2009, p. 61). Mobile technology should be integrated into the curriculum in an effort to keep up with the technological environment that society lives in outside of the educational setting. Adapting the curriculum to include mobile technologies will also function to develop skills needed to be a part of the 21st century’s global society—skills such as “digital age literacy,” “inventive thinking,” “effective communication,” and “high productivity” (Parkay et
al., 2010, pp. 323-324). According to Koszalka and Ntloedibe-Kuswani (2010), “instruction in the future is more likely to be conducted anytime and anywhere with any resource regardless of location” (p. 140).

**Theories and Models for Student Learning with Mobile Technologies**

As technology has led to changes in society and culture, changes in learner expectations have evolved. With the emergence of Web 2.0 technology, the Internet has become more than an educational tool for locating information. Students now have opportunities to interact with others through collaboration by creating and using social networks, podcasts, wikis, and blogs (Lee & Spire, 2009; Maddin, 2011; Prensky, 2006). With these changes in student expectations, several theories and models for technology immersion have been developed.

**Constructivism.** Over the past decade, educational researchers have proposed that active engagement, social learning, continuous feedback, and real-world application are instructional approaches best suited for instructional environments rich in digital technological tools (Mouza, 2008). Active engagement, social learning, continuous feedback, and real-world application together represent constructivist pedagogy (Mouza, 2008). Instruction using constructivist pedagogy has several distinguishing factors. Learning is inquiry-based in an environment where knowledge is constructed but not transmitted (Roblyer & Doering, 2010). Additionally, learning is student-centered. Students who are generating their own knowledge are able to demonstrate proficiency in different ways (Mouza, 2008; Roblyer & Doering, 2010).

Kissinger (2013) asserted that mobile technologies foster constructivist teaching and learning. For example, mobile e-book readers not only create mental understandings of society’s culture, but also allow for learner-centered and situated learning experiences (Kissinger, 2013). Students who are involved in technology-rich environments with authentic and active learning
become independent thinkers who can then transfer understanding to useful, real-life settings (Mouza, 2008).

**Learning by design.** In addition to constructivist learning goals, the use of technology advocates the importance of activating prior knowledge (Lee & Spires, 2009). Constant access to personal computing changes students’ learning experiences; therefore, educators have the essential task of facilitating student engagement and learning through the use of technology. Lee and Spire (2009) argued that students should be “involved in the design of digital environments as active participants in a learning process” (p. 65). As students become engaged in technology-immersed environments, they research, reflect, and solve problems in authentic situations. Additionally, students begin to construct their own knowledge while simultaneously building their own learning environments (Puntambaker & Kolodner, 2005).

**Vygotskian psychology and activity theory.** Emphasizing the role of “social interaction in development and learning” (p. 17), Verenikina (2010) suggested that Vygotskian psychology is a relevant theory for research about educational technologies. Even though Vygotsky’s theoretical views became known in the 1960s, Verenikina (2010) postulated that Vygotskian psychology and the Activity Theory supported the idea that computers are tools that are interconnected with a learner’s authentic activities. Though these activities result in improved student performance, Verenikina (2010) emphasized that technology should not take the place of robust pedagogical approaches. Instead, educators must immerse technology into the content using advanced pedagogies.

Verenikina’s (2010) assertions were supported by Young and Bush’s (2004) principles, which provided specific ways for teachers to implement technology efficiently and effectively. These authors provided a framework for teachers to think critically about the connection between
technology and the development of critical thinking skills in literacy and writing (Young & Bush, 2004). Young and Bush’s framework articulated a plan for teachers as they sought to “infuse technology in a way that does not interfere with the content pedagogy but supports it in a way that actively involves students and prepares them with the technical and pedagogical skills” for creating classrooms where student-centered instruction is the norm (p. 96).

Social development theory. Vygotsky’s theory of social development, largely unknown until its publication in 1962, contended that a fundamental part of the cognitive development process is social interaction (Learning Theories Knowledgebase, 2012; Miller, 2011). Believing there to be a connection between people and the sociocultural context of their shared experiences, Vygotsky indicated that human beings use “tools that develop from a culture, such as speech and writing, to mediate their social environments” (Learning Theories Knowledgebase, 2012, para. 5). Children, who may initially develop these tools merely as a social function, later internalize these tools that then lead to higher-order thinking skills (Learning Theories Knowledgebase, 2012; Miller, 2011; Verenikina, 2010).

Using this theory, educators are able to promote learning contexts that actively engage students who play an active role in constructing knowledge by collaborating with their teacher who facilitates meaningful construction. Learning takes place both formally and informally as students become autonomous, informal learners within social settings (Bell, 2011; Miller, 2011). Using Web 2.0 services, students are able to share ideas and post their creative writings, read informational and fiction texts based on their own interests, and construct knowledge through informal learning that takes place outside the classroom (Bell, 2011; Siemens, 2004).

Connectivism. While social constructivism focuses on the “importance of social interactions in affecting the individual’s generation or knowledge or facts about the world” (Bell,
Siemens (2004) proposed that learning is a “process of connecting specialized nodes or information sources,” and may lie in “non-human appliances” (Bell, 2011, p. 103). Students also learn through the process of decision-making as they choose what topics to learn about and how changing opinions about what is correct bring about increased learning and knowledge (Bell, 2011; Siemens, 2004).

Kop and Hill (2008) maintained that connectivism pedagogy indicates a shift toward student autonomy in learning, as the emphasis of the theory is the “distribution of learning across networks of people and things and the capacity of learners to be active” (Bell, 2011, p. 103). In contrast, Verhagen (2006) opposed the idea of connectivism as a theory and claimed it was merely a pedagogical approach at the curriculum level. After studying five scenarios involving technology integration, Bell (2011) posited that “connectivism alone is insufficient as a theory to inform learning and its technology-enabled support in an internetworked world” (p. 112), yet it can be an “influential phenomenon that inspires teachers and learners to make changes in their practice” of technology integration (p. 112).

**Situated learning.** Developed by Lave in 1988, the Situated Learning Theory posited that learning takes place in unintentional ways and is “situated within authentic activity, context, and culture” (Learning Theories Knowledgebase website, 2012, para. 2). Accordingly, learning not only takes place inside the boundaries of the classroom, but also wherever the learner might be. Drawn from both constructivism and social cognitive theory, situated learning focuses on the “context in which activities occur and their application to real-world use” (Kissinger, 2013, p. 157). Because of the increase in m-learning opportunities, students are able to create mental understandings of the world, which provides learner-centered and situational learning experiences (Kissinger, 2013).
Components of situated learning also include social interaction and collaboration (Learning Theories Knowledgebase, 2012). With m-learning devices, learners are able to constantly interact with not only others, but also their environment. Learning afforded by mobile technology is “highly personal and situated within the individual’s own authentic contexts” (Kissinger, 2013, p. 156).

**Strategies and Models for Technology Integration**

**Technology pedagogical content knowledge.** An understanding of educational technology theory is only one component of understanding the impact of technology immersion and m-learning. Prensky (2006) argued that teachers must seek ways to understand students’ habits, interests, and needs. In an effort to define issues related to digitally native students, Mishra and Koehler (2006) introduced a specialized form of knowledge called Technology Pedagogical Content Knowledge (TPCK or TPACK). This pedagogical approach is defined as knowledge about the “complex interplays between technology, pedagogy, and content and how they play out in different contexts” (Mishra & Koehler, 2006; Koehler & Mishra, 2009). This instructional approach characterizes the strategies teachers must use when integrating technology into their teaching of constructivist learning goals (Lee & Spires, 2009).

**Technology integration planning model (TIP).** When planning for use of digital technologies, teachers who are experienced with technology integration intuitively use the phases in the TIP model, a problem-solving method useful for selecting best practices in using digital technologies (Roblyer & Doering, 2013). The TIP model provides both inexperienced teachers and those with expertise in integrating technology with a three-phased guide for determining what materials would benefit student learning and what issues may need to be addressed (Roblyer & Doering, 2013). Phases include analyzing learning and teaching goals, planning for
technology integration, and reflecting on instruction through analysis and revisions (Roblyer & Doering, 2013).

**Professional Development and Collaboration**

Largely, most professional development has been delivered to teachers through scheduled, face-to-face meetings (Jones & Dexter, 2014; Plair, 2008; Tytler, Symington, Malcolm, and Kirkwood, 2009). Cano (2006) argued that four elements must exist if professional development is to be effective. These elements include: (a) engaging learning communities, (b) appropriately allocated resources, (c) clear expectations and established goals, and (d) vibrant administrative and teacher leadership.

Considered to be mostly ineffective for teachers attempting to effectively implement mobile technologies, formal professional development usually does not meet the needs of 21st century teachers on a large-scale basis (Jones & Dexter, 2014; Ross, 2013). Reasons for this ineffectiveness include specificity of time and locale, as well as the lack of timely, on-going support (Mackey & Evans, 2011). Because teachers face additional pressures of integrating rapidly developing digital technologies, they must receive effective professional development using different delivery systems than in years past; otherwise, most attempts to prepare students for a technology-rich global society will fail (Cano, 2006; Jones & Dexter, 2014; Kopcha, 2010).

With the ineffectiveness of formal professional development and the rapid development of communication technologies, the need for other alternatives to improve teachers’ practice and encourage growth through collaboration and discussion has been researched. According to Dewey (1916), reflection upon and discussion about a teacher’s own practice is a social process and not an isolated activity. Dewey asserted that reflection was the “product of practices embedded in community settings” (Riveros, Newton, & Burgess, 2012, p. 206). Due to
isolation, however, teachers have little time or opportunity to discuss their concerns about technology integration. Professional learning about technology integration must be embedded in educational practices. Triggs and John (2004) asserted that isolation among educators is “powerful” and “fueled by external and internal pressures, of no time or opportunity to reflect on or discuss teaching with colleagues” (p. 437). Cifuentes, Maxwell, and Bulu (2011) argued that effective technology integration must include social activity within a community of learners. This community, which can include intentional or incidental outcomes, provides opportunities for educators to engage in collaborative activities and discussions, build trust relationships, and learn from each other’s practice (Wenger, McDermott, & Snyder, 2002).

Alternatives for improving teachers’ practice with mobile technology integration have emerged and include formal and informal learning communities (Dufour, 2004; Jones & Dexter, 2014; Kopcha, 2010). Formal and informal learning involves the development of teacher learning communities and may include the development of PLCs (Dufour, 2004) and CoPs (Fitzsimmons, 2007; Jones & Dexter, 2014; Wenger, 2007).

Learning communities. Professional development occurring through learning communities not only improves teacher communication and collaboration, but also provides timely support and teacher choice about time and content (Dufour, 2004; Jones & Dexter, 2014; Wenger, 2007). Cano (2006) contended:

Professional development is most effective when it takes place in vibrant learning communities. These learning communities take various forms, but all value ongoing learning by teachers and students. They foster collegiality and problem solving, and they emphasize continuous improvement in classrooms. (p. 2)
More recent research has illustrated several benefits to learning communities. Learning communities provide opportunities for collaborative planning and mentorship, improvement in practice by helping and learning from other teachers, and increases in problem-solving to improve practice (Guskey, 2009; Henkin, Harmon, Pate, & Moorman, 2009; Jones & Dexter, 2014; Kopcha, 2010).

**Informal learning through CoPs.** CoPs not organized by the school but formed as a result of teachers who share a common problem are considered informal learning communities (Jones & Dexter, 2014). Usually formed by teachers who are in close contact each day, CoPs offer several benefits to teachers adopting and implementing mobile technologies. Teachers are able to choose the time, content, and method for learning, and technology support improves because response time for support improves (Chalmers & Keown, 2006; Martin, Strother, Beglau, Bates, Reitzes, & Culp, 2010; Ming, Wah, Azman, Yean, & Sim, 2010; Plair, 2008). Though CoPs are to be voluntary and allow for teacher choice, their effectiveness largely depends on teachers’ knowledge and skills relating to technology integration, their effective engagement and interaction, and a personal passion from those involved (Fitzsimmons, 2007; Jones & Dexter, 2014; Riverin & Stacey, 2008).

With the increase in communication and mobile technologies, CoPs are also being developed through online communities (Jones & Dexter, 2014; Mackey & Evans, 2011; Riverin & Stacey, 2008). In a case study conducted by Mackey and Evans (2011), researchers investigated the connection between CoPs and an online professional learning graduate course. Mackey and Evans found that teachers became “brokers and conduits between the online learning and their own community of practice” (p. 12) at their individual schools. Furthermore,
interviews with participants indicated not only that the participants’ practices improved, but new ideas were shared with their colleagues also (Mackey & Evans, 2011).

**Informal learning through PLCs.** Proposing to affect change and develop capacity of teachers and schools, PLCs help to establish a school-wide culture and improve school reform efforts (Stoll, 2009). Including one or more groups of stakeholders, PLCs also provide a forum in which teachers can learn from each other both individually and collectively (Martin-Kniep, 2008). According to Bellanca and Brandt (2010), PLCs are a critical factor in assisting teachers as they develop the necessary skills for effectively educating today’s 21st century learners.

Researchers have reported several benefits of the formal establishment of PLCs. Other than improving communication efforts for teachers, PLCs provided a structured time for teachers to build a collaborative culture in order to develop authentic, research-based teaching strategies (Dufour, 2004; Duran, Brunvard, & Fossum, 2009; Gerard, Bowyer, & Linn, 2010). Research conducted by Jones and Dexter (2014), however, revealed formal and structured PLCs developed by school leaders or administrators did not always coincide with teachers’ professional learning needs or goals. One of the major challenges in sustaining PLCs related to its time constraints (Zykanov, 2010). The advancement of mobile technologies provides alternative ways for teachers to discuss and reflect on their practice and to collaboratively solve problems related to technology integration and student achievement (Jones & Dexter, 2014; Nolin, 2014; Zykanov, 2010).

**Mobile Learning Environments**

Mobile devices for learning have been used in higher education and K-12 settings and offer several advantages. Past research has indicated size, ease of use, and portability as reasons to incorporate mobile devices into learning environments (Khaddage, Lattemann, & Bray, 2011;
Mobile devices also provide improved access and options for project-based, personalized learning for the learner-driven component of digital learners’ lifestyles (Khaddage, Lattemann, & Bray; Kopcha, 2010; Munawar, 2011). As most students already own a mobile device (Lenhart et al., 2009; Thomas & Orthober, 2011; Wagner, 2008), today’s digital learners are already competent in using this form of technology. Because mobile devices are ubiquitous and bring global connectedness, the use of mobile technologies in education increases the possibilities for learners to engage with a greater range of digital resources, as well as interact with each other across place and time (Koszalka & Ntloedibe-Kuswani, 2010).

In a study on learning spaces in higher education m-learning environments, Solverg and Rismark (2012) discovered three distinct learning spaces: lectures, off-campus activities, and on-campus activities. Data indicated that students liked the flexibility of being able to watch the lectures at a convenient time for them, and that learning did not have to occur at a fixed time or place. Additionally, off-campus learning space afforded students with private learning spaces where they could watch the video lecture in real time and also relax with a cup of coffee. Off-campus learning space mostly occurred at home, where students enjoyed watching video-streamed lectures using their own wireless connections (Solverg & Rismark, 2012).

In contrast to m-learning in a higher education setting, Koszalka and Ntloedibe-Kuswani (2010) explained learning from two perspectives that are applicable to K-12 environments. They discussed safe learning and disruptive learning. Safe learning, explicit and traditional technology-enhanced instruction, provides learners with typically inaccessible resources so that students do not need to leave the classroom in order to seek required materials (Koszalka & Ntloedibe-Kuswani, 2010). Disruptive learning, however, “empowers learners by shifting the balance of control from learner as consumer of teacher knowledge to learner as communicative
participant” (Koszalka & Ntloedibe-Kuswani, 2010, p. 142). In this context, learning becomes incidental and information is readily available at the moment students need it. For this reason, “m-learning disrupts the traditional paradigms of teacher-directedness in favor of personalized approaches where learners engage their own competencies and resources while regulating their own learning” (Koszalka & Ntloedibe-Kuswani, 2010, p. 143).

Because of the benefits mobile technologies afford students as they become proficient in the skills required for success in a global environment, the use of mobile devices in the classroom has become as important as the need for paper, pencils, and books. Research into the use of mobile devices in the classroom has indicated that teachers use texting, tweeting, and podcasting in the classroom. Students were engaged and motivated when using mobile devices, and perceived the devices were helpful in mastering difficult concepts (Franklin & Peng, 2008; Keengwe, Pearson, & Smart, 2009; Thomas & Orthober, 2011; Wood, Jackson, Plester, & Wilde, 2009). Wood et al. (2009) found that texting allowed children to participate in self and peer-initiated activities, which then engaged students with print, including conventional spellings, alternative spellings, and phonological understanding. The researchers concluded the number of text messages sent and received was closely related to students’ improvement in reading and spelling. Overall, using mobile technologies not only provided students with unique opportunities to write and communicate in authentic situations using Twitter, Google Docs, blogs, and wikis, but also provided students with support from their peers and teachers when completing homework and assignments (Dohn, 2009; Kilinc, Evans, & Korkmaz, 2012; Thomas & Orthober, 2011; Woo, Chu, Ho, & Li, 2011; Wright, 2010).
Challenges and Barriers to Mobile Learning Adoption

Even though learning with a mobile device is engaging and motivating and provides students opportunities for collaboration, several barriers do exist and must be overcome before mobile technology can be used at its greatest potential. Research into barriers for technology integration and mobile devices has indicated these barriers include access, vision, beliefs, time, and professional development (An & Reigeluth, 2011; Ertmer, Glazewski, & Newby, 2010; Hew & Brush, 2007; Inan & Lowther, 2010; Kopcha, 212; Mouza, 2008). Due to time constraints and assessment demands, many teachers doubt the usefulness of mobile devices (An & Reigeluth, 2011; Liu & Han, 2010). With small screen sizes, poor resolution, and lack of data input restricting the use of mobile devices, teachers doubt the value of m-learning because the perceived task value is low (Liu & Han, 2010). Even though familiarity with mobile devices exists, teachers and students may doubt their usefulness for teaching and learning (Ertmer et al., 2010; Liu & Han, 2010; Inan & Lowther, 2010). This perceived usefulness then impacts adoption of mobile technologies.

Furthermore, lack of preparation, time, and professional development impedes the adoption of mobile technologies. Studies continue to indicate that teachers feel unprepared to adequately implement mobile technologies into their instruction (An & Reigeluth, 2011; Al-Senaidi, Lin, & Poirot, 2009; Khaddage et al., 2011; Wachira & Keengwe, 2010). Not only are lessons time-consuming to prepare, but teachers must also spend extra time determining ways to deal with student misbehavior when using technology (Ertmer et al., 2012; Ertmer et al., 2010; Kopcha, 2010). Additionally, professional development often focuses on technology skills instead of pedagogical skills needed to integrate technology effectively (Ertmer et al., 2012; Kopcha, 2010; Mouza, 2008). Research has indicated professional development programs are
too short to sustain change and provide too much information, without being content-specific (An & Reigeluth, 2011). Accordingly, “professional development, technical and administrative support, and teacher beliefs play an influential role in whether teachers [feel] ready to use [technology] in the classroom and, in turn, whether they actually [do]” (Kopcha, 2012, p. 1110).

Teachers, who are an important part of any initiative, remain skeptical about the positive effect of mobile technologies in student learning (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurer, & Sendurer, 2012; Kopcha, 2012; Kopcha, 2010; Wagner, 2008). Though professional development continues to be an external barrier for successful integration of mobile technologies, Ertmer et al. (2012) contended the attitudes and beliefs of other teachers impede the use of technology more so than a teacher’s own attitudes and beliefs. According to Ross (2013), the most important factor impacting teachers’ decisions regarding instructional technology involved accessibility and availability issues.

**Effective Implementation of Mobile Learning**

Though there is scarce research specifically dealing with student-owned devices in school, previous research conducted by Bielefeldt (2012) and Ting (2012) reported certain factors and conditions that must be in place for effective implementation of m-learning. These factors include professional development, a proper support system, and opportunities for teacher collaboration (Bielefeldt, 2012; Liaw, Hatala, & Huang, 2010; Miranda & Russell, 2011; Ross, 2013; Ting, 2012). Bielefeldt (2012) defined effective implementation as an increase in student technology use and a decrease in teacher use. Furthermore, Bielefeldt’s (2012) research found a direct correlation between increased student use of technology and increased engagement. Ross (2013) emphasized that obstacles encountered in m-learning can be alleviated through effective implementation.
Summary

Chapter two provided an analysis of the evolution of technology immersion with computers, laptops, and mobile devices. Background information was outlined, along with current findings of technology immersion outcomes and perceptions, and barriers to technology adoption and implementation. According to Fang, Hartsell, Herron, and Rathod (2010), the rapid changes in technology tools result in challenges for teachers who continue to reveal they lack confidence in using these tools for learning. Additionally, a lack of differentiated, on-going professional development continues to be a barrier in the adoption and implementation process (Brockmeier, Pate, & Leech, 2010).

While technology is being used, there continues to be a gap in the available technological tools and the effective adoption and integration of these devices (Kopcha, 2010). Research has indicated that teachers use technology for routine tasks; however, they feel unprepared for integrating technology across content areas in order to enhance learning (Ertmer & Ottenbreit-Leftwich, 2010; Koehler & Mishra, 2009). With the literature indicating a need for on-going, hands-on professional development, as well as technology not being utilized to its fullest potential by teachers and students, more research is needed on teacher perceptions of m-learning. Furthermore, there is a need for more research to determine the extent to which CoP and teacher perceptions play a role in the adoption and implementation of mobile technologies (Kopcha, 2012).
CHAPTER THREE: METHODOLOGY

Overview

The purpose of this chapter is to present the procedures, research design, and analysis for the present research study. Descriptions of the research design, as well as procedures, methodology, population, sampling method, instrumentation, and procedures for data collection and analysis are discussed throughout.

The purpose of this qualitative, phenomenological study was to investigate teachers’ perceptions of and experiences with the adoption and integration process as teachers at Tops Sixth Grade School transition from a one-to-one laptop initiative to a school-wide adoption and implementation of m-learning. Mobile learning environments were generally defined as classrooms where students who owned mobile devices were allowed to connect to the school’s Wi-Fi and use them in class to enhance their learning. Additionally, the adoption process was defined as the manner through which an individual or group sought and processed information about an innovation, then formed an attitude and decided whether to adopt or reject the innovation (Rogers, 2000).

Design

This qualitative transcendental phenomenological study examined and sought to understand the experiences and perceptions of teachers participating in the adoption and implementation of mobile technologies initiative. Additionally, these teachers were transitioning from a one-to-one laptop program to a m-learning program. Qualitative research was chosen for various reasons. First, qualitative research is useful for researchers who seek to understand concepts that have not been well defined in the literature (Creswell, 2013). M-learning is a relatively new phenomenon, especially in K-12 literature. Additionally, qualitative studies are
beneficial because the researcher can be inserted into the lived experiences of the participants. Qualitative research studies “things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them” (Denzin & Lincoln, 2000, p. 3). During this study, I sought to bring meaning to the lived experiences of teachers as they adopted and implemented mobile technologies; therefore, I conducted interviews, observations, and the focus group in the natural setting of the phenomenon.

Moustakas (1994) defined phenomenology as research “concerned with wholeness, with examining entities from many sides, angles, and perspectives until a unified vision of the essences of a phenomenon or experience is achieved” (p. 58). In a phenomenological study, researchers focus on the shared experiences of the participants so that they can ascertain the meaning of the experience and then comprehensively describe it (Moustakas, 1994). According to Creswell (2013), a phenomenological design is appropriate for describing lived experiences of a concept or phenomenon. With the purpose of phenomenology being to “reduce individual experiences with a phenomenon to a description of the universal essence” (p. 76), this research may yield information about the unique experiences of teachers during the adoption and implementation of a m-learning program.

Phenomenological research also involves the study of lifeworld, which is defined by Husserl (1970) as “what we know best, what is always taken for granted in all human life, always familiar to use in its typology through experience” (p. 123). Since mobile devices have become an integral part of the everyday lives of students and educators, an examination of m-learning teacher experiences is consistent with the choice of a phenomenological design (Cilesiz, 2011). In an effort to understand the impact mobile technology has on teaching and learning, it is essential to understand teacher perceptions and experiences during the adoption and
implementation process. Because teaching and learning with technology is different from traditional methods of teaching and learning, Cilesiz (2011) argued that a phenomenological approach is necessary because it “provides a suitable framework for research on experiences in educational technology and can advance the field by complementing and unifying existing research” (p. 488).

Because I desired to describe the experiences of teachers as they adopted and implemented mobile technologies, the transcendental phenomenology research methodology outlined by Moustakas (1994) was appropriate for this study. Transcendental phenomenology, a scientific study of phenomena and how they appear in consciousness, focuses on the descriptions of experiences instead of explanations or analysis (Moustakas, 1994). The choice of transcendental phenomenology, which includes a process for eliminating the researcher’s own opinions and suppositions about the phenomenon being examined, is also important because I have experienced the adoption and implementation of one-to-one laptop initiatives in my school district. Moustakas (1994) called this process *epoche*. During this process, the researcher “looks inside to become aware of personal bias, to eliminate, or at least gain clarity about preconceptions” (Patton, 2002, p. 485). Important to the rigor of this research, this *epoche* process enabled me to approach the phenomenon with a fresh and open mind (Katz, 1987). As a result, I was able to suspend judgment, a critical component of phenomenological research (Katz, 1987). Moving from the *epoche* process, researchers then describe what was seen using textural descriptions. These descriptions involve the “internal act of consciousness, the experience as such, the rhythm and relationship between phenomenon and self” (Moustakas, 1994, p. 90). The next step in the process is imaginative variation, which is followed by synthesis of meanings and essences (Moustakas, 1994).
Research Questions

The following research questions guided this study and provided information about teacher perceptions and experiences during the transition from a one-to-one laptop environment to a m-learning environment:

Research Question One: What are middle education teachers’ experiences with and perceptions of the mobile learning adoption and integration process?

Research Question Two: In what ways do teachers’ values, beliefs, professional needs, and past experiences with technology impact the adoption and integration process?

Research Question Three: What are teachers’ perceived obstacles and/or benefits to mobile technology integration?

Research Question Four: What collaborative sources do teachers use to create and share information about mobile learning?

Setting

Tops Sixth Grade School is an upper-elementary school in a rural town in northeast Mississippi. The school’s population was 488 students with 25 math, science, social studies, and English teachers. Based on 2014-15 student enrollment, student ethnicity was as follows: African American, 47%; Caucasian, 43%; Hispanic, 6%; Asian, 3%. Additionally, over 60% of the student population qualified for free and reduced lunch. The achievement level of the school for 2013-14 was rated a D based on the state’s accountability model: A, Star School; B, High Performing; C, Academic Watch; D, At Risk of Failing; and F, Failing. At the time of this study, the school district was in its first year of full implementation of Common Core State Standards (CCSS) and Partnership for Assessment of Readiness for College and Career (PARCC) assessments for student achievement. Beginning in 2010, the district issued an Apple Macbook
computer to every student in the district grades six through twelve. At the time this study was conducted, students in grade six had not been issued MacBook computers and did not have 24/7 access to school-owned computers. Instead, they were part of the adoption and integration of a m-learning initiative where each classroom had laptop carts, and students were able to use their own mobile devices in class to enhance learning.

**Participants**

Participants for this study were eight teachers at Tops Sixth Grade School in a rural northeast Mississippi town. This sample size was appropriate for qualitative studies (Creswell, 2013). Additionally, Patton (2002) asserted that small sample sizes are appropriate for qualitative studies because the sample provides “information-rich cases” about the phenomenon (p. 230). Participants were selected using purposive sampling. According to Patton (2002), this sampling method solicits participants who have experienced the phenomenon being studied and meet the inclusion criteria being researched. Once the potential participants had been located, I asked them to participate in the study. Using this qualitative method yielded rich descriptions about aspects of the m-learning initiative and its impact on teaching and learning (Gall et al., 2007). This method was also appropriate in a phenomenological study since all participants must experience the same phenomenon (Creswell, 2013). The criterion for participation in the study was that all participants be involved in the adoption and integration of the mobile technologies initiative.

**Procedures**

Procedures for conducting the study included applying for Institutional Review Board (IRB) approval. This approval was obtained before seeking participants (Appendix A). After
obtaining permission from the district to conduct the study (Appendix B), I met after school with possible participants to explain the purpose of the study. At this point, I gave each possible participant a recruitment letter (Appendix C) that explained the study’s purpose. Additionally, an initial interview was conducted using closed-response questions. Teachers were selected based on closed-response questions at the beginning of the interview. These closed-response questions ensured all participants met the criteria of being participants in the adoption and integration of m-learning. Once participants were selected and informed consent (Appendix D) was obtained from each participant, I conducted initial interviews. Throughout the next five weeks, in-depth, semi-structured interviews and teacher observations were conducted. At the end of five weeks, I conducted an online focus group to collect shared understandings about the m-learning adoption and implementation process. According to Patton (2002), focus groups are advantageous when researchers are attempting to increase confidence in the patterns that emerge from individual interviews. Additionally, as participants interacted with each other’s responses and considered each other’s views, I was able to obtain richer descriptions of the phenomenon (Patton, 2002). After the online focus group was conducted, data from all three methods were analyzed using phenomenological reduction methods.

The Researcher's Role

At the time of the study, I was a doctoral candidate pursuing an Ed. D. in Liberty University’s School of Education. Additionally, I was a non-participant interviewer and observer as I studied the experiences of teachers in the m-learning initiative. Through the use of interviews, observations, and an online focus group, I was the human instrument of data collection (Creswell, 2013). Even though I was an eighth grade ELA teacher in the same district where the study took place, I did not teach at the school implementing the m-learning initiative.
Starting in 2009, I began using a laptop computer to integrate technology into my lessons, and in 2010, all students in sixth through twelfth grades received an Apple MacBook computer. The implementation of the program provided opportunities for personal and professional growth. As a teacher leader for the eighth grade ELA program and district, I provided assistance and resources to teachers as they tried to integrate technology and ubiquitous computing into the content. Being a teacher and participant in the laptop program, I was also able to provide in-depth analysis of the laptop program as it compared to the m-learning initiative.

Because of my participation in the laptop program and with the additional role of human instrument in data collection, I participated in the *epoche* process as described by Moustakas (1994). To do this, I wrote about my reflections of and experiences with the laptop program. Creswell (2013) asserted researchers often described their experiences in this manner so that they could bracket out their views before investigating the experience of others.

**Data Collection**

I collected data from three sources for this study: multiple in-depth, semi-structured interviews, observations, and an online focus group discussion. Creswell (2013) asserted these methods were appropriate for collecting thick, rich data about the lived experiences in the phenomenon. Additionally, using three different methods validated the credibility of the study since the data was triangulated (Creswell, 2013; Patton, 2002). In order to gather rich descriptions, the sources of data were collected in the following order: interviews, observations, and focus group.

To develop a trust relationship between the participants and myself, I conducted interviews first. During the interviews, I was able to gain knowledge about participants’ experiences with m-learning adoption. I became a familiar face to the participants as the
interviews progressed, which helped them understand my role as an inquirer into their experiences. At the end of each interview, I set up the 50 minute observation sessions. Participants were able to set the best date for them based on their lesson plans. This gave them more control over and confidence in the observations. Observations allowed me to connect information from the interviews to data collected from the observations. I was able to verify participants’ self-reported experiences with m-learning integration by conducting the observations second. I also was able to note similarities and differences in data collected through the first two methods. The iterative nature of constantly comparing the data helped me form themes or patterns, which also aided me in pinpointing areas where more information was needed. By conducting the online focus group last, I was able to delve deeper into those areas.

**Interviews**

I conducted semi-structured interviews using an interview protocol (Appendix D) containing open- and close-ended questions in each participants’ classroom during a planning period. Semi-structured interviews, interviews containing a list of open-ended questions about the research topic, provide the researcher with the opportunity to probe and prompt the participant, and allow the researcher the opportunity to discuss certain topics in more detail (Patton, 2002). These semi-structured interviews were appropriate for this study because I asked all participants the same questions but had the freedom to ask more questions as needed to gain further insight into participant experiences. Close-ended questions provided me with information about each participant’s orientation to the topic, while open-ended questions allowed the participant to tell his or her “story” so that I could collect a plethora of data about the lived experiences (Creswell, 2013). Questions were evaluated and refined to increase validity. After anchoring each question in the literature, I asked two teachers who had integrated mobile devices
in their classrooms to evaluate the questions for clarity and ensure the questions solicited the needed information. Interviews were audiotaped to be certain correct information was recorded on the interview protocol (Creswell, 2013).

Questions were developed and anchored in the research from the literature review. The purpose of question one was to ensure that all participants had recent experience with using mobile initiatives to enhance student learning. In a phenomenological study, all participants must have a shared experience with the phenomenon (Creswell, 2013).

Questions two through nine sought to allow teachers the opportunity to express how the use of mobile devices impacted their teaching strategies and student learning. Previous research on the impact of technology integration on teacher pedagogy indicated teachers do not necessarily change their practice to more student-centered instruction. Instead, teachers continue to use a teacher centered-approach while reporting the use of technology to facilitate student engagement and learning (Holcomb, 2009; Ottenbriet-Leftwich, Glazewski, Newby, & Ertmer, 2010; Weston & Bain, 2010).

Questions 10 through 13 were used to understand how professional development and communication channels impacted teacher perceptions of the m-learning adoption and implementation process. Research has indicated professional development programs are too short to sustain change and provide too much information without being content-specific (An & Reigeluth, 2011). Accordingly, “professional development, technical and administrative support, and teacher beliefs play an influential role in whether teachers [feel] ready to use [technology] in the classroom and, in turn, whether they actually [do]” (Kopcha, 2012, p. 1110).

In addition to professional development, the use of communication channels is an important component of technology adoption and integration. Cifuentes, Maxwell, and Bulu
(2011) argued effective technology integration must include social activity within a community of learners. This community, which can include intentional or incidental outcomes, provides opportunities for educators to engage in collaborative activities and discussions, build trust relationships, and learn from each other’s practice (Wenger, McDermott, & Snyder, 2002). A continuous process, learning occurs in the context of communities of practice (Lave & Wenger, 1991). Yet because of teacher isolation, educators have little time or opportunity to discuss their concerns about technology integration. Triggs and John (2004) asserted that isolation among educators is “powerful” and is “fueled by external and internal pressures, of no time or opportunity to reflect on or discuss teaching with colleagues” (p. 437). To combat this isolation, professional learning must be embedded in educational practices and social context.

Questions 14 through 20 addressed the benefits and challenges for teachers as they face multiple, ever-changing technologies in the m-learning environment. Research into barriers for technology integration and mobile devices indicated access, vision, beliefs, time, and professional development as all being possible hindrances (An & Reigeluth, 2011; Ertmer, Glazewski, & Newby, 2010; Hew & Brush, 2007; Inan & Lowther, 2010; Kopcha, 212; Mouza, 2008). Due to time constraints and assessment demands, many teachers doubt the usefulness of mobile devices (An & Reigeluth, 2011; Liu & Han, 2010). With small screen sizes, poor resolution, and lack of data input restricting the use of mobile devices, teachers doubt the value of m-learning because the perceived task value is low (Liu & Han, 2010). Even though familiarity with mobile devices exists, teachers and students may doubt their usefulness for teaching and learning (Ertmer et al., 2010; Liu & Han, 2010; Inan & Lowther, 2010). This perceived usefulness then impacts adoption of mobile technologies.
In order for mobile devices to be fully and effectively integrated into classroom instruction, educational leaders must have an understanding of the obstacles encountered by teachers in the adoption process (An & Reigeluth, 2011; Hew & Brush, 2007; Kopcha, 2012; Serin, 2012). Not only must teachers possess the required knowledge and ability to teach utilizing m-learning, but district leaders must also understand the barriers teachers encounter. This understanding may lead to solutions that will aid in the adoption and implementation processes.

Research has indicated numerous benefits for students in m-learning environments. Overall, using mobile technologies not only provided students with unique opportunities to write and communicate in authentic situations using Twitter, Google Docs, blogs, and wikis, but using mobile technologies also gave students support from their peers and teachers when completing homework and assignments (Dohn, 2009; Kilinc, Evans, & Korkmaz, 2012; Thomas & Orthober, 2011; Woo et al., 2011; Wright, 2010).

Question 21 provided the opportunity for participants to express their views on any topic about m-learning adoption and implementation that may not have been addressed in the interview question protocol. Responses to this question revealed insights that need further investigation in future studies.

**Observations**

Observation is the “process of gathering open-ended, firsthand information by [the] observation [of] people and places” in the participants’ natural setting (Creswell, 2013, p. 213). Since interviews only provide a rich description from the participants’ perspectives, observations were an important component of data collection. According to Gall, Gall, and Borg (2007), observations allow researchers the opportunity to “formulate their own version of what is
occurring and then check it with the participants” (p. 276). This additional data source provided a more complete description of the adoption and implementation process of the m-learning initiative. I conducted one scheduled observation of each participant to observe how he or she used mobile technologies when teaching. As a non-participant observer, I observed teachers in their 50-minute classrooms, and then later in the day transcribed the data to ensure accuracy. An observation protocol (Appendix E) was used so that I was able to record field notes, detailed notes recording the behaviors, activities, and all patterns observed in the natural setting (Creswell, 2013).

Focus Groups

An online focus group, the process of “collecting data through interviews with a group of people” (Creswell, 2013, p. 218), was also used as a data source. The online focus group was held after interviews and observations were transcribed. Using an asynchronous discussion board, participants were able to read the questions and respond during a time that was convenient to them. The discussion board was open for two weeks, which provided ample time for teachers to respond to the questions and then respond to each other’s posts. By using this method, I was able to collect shared understandings about the m-learning adoption and implementation process. According to Patton (2002), focus groups are advantageous when researchers are attempting to increase confidence in the patterns that emerged from individual interviews. As participants interacted with each other’s responses and considered each other’s views, I was able to obtain richer descriptions of the phenomenon (Patton, 2002). Questions for the focus groups were written based on the information gleaned from individual interviews and observations. Since qualitative analysis is iterative in nature, the later development of these questions provided me with the opportunity for reflexive iteration. According to Srivastava and Hopwood (2009),
reflexive iteration is “at the heart of visiting and revisiting the data and connecting them with emerging insights, progressively leading to refined focus and understandings” (p. 77). As such, data collected from interviews and observations informed the generation of the focus group questions. Focus group questions were evaluated and refined by two teachers who had already integrated mobile devices in their classrooms. Minor changes to improve clarity were suggested. Additionally, each question was written based on the information gleaned from the interviews and observations (Creswell, 2013). Using the online focus group protocol (Appendix E), I posted the questions, participants answered them and responded to each other, and at the end of the two weeks, the online focus group session automatically provided a transcript of the conversations to ensure correctness. (Creswell, 2013).

Data Analysis

Throughout the process of reading and rereading the data, I simultaneously wrote memos on transcripts, reflected about the process, and coded data using colored highlighters. To ensure coding was accurate, I asked a colleague to review my work periodically during the research process. Writing down ideas as they occurred to me aided in interpretation and helped form the basis for conclusions or recommendations (Bloomberg & Volpe, 2008). Memoing, a process of writing notes on interview transcriptions or observations, not only initiated thought processes, but also helped to reveal themes or significant statements (Bloomberg & Volpe, 2008).

When analyzing the data, I used a “modification of the Stevick-Colaizzi-Keen method” outlined by Moustakas (1994, p. 121). The steps in the process included epoche, phenomenological reduction, imaginative variation, and synthesis of composite textural and composite structural descriptions (Moustakas, 1994).
Epoche

To avoid bias when analyzing the data, I epoched my opinion and experience with technology adoption and integration. Epoche, or bracketing, is defined as a “systematic effort to set aside prejudgments regarding the phenomenon being investigated” (Moustakas, 1994, p. 22). Because I have participated in the one-to-one laptop program in the school district of study, I did have experience with the adoption and implementation process. Moustakas (1994) maintained it is important for the researcher to be “open, receptive, and naïve in listening to and hearing research participants describe their experiences of the phenomenon being investigated” (p. 22). For this reason, I kept a reflective journal in an effort to bracket my personal opinions regarding the phenomenon being investigated.

Phenomenological Reduction

I used phenomenological reduction while analyzing the data, which allowed me to bracket, my personal experiences about the phenomenon (Moustakas, 1994). This process required looking at the data repeatedly so that “I look and describe, look again and describe, look again and describe” (Moustakas, 1994, p. 90). By eliminating any suppositions about the adoption and integration of mobile technologies, I was able to remove personal bias on the phenomenon. During the study, I maintained a reflective journal in an effort to epoche my preconceptions related to the phenomenon.

Horizontalization, the process of listing statements and considering them with equal value, was the next step (Moustakas, 1994). I described experiences from the “vantage point of self-awareness, self-reflection, and self-knowledge” (p. 95). When considering the participants’ experiences, I recorded all relevant statements as significant to the lived experience. After listing all relevant statements, I recorded significant statements that did not change when considered
from multiple sources. Statements that were considered to be irrelevant to the research questions, repetitive, or overlapping, were deleted. Once this was done, only the horizons, or “textural meanings and invariant constituents of the phenomenon” (p. 97) were left. The invariant horizons were listed and coded in order to cluster meanings and themes within the data.

Using the list of meanings and themes, I then wrote individual textural descriptions and composite textural descriptions. Individual textural descriptions are a compilation of “invariant textural constituents and themes of each research participant,” while composite textural descriptions are individual descriptions that have been integrated into a “group or universal textural description” (Moustakas, 1994, p. 180). Textual descriptions included what the participants experienced as they adopted and integrated mobile devices into the classroom. The structural descriptions described how the participants experienced the phenomenon in relation to the setting or context (Creswell, 2013). When analyzing the information, I described in “textural language just what one sees, not only in terms of the external object but also the internal act of consciousness, the experience as such, the rhythm and relationship between phenomenon and self” (p. 90). In analyzing the significant statements and themes, I wrote a narrative description of how the participants’ experiences were influenced by the context or setting (Creswell, 2013).

**Imaginative Variation**

Using “imagination, varying the frames of reference, employing polarities and reversals, and approaching the phenomenon from divergent perspectives, different positions, roles or functions” (Moustakas, 1994, p. 98) is the task of imaginative variation. By employing imaginative variation, the most crucial aspects of the phenomenon were included in a description. During the process, the phenomenon was viewed from various perspectives and explored from all imagined possibilities. Structural qualities were listed and then clustered into
themes. Moustakas (1994) listed six universal structural themes to consider, including “time, space, relationship to self, to others, bodily concerns, and causal or intentional structures” (p. 181). Structural qualities and themes were then integrated into a written individual and composite structural description.

**Synthesis of Meanings and Essences**

The final step in data analysis was explaining the essence of the phenomenon by intuitively and reflectively writing a synthesis of the universal themes in the lived experiences of the participants (Moustakas, 1994). This synthesis combined the structural and textural descriptions and may provide the reader with knowledge about what the participants experienced and how they experienced it (Creswell, 2013).

**Trustworthiness**

Lincoln and Guba (1986) identified four criteria for achieving trustworthiness in a study: credibility, confirmability, transferability, and dependability.

**Credibility**

Credibility, or the fit between the participants’ experiences and the researcher’s interpretation (Schwandt, 2007), was achieved with member checking, triangulation of data, and peer debriefing (Lincoln & Guba, 1986). Member checking is the solicitation of participant feedback on the findings of the study (Schwandt, 2007). According to Creswell and Miller (2000), member checks are a crucial part of validity procedure as it “shifts from the researchers to participants in the study” (p. 127). Member checking allowed the participants in this study to read the findings and determine the accuracy of the description and interpretation of the phenomenon. Participants were then provided an opportunity to give written feedback or give
feedback via email or focus group. Other than a minor grammatical corrections, the participants believed the transcripts, findings, and description of the phenomenon to be accurate.

Peer debriefing, or the “review of the data and research process by someone who is familiar with the research or the phenomenon being explored” (Creswell & Miller, 2000, p. 129), was also used to establish credibility. A peer familiar with the m-learning initiative was asked to review the content and procedures described in the report to determine the accuracy of the content, methodology, and interpretation. This colleague was a valuable asset, providing written feedback during the research process and serving as a sounding board for ideas and obstacles encountered (Creswell & Miller, 2000). During the research and data analysis phases of this study, this colleague read the chapters to evaluate content, methodology, and interpretation. Changes were made based on areas where more details and clarity were needed.

Triangulation of data, or the methods used to examine the veracity of a study’s findings and interpretations (Schwandt, 2007), provided credibility because the data was collected from three different sources so that comparisons and matches could be made between experiences (Creswell, 2013; Lincoln & Guba, 1986). The three sources of data used in this study were interviews, observations, and focus groups.

**Confirmability and Dependability**

Confirmability is the criteria that ensure the interpretations and findings are not fabricated by the researcher (Schwandt, 2007). Dependability is the assurance that the research process was conducted in a logical and traceable manner (Schwandt, 2007). Confirmability and dependability were achieved by using an audit trail, which assured that documents that supported the findings of the study were kept (Lincoln & Guba, 1986). An audit trail was established as I kept “clear documentation of all research decisions and activities” (Creswell & Miller, 2000, p.
I utilized three suggested activities for establishing a clear audit trail: recording all research activities and data analysis procedures, and developing a data collection chronology (Creswell & Miller, 2000).

**Transferability**

Finally, the writing of thick, rich descriptions ensured the transferability, or generalization to other settings and participants of the study (Schwandt, 2007). According to Denzin (1989), “thick descriptions are deep, dense, detailed accounts” (p. 83). Creswell asserted that thick, rich descriptions create “verisimilitude,” which are “statements that produce for the readers the feeling that they have experienced, or could experience, the events being described in a study” (Creswell & Miller, 2000, p. 129). By providing thick, rich descriptions, I provided readers of the research with the opportunity to determine if the study’s results can be generalized to other populations (Lincoln & Guba, 1986).

**Ethical Considerations**

The following ethical issues were considered and addressed in the research proposal for the IRB: anonymity, informed consent (Appendix C), and data security (Creswell, 2013). Before any data was collected, permission to conduct the study was obtained from the IRB. I then asked for participants and provided them with informed consent forms, which informed them about the study and let them know about their rights as participants (Creswell, 2013). Anonymity protected the privacy of everyone involved, as pseudonyms were used to ensure anonymity was provided for the participants and the site. Additionally, the data was stored in locked cabinets and password-protected documents on the computer.
Summary

The purpose of this chapter was to present the procedures, research design, and analysis for the present research study. Descriptions of the research design, as well as procedures, methodology, population, sampling method, instrumentation, and procedures for data collection and analysis were discussed. The following chapter will discuss the findings from the interviews, observations, and focus group.
CHAPTER FOUR: FINDINGS

Overview

The purpose of this transcendental study was to investigate teachers’ perceptions of and experiences with the adoption and integration process as teachers at TOPS Sixth Grade School transition from a one-to-one laptop initiative to a school-wide adoption of a mobile learning initiative. Moustakas (1994) defined phenomenology as research “concerned with wholeness, with examining entities from many sides, angles, and perspectives until a unified vision of the essences of a phenomenon or experience is achieved” (p. 58). In a phenomenological study, the aim is not to explain or analyze participant experiences, but to describe them.

The transcendental phenomenological method was used to study all the teachers who experienced the transition from a one-to-one laptop initiative to a mobile learning environment. Expressing the essence of how teachers viewed their adoption and integration of m-learning was the phenomena being studied.

This chapter will discuss findings from the interviews, observations, and focus group, as the purpose of chapter four is to present the results of the data analysis.

Research Questions

This study was designed to understand how teachers thought and felt during the adoption and implementation of the m-learning initiative. Four research questions guided the study:

**Research Question One:** What are middle education teachers’ experiences with and perceptions of the mobile learning adoption and integration process?

**Research Question Two:** In what ways do teachers’ values, beliefs, professional needs, and past experiences with technology impact the mobile learning adoption and integration process?
Research Question Three: What are teachers’ perceived obstacles and/or benefits of mobile technology integration?

Research Question Four: What collaborative sources do teachers use to create and share information about mobile learning?

This research pertained to teacher experiences with and perceptions of m-learning adoption and integration. To obtain a rich description of the phenomena, the collective voices of the participants were heard during collection of data.

Participant Summary

Eight participants with a wide range of teaching experience agreed to participate in this research. Each participant was involved in the one-to-one laptop initiative and was experiencing the transition to a m-learning environment.

After obtaining permission from the district, I discussed the research with all the sixth grade teachers and gave consent forms to teachers who indicated they were interested in participating in the study. After meeting with interested teachers, eight of them agreed to participate in the study and signed the consent form. All of them worked at the sixth grade school. Of the teachers participating, three were ELA teachers, two were science/social studies teachers, one was a special education tutorial teacher, another was a gifted education teacher, and the last was a technology coordinator for the school and district.

Participant Profiles

Lina, who held a degree in secondary education in English education and a K-12 certification in gifted education, had been teaching fourth through sixth grade gifted education at TOPS for 15 years. At the time of the study, she taught 35 students with only a small percentage qualifying for free and reduced lunch. When she began teaching in 2007, she only had one
computer in the classroom. That number gradually grew to four computers. As student access to technology grew, her integration of educational technology increased as well.

Gayle, who had a degree in elementary education, had been teaching at TOPS for 18 years. At the time of the study, she taught ELA to 58 students with high proficient and advanced scores on the previous year’s state test. Most of her students did not qualify for free or reduced lunch.

Raegan, who held a degree in secondary education in social studies and English, had taught in the school district for 15 years. At the time of the study, she taught 43 students whose achievement scores fell in the bottom 30% of the school population. Fourteen students were receiving Tier II or Tier III Response to Intervention (RTI) services. Over half of her students qualified for free or reduced lunches.

Marisa, who held an undergraduate degree in English education, had been teaching for one and a half years. She taught ELA to 29 students whose achievement scores were minimal and low basic. The students were in the bottom 25% of the school population based on their scores from the previous year. Nine of her students qualified for special education services, with seven of them receiving tutorial services from a certified special education teacher. Seventy-two percent qualified for free or reduced lunch.

Carrie, who held a K-8 certification in elementary and secondary education, had been teaching science at TOPS for eight years. She taught 60 students, all who were performing below grade level academically. Sixteen students received accommodations and qualified for special education services.

Maria held an undergraduate degree in elementary education and a graduate degree in instructional technology. She was certified in K-6 education, secondary education in English
and social studies, and information and communication technologies (ICT). She had taught at TOPS for 12 years. At the time of the study, she was teaching science and social studies to students with achievement scores ranging from basic high to proficient low.

Karen, who had an undergraduate degree in mild-moderate disabilities and a graduate degree in special education and educational leadership, had been teaching for a little over 26 years. For the last 16 years, she taught students with mild to moderate disabilities. Additionally, she was a co-teacher in classrooms where students received tutorial services.

Nikita had an undergraduate degree in journalism, a master’s degree in instructional technology, and was a specialist in educational leadership. She had 20 years of experience in education, with 18 of those years in the district. Initially, Nikita started teaching in the business education department of the high school. At the same time, she began offering professional development in the district during the move to the one-to-one program. After serving as the assistant principal at TOPS, she became the instructional technology coordinator.

**Interviews, Observations, and Focus Group**

I conducted interviews at the school during the participants’ planning periods or after school. The interviews, lasting between 40-60 minutes, were conducted at a time chosen by the participants so that it was convenient for them. I asked each participant the same set of questions during the interview; however, probing questions were asked when a deeper understanding or clarification was needed. To ensure accuracy, I audio-recorded and transcribed the interviews. After each interview, the participants chose the dates for their scheduled observations. I used the observations to gain a visual picture of the participants’ integration of mobile technologies. After transcribing the interviews and observations, I sent the transcripts to each participant for member checking and asked them to examine the transcription for accuracy. If any changes
needed to be made, the participant was asked to call or email. The only corrections were grammatical corrections. After these were corrected, I coded the transcripts and wrote memos in the margins (Appendix H).

Participants chose their observation date and the observations were used to gather a clear, visual picture of the participants’ adoption and integration of m-learning in the classroom. I found the observations to be a valuable tool since the data collected during interviews was self-reported by the participants. Each observation lasted 50 minutes. I then transcribed the observations and coded them to compare themes found in the interviews.

After I transcribed and coded the observations, I compared the codes to the interview data. Questions for the focus group were reviewed so I could adjust them based on areas needing clarification. These areas included teachers’ beliefs about the impact of socio-economic status and academic achievement on m-learning integration. Additionally, I needed more information on teacher’s previous experiences with technology integration and m-learning and Internet issues. Another teacher with experience in technology integration viewed the questions for reliability as I gathered needed information for this study. The focus group was held using Haiku Learning’s asynchronous discussion board. The discussion board provided a convenient way for participants to share their ideas and respond to other’s answers. The discussion board was open for two weeks, which allowed participants to view the posts and add more information about their experiences when they came to mind. Each participant read the questions and posted their responses. Additionally, they were able to respond to other participants’ answers. The information from the discussion board focus group provided rich descriptions about their experiences and verification of the themes gathered from the semi-structured interviews and teacher observations. Next, I emailed all transcripts to participants to ensure the participants
agreed with them; this allowed member checking from each participant and ensured the validity
of the data. There were no changes made to the transcripts during the member checking process
other than a few grammatical errors made during the transcription.

**Significant Statements**

The transcripts from the focus group, interviews, and observations were then analyzed
using Moustakas’ (1994) phenomenological reduction. The data were analyzed and significant
statements were identified using the steps Moustakas defined as horizontalization.
Horizontalization is the process of listing statements and considering them with equal value
(Moustakas, 1994). In this step, I described experiences from the “vantage point of self-
awareness, self-reflection, and self-knowledge” (p. 95). When considering the participants’
experiences, I recorded all relevant statements as significant to the lived experience. After listing
relevant statements, I recorded significant statements that did not change when considered from
multiple sources.

**Meaningful Units/Themes**

Once significant statements were identified, the next step in the data analysis process was
to identify meaningful units (Creswell, 2013) about the phenomenon that were revealed during
the process. After removing overlapping and repetitive statements, significant statements were
clustered into meaningful units or themes using NVivo. Transcripts were read many times to
determine patterns of information or themes. Together, the analysis of data from all three data
sources provided clarification about the experiences of teachers participating in m-learning
initiatives to enhance student learning. Only the horizons, or “the textural meanings and
invariant constituents of the phenomenon,” were left (Moustakas, p. 97). The invariant horizons
were listed and coded in order to cluster meanings and themes within the data (Appendix I).
emailed the themes and subthemes to the participants to ascertain their feelings about the accuracy of them. Feedback from the participants indicated they agreed with the information; therefore, no changes were made. Additionally, colleagues familiar with mobile learning gave feedback on the themes and subthemes by reading the analysis of the transcripts and connecting them to identified themes and subthemes. No changes were made as a result of the peer debriefing.

The following is a discussion of the themes I discovered through an analysis of the data from all three data collection methods. A representative sample of responses was used to support selected themes.

**Research Question One**

Research question one was designed to obtain information about teacher experiences with and perceptions of m-learning adoption and integration. Two meaningful units were revealed after a thorough analysis: (a) frustrating process and (b) culture change required.

**Frustrating process.** Teachers overwhelmingly shared the frustrations they felt when implementing the m-learning initiative. Subthemes related to this theme related to student access, hardware and server issues, and time consumption. This theme was evident in the focus group discussions, observations, and interviews.

**Student access.** All but two of the participants reported problems due to lack of access for some students. The majority of the teachers felt that the school district should provide a device for each student to keep with them during the school year. Maria reported, “When students had their own computers, they wanted to find Wi-Fi access at restaurants—the library . . . wanted [Internet] access because they owned the computer…many don’t have access to anything but a phone. They’d be better off with a computer” (Interview with Maria, November,
In December’s discussion board focus group, Raegan asked, “With everything on the computer…what happens when students don’t have a working device or access to the Internet?”

Several of the teachers reported that lack of access for students was frustrating because they could not plan project-based learning or needed a different plan for students who did not have a computer. Maria shared:

I think more of my students have it [a computer] than they let on . . . because they have older siblings who have computers issued to them in grades 7-12. As a teacher, though, I can’t say, ‘Everybody do this on the computer tonight.’ Some students play it for an excuse, but how do you know for sure? If I want them to read an article, they could download it here at school and read it at home . . . now that we don’t provide each student with their own laptop, they can’t get what they need . . . so I basically avoid assigning homework that requires technology. I mean, I could make copies, but it is not always easy to do this so you just end up avoiding assigning something that requires access to computers (Interview with Maria, November, 2014).

When discussing student access in the interviews, the teachers also discussed the transition from one-to-one laptops to m-learning with laptop carts. Several teachers felt the one-to-one laptop initiative was less frustrating. Maria shared that students took more pride in caring for the computers when they owned them and used them all year long. Now, however, students draw on them or pry the keys off the keyboard. Additionally, Maria said that taking time to pass out the computers and then take them back influenced her decision to use the computers many days because of the “time crunch” she feels each day.

When I asked Carrie about her perceptions of m-learning and the reason for the district transitioning from the one-to-one laptop initiative, Carrie gave this explanation:
I like one-to-one better than m-learning with carts because students all have a computer—not just some. I hated it when [the district] went to carts—many people cheered about it but I didn’t . . . I’m able to do so much more with the computers when students always have 24/7 access. Always going to have a few who are using it inappropriately—not always the kids—was mama, grandmamma, or neighbor—so all kids at this school lost access to a laptop (Interview with Carrie, November, 2014).

Karen explained the problems that are occurring because of the shared computers on carts when she said:

We have run the gamut between one-to-one and classroom sets on carts. I can have students who log in during my class and then go to another class and can’t log in because their information is attached to another computer. This is a problem . . . students have to take the computer with them to their math or ELA class . . . now I don’t have enough computers for the students in my next class (Interview with Karen, October, 2014).

Hoping that the district’s m-learning initiative, especially BYOD, would solve the access issue, Maria felt that it was going to benefit her class; however, she said the “district limited it to a laptop . . . the district said students could not use the BYOD server with a phone or tablet” (Discussion board focus group with Maria, December, 2014). Additionally, because students don’t have laptops to bring to the school, she said, “BYOD is not working—they either don’t have a laptop or won’t bring it to school” (Discussion board focus group with Maria, December, 2014). She added that some of the cloud computing programs utilized by the district do not work on mobile phones or tablets. If that issue could be resolved, she claimed “teachers would accept a phone being out in class because any device [students] bring to the table is better than them not having any device” (Discussion board focus group with Maria, December, 2014).
Lina said the “move to the carts is much better,” however, and expressed the belief that the move to m-learning with laptop carts has been positive and with fewer issues (Interview with Lina, October, 2014). She reported that the school was not having as many problems with repair fees and students losing the laptops. Gayle, with most of her students having access to a laptop at home, did not express a preference one way or the other.

**Hardware issues.** Every participant reported hardware issues with the laptops. Karen shared a frustration in her class because of the “issues with tech,” and gave the example of “twice we have had a unit test planned and when the morning rolls around, no one can get on because Engrade is down. Building wide no one is able to—a week later it is the same song” (Interview with Karen, October, 2014).

Carrie added that more computers are needed because “they are having major issues with computers that have wear and tear . . . computers need to be updated so that so much time is not spent on maintenance and troubleshooting during class” (Interview with Carrie, November, 2014). Gayle and Marisa concurred with the others who shared about computer problems. They did not, however, experience as many issues in class. Marisa did have problems with the battery life of the computers in her classroom; because she did not have enough chargers to charge all of the computers, she could only use them in either the first half of the day or the second. She shared, “I don’t have enough chargers to keep them charged after they have been used for a whole class period” (Interview with Marisa, November, 2014). Many of the teachers borrowed computers from other classrooms whenever they needed more working computers; however, sometimes, the teachers next door to them were also using the computers.

These computer issues were evident during observations. For instance, Raegan had problems with her school-issued laptop. When teaching a lesson on figurative language, she
tried to open the file for the presentation. She received an error message indicating that she needed an updated version of Keynote. When she tried to work around the error, she was unable to do so because she needed an administrative username and password to update the program. To get the update on her laptop, she would have to send it to the helpdesk. As time was limited, she eventually decided to allow students to research different types of figurative language. She then discovered there were issues with the server and finally decided to give a handout to the students to read and complete a puzzle on figurative language. During the time it took to try to troubleshoot the computer issues, the classroom became noisy since students were not engaged in a task. When discussing the technology issues in the focus group, she shared her frustration about the problems encountered when attempting to implement the m-learning initiative.

Similarly, Karen and Marisa shared their frustrations with the m-learning implementation in focus group. Karen said, “When it works it’s good, when it doesn’t – well, you have to shift gears…causes a distraction and sometimes a behavior issue” (Discussion board focus group with Karen, December, 2014). Marisa agreed and said the issues result in “parking lot planning,” where teachers are not certain if it will work from day to day so “how will you teach and assess the skill, without knowing if it is going to work? [It] requires constant flexibility” (Discussion board focus group with Marisa, December, 2014).

Server issues. These issues were mentioned numerous times during the interviews and the focus group discussions. The school in which the participants teach used numerous cloud computing software programs with the implementation of m-learning. These included Haiku Learning Management Systems, Google Apps for Education, Engrade, Write to Learn, Pearson, and Classworks. All of these programs required a Wi-Fi connection to work. I could feel thick
tension and frustration as Raegan described the problems she has had with the Internet connection in her classroom. She said:

I have to stop and send the computer to the helpdesk, which means lots of interruptions because I don’t have extra computers. The kids have to leave the class. I want to be able to change the date on the computer because it messes with the Internet connections but I don’t have access to do it because I’m not an administrator. Other issues are like on the first day of the district common assessment . . . I had five kids who couldn’t get onto the test and this takes up instruction time and adds more days for testing. It is because of technological issues, which made them plow the row again—I was chomping at the bit—thinking I need to be teaching. Instead, I was walking around the room for four days during testing (Interview with Raegan, November, 2014).

Lina desired “city-wide Wi-Fi since many of my students have a device but don’t have Wi-Fi access at home” (Interview with Lina, October, 2014). She added that “10-12 % of my students don’t have access to the Internet” outside of school (Interview with Lina, October, 2014). Lina also addressed her frustration with the server issues at school. She explained that there are days when she just gives up and takes the devices. Marisa reported, “It can be chaotic . . . [implementing m-learning] causes frustration because they [teachers] don’t have control over the technology sometimes” (Interview with Marisa, November, 2014). Frustration was also evident when Carrie explained how she is limited in her instructional strategies with technology. She said, “I used to build my bellringer and exit tickets [on Haiku] and I loved it because I would get instant feedback for how students do . . . but now it is not as reliable . . . frustrating to always have to have a back-up plan” (Interview with Carrie, November, 2014).
Carrie also stated that her main frustration is that the laptops do not work properly. She said, “Students get frustrated when they don’t work. This is time consuming too…because when I plan a marvelous lesson and the [computers] don’t work or we can’t get on the Internet” (Interview with Carrie, November, 2014).

I also saw evidence of teacher frustration in the observations. In Maria’s room, students were very engaged in creating a glossary of words for chapter 17 of the novel they were reading. Students were able to look up words they did not know and research information about the sea life mentioned in the text. At the same time, they were completing an interactive activity, which allowed them to explore the setting of the book. About 15 minutes into the class, the students began having difficulty staying connected to the Internet. As the teacher went from student to student trying to help them get logged back in to the Internet and the interactive website, other students were taking the laptops to the helpdesk. The only students not having issues with the Internet were those who had their own devices. The teacher was very frustrated because she had prepared a research activity that was very engaging, but her classroom environment became chaotic because of issues with Internet access.

**Time-consuming process.** All participants talked about the amount of time, much of it on their own, required to implement the m-learning initiative. When interviewing Gayle, she shared about her attempts to create a video about how she is using mobile technology with her students. She expressed the task was “very time consuming when trying to put video clips together” (Interview with Gayle, November, 2014). Most of the participants reported feeling there was too much to learn and implement in a short time. The number of platforms and programs has increased since moving to the m-learning initiative. These platforms and programs include Haiku LMS, Google Drive, Google Apps for Education, Write to Learn, Engrade, and
Pearson Success Net. Karen suggested, “It is the pace in which changes are made . . . impacts teachers and morale . . . maybe not the actual pace of it but maybe the number of things . . . [the district] may do it all at one time . . .” (Interview with Karen, October, 2014).

Marisa added, “I’ve never been taught how to use a MacBook . . . must spend a lot of time on my own” (Interview with Marisa, November, 2014). Carrie talked about the time-consuming task of planning. She shared that implementing lessons using mobile technology is “time consuming . . . because we plan a marvelous lesson and then [the computers] don’t work or we can’t get on the Internet . . . this is very frustrating” (Interview with Carrie, November, 2014). Similarly, Raegan, when discussing the amount of new skills teachers had to learn, said:

I don’t have time to learn everything so I introduce to a couple of kids what I want to do . . . ask them to go home and figure out how to do this. Then [I] have them come back and teach the class (Interview with Raegan, November, 2014).

Karen also expressed frustration about the amount of time required to “know all these programs” and emphasized “I have no more time to explore on my own” (Interview with Karen, October, 2014). Lina concurred when she said, “Teachers have been challenged with the many and varied software and programs the district has implemented. Frustration sets in with all the things we have to learn and implement . . . ” (Interview with Lina, October, 2014).

Culture change required. An analysis of data revealed that a change in culture for both teachers and students is required for effective implementation of m-learning in the classroom. Participants in the study reported the need for students to realize the devices are more than toys. Also, some participants expressed their concerns about students staying on task when using mobile technology, while others shared particular experiences of students not using technology
appropriately. Two subthemes were revealed: (a) digital citizenship and (b) teacher and district response.

**Digital citizenship needed.** According to Maria, students in her classes see the devices as more of a gaming or social media toy. She said, “Do’s and Don’ts are a must . . . if seen using [the devices] inappropriately, they have consequences . . . use their phone inappropriately on Facebook, the phones are taken up” (Interview with Maria, November, 2014). Similarly, Lina said:

> Devices are not toys—they are tools. From the beginning of the year I try to get my students to wrap their minds around that. I train them from the beginning to make connections on how to use [the devices] in the classroom (Interview with Lina, October, 2014).

Carrie said, “The first thing I talk to them about is that it is not a toy—it is an expensive tool . . . so I go over with them that the device belongs to the school and should be taken care of” (Interview with Carrie, November, 2014). Additionally, Karen explained that most of her students view the devices for “fun and games” and as such, “[the devices] have hindered at times in mastering the content” (Interview with Karen, October, 2014). Maria also reported inappropriate use by some of her students. She shared how some students had “uploaded inappropriate photos and shared them with others” (Interview with Maria, November, 2014). Also, some students had posted “inappropriate comments on the class discussion board.” Lina, sharing “students as young as third grade have Twitter and Instagram accounts,” explained, “Students don’t realize what they put on the Internet and in social media—it’s always there . . . no taking it back” (Interview with Lina, October, 2014).
Participants all agreed that teaching digital citizenship is essential when implementing m-learning initiatives. In the focus group discussion, Maria shared that teachers have “concerns about privacy issues” and added, “it will always be an issue” so these “kids must learn not to do personal business with your private information.” Gayle concurred and added, “. . . not just at school . . . anywhere . . . it’s a part of society so beneficial for them to learn not to give out certain information” (Discussion board focus group with Gayle, December, 2014).

Teacher and district response varies. In discussing the consequences of inappropriate use, some participants shared how the district made decisions to change the one-to-one program to a m-learning initiative where carts were in the classrooms but students would not have 24/7 access to the device any longer. Participants expressed their anxiety about inappropriate use and suggested possible solutions. In the focus group discussion, Raegan expressed her anxiety about her students playing games or being on social media. She asked the other participants:

Do you find it disarming to hear the clicking and not be able to see what they are doing?

Sometimes, I have to sit right by my students because I need to see what they are doing . . . must make sure they are on task and making good choices (Discussion board focus group, December, 2014).

Marisa answered, “Keeping the students focused on what they are supposed to be doing . . . I’m afraid they will eventually learn they can chat and share things on the computer” (Discussion board focus group with Marisa, December, 2014).

When discussing inappropriate use, Carrie explained, “Not only the kids though . . . parents too . . . mama, grandmamma, and neighbor . . . all took advantage of the 24/7 access to a computer. As a result, the students [at this school] lost access to the one-to-one program” (Interview with Carrie, November, 2014). In the interview with Nikita, I asked her about the
district’s decision to stop the one-to-one laptop program for sixth graders. She said that students do make bad decisions when using technology; however, she emphasized, “That’s part of life.” Additionally, she reiterated the need for teaching “kids what is appropriate and what isn’t on school-issued devices instead of taking it away or blocking it” (Interview with Nikita, November, 2014). Her opinion was that the district “made decisions based on a small percentage of wrong doers . . . gave the message that it was okay for students not to participate . . .” (Interview with Nikita, November, 2014).

To help solve the issue of inappropriate use, however, other teachers felt blocking sites was appropriate. Maria and Carrie suggested that the district block all social media sites, including Google Chat and YouTube, because “students are on that when they shouldn’t be during class” (Interview with Carrie, November, 2014). During Nikita’s interview, she disagreed and asked, “Why block it because it is a valuable tool for both students and teachers?” Emphasizing the importance of changing this mentality, she said:

We ban it or say [the students] can’t use it . . . can’t be scared kids will do something wrong with the technology. [They] might play a game or do some other classwork. Students may be thinking about other things anyway . . . writing a love letter, playing tic-tac-toe, drawing. How is that any different? Technology is the same thing. We worry about students being on Google Chat, or playing games. This is just like always—just redirect them. Don’t think differently . . . monitor, be aware. Don’t shut [the computers] down and take them up (Interview with Nikita, November, 2014).

Lina agreed and said, “It’s important for students and teachers to view technology from a different standpoint—not so much what they can’t do on the device but what they can do” (Interview with Lina, October, 2014).
Research Question Two

Research question two was designed to gather information about how values, beliefs, professional needs, and past experiences with technology impact the adoption and integration process of m-learning. A priori codes from RQ2 were initially used to code the data. These codes included the following: values/beliefs, professional needs, and past experiences. Data from these codes were then analyzed for significant statements and meaningful units or themes. The following themes were discovered: (a) steep learning curve, (b) hindrance to increased test scores, (c) ongoing professional development needed, and (d) socio-economic and achievement levels.

Steep learning curve. During this school year, the state implemented the new CCSS. Teachers expressed that time was lost during class due to the issues with the computers and server. Overwhelmingly, the participants said the students had little experience with using mobile devices, especially the laptops and different platforms for learning. Preparing students to utilize the devices in order to enhance learning was a big consideration when planning. Karen shared about the importance of training and modeling for sixth grade students. She emphasized that teachers must plan for such instruction even though it takes time out of valuable class time for the state curriculum and assessments. She said:

Like today we started a Wiki project and students had lots of questions when they started that today . . . causes a time crunch when teaching students to use the tech for learning and then you have to contemplate printing when things don’t work (Interview with Karen, October, 2014).

Gayle discussed how much time and thought “goes into [planning and teaching] so I can show them how to do this, I mean, I must teach them rules and procedures for using mobile
technologies for learning” (Interview with Gayle, November, 2014). Furthermore, she added, “I can’t teach everything in one week, but procedures are a must. I must teach them how to use technology prior to them showing mastery of a standard through the use of technology” (Interview with Gayle, November, 2014). Marisa detailed all the essential elements her students must know before she could begin successfully implementing m-learning in her class. Not only must she establish and teach rules, expectations, guidelines, and goals, but she also must teach them about how to use the various devices and the programs the district utilizes. She said, “I also have to take time out to teach them how to log in and use Write to Learn, Google Drive, Haiku, and Pearson Success . . . this takes a great deal of time” (Interview with Marisa, November, 2014). Adding to the learning curve is teacher perception that students do not have keyboarding skills needed to be able to type. Marisa, however, explained, “With tight guidelines for teaching CCSS standards, this loss of time may seem wasted . . . but it is time well spent” (Interview with Marisa, November, 2014).

In the interviews, Karen and Raegan explained how teaching students to use the different programs and tools is a big challenge. Raegan said, “They don’t come to sixth grade with the computer skills that are needed to access all of the different resources that we use in our classrooms” (Interview with Raegan, November, 2014).

Apart from training students on how to use the various platforms and devices, Carrie and Maria discussed the importance of taking time to model using the devices to enhance learning. When conducting research, Carrie said:

It takes a lot of time to teach them about using [the programs and devices] . . . I have to teach them about how to search for stuff . . . how to find answers to a problem . . . how to analyze research for science and then make a graph to represent results. It takes time to
do this but other places in the world know better about using technology so we must learn it too (Interview with Carrie, November, 2014).

In the interview, Marisa summed up the steep learning curve:

It’s not as easy as it looks. Our students come to us with little to no computer skills . . . we have to teach students how to use these - they don’t come to us knowing how to use them especially for learning (Interview with Marisa, November, 2014).

**Hindrance to increased test scores.** Throughout the interviews and focus group discussion board, participants shared their belief that assessing students on their mastery of CCSS standards on mobile devices such as laptops would lead to lower scores. All participants, especially ELA teachers, felt pressured about the new PARCC assessments since the new state teacher evaluation hinges on student test scores. Participants described their students’ frustration with using computer-based testing instead of pencil and paper tests. Gayle said that parents and students were concerned about the computerized testing because students have been taught strategies for taking paper and pencil tests. Additionally, the computerized tests will be timed, which may result in students not finishing their assessments.

Raegan shared her concerns about her students’ first on-line computerized assessment. She added that her students were upset about the tests, but all she could do was tell them it would get better. She said:

Using the laptops for testing is an issue because there is something different in taking a pencil and highlighter to mark up the text. Not knowing what PARCC is going to do with the test on the computer is a big hurdle (Interview with Raegan, November, 2014).

Gayle described her concerns about computerized testing:
On the first online assessment, [we] realized that they don’t know how to manipulate the computer. On a paper copy, [students] can annotate the text to break it down but when they are at their desk with a computer screen, they don’t know that buttons highlight . . . then with the ADD/HD kids—those who were unraveling [the text]—how do they stay focused when they can’t interact with the text in the same manner as paper and pencil? All this will take a great deal of practice and teaching and knowing how to get the most from students . . . have to figure out what will help them on the device…to aid [the students] in taking the test (Interview with Gayle, November, 2014).

Karen explained, “Some kids are different types of learners but [there is] only one way of testing on a computer” (Interview with Karen, November, 2014). Carrie pointed out that most of the students prefer tests on paper so they can annotate the text. She said, “Every kid is different . . . maybe they should have a choice” (Interview with Carrie, November, 2014). Marisa and Karen agreed that the use of mobile technologies could be problematic. Karen said that her students were capable of creating presentations using technology, but that she also gives them choices on how to complete their assignments. She asked, “Has access [to mobile technologies] in the classroom increased knowledge of content? No, I think it may be a hindrance for my students” (Interview with Karen, October, 2014).

When I asked Gayle how m-learning has impacted her students’ achievement of the CCSS, she responded:

Learning with mobile devices is not a silver bullet. [It] can’t replace what a teacher’s interaction with the students . . . the computer is a resource. [It] enhances a student’s learning . . . the teacher becomes obsolete if we say the computer can raise the bar and get students to the level of whatever standardized test I am giving . . . can’t expect [the
computers] to teach students so they learn better on their own. I use tech to enhance what I am teaching, but I don’t think it’s going to be the thing that changes their academic success (Interview with Gayle, November, 2014).

Raegan summarized the participants’ concern about increased test scores when she said, “The mobile learning program has been beneficial for students in the classroom, but I am not sure how this has helped them to prepare for the district and state assessments” (Interview with Raegan, November, 2014).

**Ongoing professional development needed.** All participants shared how they are trained in mobile technology integration the week before school begins or at the end of each school year. The district also offers a three to five day May Institute at the end of the year. Teachers are able to choose the workshops they want to attend. Additionally, they receive training during their 50-minute planning time or after school. Overall, participants reported that more on-going support is needed if they are to effectively implement the m-learning initiative. Maria described PD as brief and suggested that trainers might “give us an assignment where we go back and try [mobile technology and programs] in our classrooms? After that, we could go back, share our experiences [and] then get feedback from them” (Interview with Maria, November, 2014). Gayle and Raegan agreed with Maria. Gayle added, “They could even give us a step-by-step guide” (Interview with Gayle, November, 2014). Raegan said, “[The district] doesn’t need to leave us hanging on a cliff. We try to do all this stuff, but there’s not really any way we can know about all these programs—like Classworks, Google Apps, and Engrade” (Interview with Raegan, November, 2014).

Similarly, Carrie added:
The hardest thing for me is they train us but they don’t give us time to practice—they teach us 30 things in about an hour—impossible. We can’t learn all of that in so little time . . . right now teachers are overwhelmed learning how to do all of these programs (Interview with Carrie, November, 2014).

She also described training during the 50-minute planning period as being inadequate, but stated that having training after school is problematic because teachers also have their own children. Overwhelmed with the professional development offered to her, Karen showed her frustration when she said, “Some people in the district know [how to use technology to enhance learning] and know it well. But then there are people who don’t have a clue yet they are the ones sitting there making decisions” (Interview with Karen, November, 2014). She emphasized that training for all the programs the district uses is never-ending.

Marisa, who is in her second year of teaching, expressed the same concerns about professional development. She suggested, “District leaders should provide hands-on training . . . where we can be taught, then go integrate it . . . see what works and what doesn’t . . . then go back and get more training” (Interview with Marisa, November, 2014). Lina shared her extreme concern for new teachers when she said, “Google Drive, Mimio—areas where teachers, especially new ones, need training. [The district] just hands these devices to them and expect[s] them to figure it out” (Interview with Lina, October, 2014). When asked how she got her training on Google Apps for Education, she said, “I trained myself.” Adding to Lina’s comment about how to use Google Drive with her students, Nikita expressed her belief that professional development should be personalized. She suggested that teachers need to “begin to have conversations about what we could do—how can I tie this [technology] to a standard . . . ask
what do I need . . . if [someone] wants to become a Google expert, just access the information on the Internet” (Interview with Nikita, November, 2014).

**Socio-economic and achievement levels.** During the interviews and observations, this theme became evident in not only what participants’ said, but also in how they used mobile technology in their classrooms. Wanting to delve deeper into this area, I focused on participants’ perceptions of how socio-economic and achievement levels impacted implementation of the m-learning initiative during part of the focus group discussion board.

**Socio-economic levels.** All participants reported their concern about learning with mobile technologies based on their students’ socio-economic levels. Karen said:

> Socio-economic level has a tremendous impact on m-learning. Very, very few of my students have phones or home computers with Internet access. Due to the lack of exposure at home, most of the hands-on experience and training they receive occur[s] at school (Discussion board focus group with Karen, December, 2014).

When discussing this issue with Carrie, she agreed with Karen and compared her students’ exposure to technology with Gayle’s higher achieving students. She said, “This means we have more to teach them about technology, plus they usually need more instruction on content” (Discussion board focus group with Carrie, December, 2014).

Gayle responded to their comments:

> The majority of my students are from your middle- to upper- socio-economic levels. My students come to class with phones that have Internet access or Kindles or Nooks. They use their devices to read or research. This luxury of having a tool with access to the Internet just shows that the socio-economic level has benefits that others at a less
fortunate socio-economic level might not get to have (Discussion board focus group with Gayle, December, 2014).

Raegan discussed her students’ exposure to technology when she said that around 3/4 of her students had a computer and Internet access at home, even though most of them qualified for free and reduced lunches. She said that many of her students claimed to have a data plan but did not want to waste it on school assignments. Carrie, who also taught students from lower SES homes, claimed her students were not able to use their computers effectively and said it was a major disadvantage for them. She emphasized that lack of Internet access “changes the picture of m-learning and what I can do with my students when they don’t have access at home” (Interview with Carrie, November, 2014). Carrie, along with the other teachers, perceived lack of the Internet and experience with using devices as a disadvantage for these students, especially when considering the time crunch with the new CCSS standards. After this, Lina interjected:

Many of the gifted students I teach that are socio-economically challenged are the first to search out a way to finish a product outside of class. These students will work on a product outside of class digitally because they know I can see their progress and they want praise from me. I make sure to search out the students who do this the next morning and thank them for their diligence (Discussion board focus group with Lina, December, 2014).

Gayle, who taught the same students in Lina’s classroom, felt Lina was right on target with her assessment of students and technology. She reiterated that her students go “above and beyond producing products by way of technology” (Discussion board focus group with Gayle, December, 2014). Besides constantly researching information to use, Gayle said her students research unique ways to present their research. She explained, “They desire to present in that
mature way and that takes learning on their part” (Discussion board focus group with Gayle, December, 2014).

**Achievement levels.** Gayle, whose students were mostly from middle- to upper-socio-economic level homes, expressed how different it is this year compared to the previous year when she said:

The competency with which the students use the technology in this class is amazingly different from what I taught last year in another class (proficient low to basic MCT scores). This class has students who all scored advanced on the MCT test. They are very comfortable using a variety of technology—smart phones, laptops—in a complementary manner (Interview with Gayle, November, 2014).

During the observations in her class, Gayle appeared to be more confident in her students’ ability to use the technology. Because the students were able to interact with mobile technologies to accomplish learning goals, she was then able to work with other students in small groups. When I commented on her ability to work in small groups while her other students worked independently with laptops, mobile phones, and e-readers, she said:

I use it because of the [achievement] level of kids I have—I worry less about students not doing what they are supposed to do on the computer; I trust them to be doing what they are supposed to do. I wasn’t able to do this with the laptop program last year. My students were not able to use them independently without me constantly monitoring what they were doing. I wasn’t able to trust them as much. Definitely, the achievement level of my kids would determine how freely and how often we would use our devices (Discussion board focus group with Gayle, December, 2014).
In Lina’s observation with these same students in her class, she also appeared very confident in the integration of mobile technologies. She introduced a project called “Let’s Take a Trip,” a research-based project in which the students were to act as a publicist trying to promote travel to his or her assigned United States region. They were to create a short commercial promoting the landmarks, landforms, natural resources, exports, and interesting facts about their region. When students had questions about how to do certain tasks, other students helped them. It was evident they had a great deal of experience using the different aspects of the technology. The transition into using the technology and subsequent troubleshooting were done with ease.

In comparison, when teaching her students and integrating mobile technologies, Marisa described how challenging it was in the beginning to get all of her students to utilize the different programs. She smiled as she said, “I have seen my students grow significantly since day one. They are typing faster and with more proficiency. They have learned that the computer can be their best friend when conducting research, completing writing assignments, and enhancing their understanding” (Interview with Marisa, November, 2014). In contrast, Karen, who is an inclusion teacher with Marisa, described the use of m-learning as “very, very difficult for some who have not acquired proficiency in simple use such as logging in and accessing familiar sites” (Interview with Karen, October, 2014). She shared that she is not sure m-learning has had a positive impact on students with disabilities because she is not confident of its impact on actual student achievement. She emphasized, “Teaching them using mobile technologies requires a lot of teacher monitoring, modeling, and supervision…easier in the inclusion class with two teachers obviously” (Discussion board focus group with Karen, December, 2014).
In Karen and Marisa’s observation, students were studying point of view. The students were asked to recall the story of *The Three Little Pigs*. She told them they would be hearing the story from the wolf’s point of view. Karen had uploaded a video for them to watch on their Google Drive: a video of the book *The True Story of the Three Little Pigs*. Students were to take notes and then write a comparison of the events from the wolf and pig’s points of view. Students used earphones to listen to and watch the video and take notes. With multiple windows open on the laptops, students were able to accomplish this at the same time. Each student then shared their notes with a partner and discussed what they saw. Students were able to stop and rewatch segments of the video when they needed to, which allowed for differentiation as students completed the assignment. It was interesting to see students with the lowest achievement use mobile technology to write and collaborate after watching the video. It was evident that time had been spent training the students to use Google Drive for different purposes. The lesson flowed and transitions were flawless as the students worked. With two teachers in the class, students received assistance using mobile technologies to complete the assignment.

**Research Question Three**

Research question three sought to identify participants’ perceived obstacles and/or benefits for mobile technology integration. Initially, a priori codes were used to sort data from observations, interviews, and focus groups. The codes included the following: benefits and obstacles. Data from the codes were then analyzed for significant statements and meaningful units or themes.

**Benefits.** The following themes were discovered as benefits: (a) student collaboration, (b) student motivation and engagement, (c) vast resources, and (d) improved teaching.
**Student collaboration.** Participants reported student collaboration as a benefit for m-learning. Collaboration among students was also evident in participant observations.

Gayle shared about a newspaper assignment her students completed using Google Drive. During the editing and revising process, students were required to share their newspaper with at least two other students. Students were directed to read and make comments on each other’s newspaper. Gayle cautioned that much modeling and monitoring was required, since students were learning to “give good feedback and not just chat” (Interview with Gayle, November, 2014). Using a discussion board format with her students, Maria also shared how her students were learning that they could “collaborate anytime, anywhere,” and that they were “delighted once they realize[d] they don’t have to be sitting next to [each other] to collaborate” (Interview with Maria, November, 2014). She emphasized that her students were learning to work in teams and said, “For teachers, it’s all about having a plan and communicating that plan . . . what information you will need and how it should be presented” (Interview with Maria, November, 2014). Additionally, she said that the lesson learned [for her students] is “much bigger than content knowledge.” Definitely, the benefits of collaborating, according to the participants, are essential tools for 21st century learning. When discussing the benefits of digital tools such as Google Drive, Lina shared how her students used the cloud platform to collaborate on class projects from home. Additionally, Marisa liked how students could collaborate using any device with an Internet connection. Carrie added, “The ability to receive feedback from their peers as they share information and collaboratively create presentations is a plus” (Interview with Carrie, November, 2014). Similarly, Karen and Raegan agreed about the benefits of collaboration but shared a different way their students collaborate. They both used blogging, where their students researched about a particular topic, wrote about their findings, and then shared with classmates.
Karen said, “[The students] basically learn from each other” (Interview with Karen, October, 2014).

**Student motivation and engagement.** During interviews, participants reported students were more motivated to complete assignments when using mobile devices. Additionally, students were more engaged in tasks requiring technology. The increase in motivation and engagement was also evident during the observations.

When asked about the increase in motivation and engagement, Lina and Gayle reported the increase was partly due to the freedom students felt. Lina shared that her students had “more freedom to explore solutions to real-life problems” (Interview with Lina, October, 2014). Similarly, Gayle shared about a project her class did on the Civil War. M-learning provided her students with resources they would not normally have had access to. Additionally, her students were able to “pick and choose what they want so they have the most significant information. It is freedom for them . . . very powerful” (Interview with Gayle, November, 2014). Maria shared that her students are “100% more engaged if [assignments] can be done on the computer, even if it is just writing a paragraph about what they did on a science project” (Interview with Maria, November, 2014). Lina, who discussed her students’ preference for typing rough drafts rather than writing them using a pencil and paper, supported this idea. Lina said, “. . . [it] excites them to no end . . . they actively edit and see the timesaving feature. This is real-life learning . . . very motivating. No one really uses pencil and paper first as an adult” (Interview with Lina, October, 2014).

During Lina’s observation in the last period of the day, her students were visibly tired; yet when she mentioned creating a commercial using We Video, the students seemed to come alive. The same thing was evident during Gayle’s observation. Her students were very
confident and engaged as they used technology to create a presentation on figurative language. Additionally, students switched between laptops and mobile phones with ease, depending on the task they were trying to accomplish.

Gayle explained, “Technology makes learning fun . . . they get to do it a different way than what they did at the K-5 school” (Interview with Gayle, November, 2014). Maria agreed and said that the increase in student engagement has “allowed her to work in small groups with her students” (Interview with Maria, November, 2014), which had been difficult to manage before mobile technology integration. When observing Carrie’s class, I saw a glimpse of student engagement as they used smart scopes with the laptops to conduct an experiment. They were eager to be real scientists, using different tools to explore a problem and find a solution. In the lesson, Carrie taught her students how to make adjustments to their hypotheses as they used technology to search different ways to solve a problem about solubility. When sharing about increased student engagement and motivation, Lina said:

Students take pride in developing products digitally because they see a professional connection to their product. Students see creating a digital movie as an opportunity to produce their own commercial or short film. They see composing, publishing, and sharing their compositions as an opportunity to behave as authors. They see Keynotes and other slide show products as opportunities to share what they learned in a professional way as a doctor or educator might do when sharing ideas with their peers. Students are more engaged when assigned a meaningful performance task that integrates technology (Interview with Lina, October, 2014).

**Vast resources.** All participants discussed how excited they were with the abundance of resources available to them. In fact, two participants shared that they had access to more
resources than they had time to integrate. Students and teachers had access to various software
and cloud platforms, including Google Drive and Apps, Classworks, Engrade testing platform,
and Haiku Learning Systems. In interviews with Marisa and Karen, both participants agreed that
there were so many resources that it was sometimes hard to choose which one would be best for
the students.

When discussing the resources, the participants showed enthusiasm as they shared about
the benefits of utilizing the different platforms and programs. Karen said, “[Newsela,
Classworks, and Engrade] are great tools to help us track the progress of our students. We can
use them to pinpoint the standards that each individual student has or has not mastered”
(Interview with Karen, October, 2014). The ELA and science teachers mentioned the usefulness
of blogs and discussion boards for assessing what students have learned. All of the participants
reported that they were able to find resources other than what they had in the classroom. Gayle
summed up the benefit of the available resources when she stated, “Teachers went from being
very limited to what you can get your hands on to this limitless realm” (Interview with Gayle,
November, 2014). Raegan added, “I can search for whatever I need . . . anytime, anywhere—24
hours a day, 365 days a year . . . I have everything on my cell phone connected to my school”
(Interview with Raegan, November, 2014).

**Improved teaching.** Seven of the participants reported the m-learning initiative had
provided an instructional advantage. Karen said, “We search for more digital types of learning
and ways to teach things that are outside the box and may be different from the way we used to
do things” (Interview with Karen, October, 2014). Marisa added, “With BYOD phones and
laptops, I’m able to let students search and find and present material in a whole different way
other than just paper and pencil, which let’s me implement different resources to enhance their learning” (Interview with Marisa, November, 2014).

Every participant compared instructional methods before the m-learning initiative. Mostly, the participants shared they used lecture, textbooks, and handouts for instructional resources. Maria, when comparing her current instruction to her instruction before the m-learning initiative, said, “A lot of the science textbooks were obsolete but I was dependent on them. Now I’m a facilitator for student learning. They are able to research and collaborate with current information, and I mainly use project-based learning” (Interview with Maria, November, 2014). Carrie, who also taught science, agreed that current, up-to-date resources and information are essential. She added, “We can get through a lot more material in a class period versus just the textbook and writing notes” (Interview with Carrie, November, 2014). When discussing the improvements to her teaching, Lina said, “I’m able to create more real-life instruction for students . . . my instruction is less canned . . . [it] makes their learning more authentic” (Interview with Lina, October, 2014). Agreeing with Lina, Gayle stated, “When I put something in front of kids that’s not the old-fashioned way . . . like using YouTube . . . it lets kids visualize this way and it keeps their attention” (Interview with Gayle, November, 2014).

When discussing the resources provided in a m-learning environment, the participants reiterated the tremendous benefit of begin able to easily individualize instruction. Maria explained:

The extra practice [the students] are getting on Classworks each morning, during guided study, and as a filler for dead time in class is huge. There is no way a teacher could pull this amount of practice work, run it off, and have it individualized based on students’ needs (Interview with Maria, November, 2014).
Along with the differentiation provided to students, teachers were also able to provide more immediate feedback. When discussing the differences in instruction, Nikita added, “The m-learning initiative has made me more productive as a teacher . . . data is immediate based on Engrade . . . guides instruction . . . before, we may have to wait until graded, like three or four days before it would guide our teaching” (Interview with Nikita, November, 2014).

**Obstacles.** Themes uncovered for obstacles included the following: (a) uncertainty and sustainability and (b) access. Issues with the computers and server, already discussed in RQ1 as a frustration to teachers, also proved to be an obstacle to participants as they implemented the m-learning initiative. Overall, the computer and server problems led to the two themes uncovered as obstacles.

**Uncertainty and sustainability.** During the interviews and focus group discussion board, most of the participants mentioned uncertainty about the reliability or sustainability of the m-learning initiative. Raegan said, “There is always a Plan B when it comes to technology. Nothing is certain when it comes to dealing with computers and the servers” (Discussion board focus group with Raegan, December, 2014). Lina agreed and added, “Glitches do occur . . . requires me to scratch the plan for the day and move on to something else. I usually have a back up plan just to be safe” (Discussion board focus group with Lina, December, 2014). Maria shared that uncertainty about technology causes teachers to “pump the breaks as far as planning assignments requiring technology in class and outside of class” (Discussion board focus group with Maria, December, 2014). Carrie said:

My biggest beef is the uncertainty of the computers. I mean, are they going to work? Do I need a Plan B? Hate when I plan a marvelous lesson and then it doesn’t work because of the computers or server (Interview with Carrie, November, 2014).
She also explained her uncertainty in using Haiku for her bell ringers when she said, “Haiku goes down and then my classes are inactive. Now, it is not as reliable so I always have to have a back up plan” (Interview with Carrie, November, 2014).

Agreeing with Carrie, Marisa said, “The issues with tech require planning multiple strategies and ways to teach—just in case technology doesn't work” (Discussion board focus group with Marisa, December, 2014). Maria added, “Uncertainty is there . . . is the district able to keep working technology in students’ hands? If [the district] can, there’s no reason to go backward . . . technology’s not going away” (Discussion board focus group with Maria, December, 2014). All of the participants shared how much they now rely on mobile technology for project-based learning. Gayle and Nikita described the teachers’ concerns about not having technology initiatives. Gayle said, “All the programs we are using are online—Google, Classworks, Write to Learn, Engrade. What would we do? Sustainability is expensive which may be why students are being encouraged to bring their own device” (Interview with Gayle, November, 2014).

Access. Every single participant reported access to be a tremendous obstacle, especially when planning project-based or collaborative assignments that required access to not only a mobile device, but also the Internet. All but two of the participants felt that the one-to-one laptop initiative was better because the program ensured that all students would have 24/7 access. With many student resources and programs requiring Wi-Fi, teachers were reluctant to plan assignments that would require access outside of school. Nikita explained that having some type of mobile device should “be a non-negotiable.” She added, “Thinking these devices [for learning] are optional—this mentality—is a big hurdle” (Interview with Nikita, November, 2014).
Raegan asked:

How am I going to consistently use [these devices] in the classroom for kids—especially for those who only have Internet access on their phones? Many of them have limited data plans…homework is a challenge because I can’t send things home for all students to do (Interview with Raegan, November, 2014).

When discussing access in the focus group discussion board, the participants agreed lack of access definitely prevented assignments outside of class; thus, additional time in class must be provided for students who do not have access. Lina said, “Overall, I do have to provide more time in class to finish products than when we first went one-to-one and students took home their devices” (Discussion board focus group with Lina, December, 2014).

Karen cautioned, “Teachers must be careful about holding students accountable who don’t have access” (Interview with Karen, October, 2014). She added, “Students with more access to technology have an advantage over those who don’t.” Gayle agreed and said, “Students who have access to the Internet and a mobile device—tablet, phone, or laptop—don’t have to sit in a classroom . . . learning takes place anytime, anywhere . . . on your own schedule” (Interview with Gayle, November, 2014). Carrie added, “I am able to do so much more with my students when they have 24/7 access. It limits the types of assignments—like project based ones—that I give when they don’t” (Discussion board focus group with Carrie, December, 2014). Nikita, who also felt that the m-learning initiative gave access to anytime learning, agreed with Karen and Gayle. She said, “If all students had access, they would be exposed to a bigger world than where [they] were born . . . many of the students without access never see past their own neighborhood . . . they believe this [world] is all there is” (Interview with Nikita, November, 2014).
Research Question Four

Research question four was designed to gather information about the collaborative sources used by participants in an effort to create and share information about m-learning. All of the participants indicated that they used Google Drive and Haiku to collaborate as they shared resources and lesson plans. An analysis of the data revealed the following themes for collaborative sources: (a) informal conversations, (b) personalized and self-taught, (c) professional learning communities, and (d) more collaboration needed.

Informal conversations. Many of the collaborative sources used by participants included informal conversations. The conversations were mainly held among members of the same pod or team, but sometimes would occur during lunch or at duty. Marisa said:

We have several teachers that are tech savvy and they are always willing to help out in any way possible. The teacher next door and I will get together and discuss our lessons. She puts our bell ringers on Engrade and adds integrated reading lessons on Haiku for us to use. On Teachers Pay Teachers, a sharing website online, one of our teachers found interactive notebooks. She shared those with us. Usually, these discussions are held in passing, not necessarily in any formal PLC or meeting (Interview with Marisa, November, 2014).

Carrie added, “With the cloud, it is easy to share with others throughout the building. We try to collaborate with ELA teachers to involve ELA in science and visa versa—we want to do something to incorporate math, language, reading, and science” (Interview with Carrie, November, 2014). Similarly, Karen said:

We each search more for digital types of learning and ways to teach things that are outside the box and may be different from the way we used to do things. Usually,
someone with tech savvy skills in each department has a different way of teaching and shares that with others (Interview with Karen, October, 2014).

Gayle added:

Sometimes in conversations with the principal, he will make suggestions for people to go visit. He might share that if you want to go see a certain type of technology being used, then go to this classroom . . . like go see how the challenge teachers are using Google Drive (Interview with Gayle, November, 2014).

Raegan also said that much of the collaboration they did was through informal discussions:

ELA has a group on Google Drive where we share resources . . . we share all the time within our pod and on our floor but most of it is informal . . . like we might ask what others are doing this week. Then we discuss it (Interview with Raegan, November, 2014).

Carrie agreed with the other participants about how informal conversations with tech-savvy teachers led to more collaboration about integrating mobile technologies. When discussing how informal conversations benefited them for implementing m-learning, Gayle explained that teachers came up with many more ideas when they worked together. She said:

When you are trying to think of things on your own, it doesn’t always work. That’s when we ask how did you teach this? It seems to be more meaningful when we try it and realize exactly what we need more help with (Interview with Gayle, November, 2014).

**Personalized and self-taught.** All of the participants reported that much of the information they had learned about implementing m-learning was mostly self-taught and was based on their professional needs. When looking for information, they used a variety of resources, including the Internet, YouTube videos, Pinterest, and blogs. Nikita shared, “Videos
are useful for viewing other teachers somewhere else doing something I want to improve on. I can watch as many times as I need to in order to become proficient with implementing the technology” (Interview with Nikita, November, 2014). Similarly, Carrie said, “What I’ve learned I’ve learned on my own” (Interview with Carrie, November, 2014). Coinciding with Carrie’s idea of personal learning, Raegan added, “Mainly I learn about using m-learning on the Internet. I can get on Pinterest for hours to find ideas for tech integration. I search for whatever I need anytime, anywhere—24 hours a day, 365 days a year” (Interview with Raegan, November, 2014). Gayle agreed and said, “Pretty much I use the Internet. It’s instant knowledge . . . so much access to every subject I could possibly want.” Instead of “reinventing the wheel,” teachers in this study took advantage of the vast resources offered on the Internet as well as on different forms of social media (Interview with Gayle, November, 2014).

**Professional learning communities.** Another way participants reported they shared collaboratively was through professional learning communities (PLCs). When discussing ways teachers shared, Raegan said:

> The school is large so it’s hard to meet with all the teachers . . . hard to get together. We don’t have a common planning period together. With the size of the school . . . getting from here to there . . . you’re 7 minutes from one place to the other . . . some teachers we never see until we have our scheduled PLC on Tuesdays. That’s why we need to have many different ways to collaborate (Interview with Raegan, November, 2014).

Karen explained how informal PLCs worked for them as she shared the benefits of having “pockets of people” available for “impromptu tech support” (Interview with Karen, October, 2014). She also described how conversations led to informal PLCs. In this discussion, she shared that the Challenge teachers showed them how to use parts of Google Drive. This idea
seemed to be the consensus for all participants except Gayle, who had a different opinion on PLCs. She stated that she believed PLCS were not being utilized correctly for collaboration. When I asked her to elaborate on this idea, she said:

We are not sharing things within our ELA department . . . we talked about what is a true PLC. Have we had a true PLC? We get together every Tuesday and stay until 4:30 or 5:00. I don’t think it is used correctly though…it probably isn’t because we don’t have collaboration and share ways of teaching that worked and ask how others might be teaching this standard so that it is effective (Interview with Gayle, November, 2014).

Maria’s only concern about the PLCs was that “way too much information is being shared at a time. Maybe the information should be divided up into segments or the PLCs should be longer than one planning period” (Interview with Maria, November, 2014). In her description of the science PLC, Maria shared about their weekly meeting where they discussed the effective use of Google Drive and peer editing in the science classroom. She also explained that the technology committee meets on a district level. A representative from the school attends the meeting and reports back to the departments. Though these PLCs are formally arranged meetings, Nikita also shared that the district had many informally developed PLCs. These meetings were held outside of the common planning period for teachers. She further explained the goal for the district focus groups was a common desire to meet the needs of individual schools, especially since there were a wide variety of initiatives based on the age level of the students at the individual schools. Supporting Nikita’s idea of informal PLCs, Lina shared in her interview about her leading of some PLCs and how the meetings came about when she said:

I work on training teachers on Google Apps and Google Drive. For ELA, I shared with them on templates . . . some didn’t know about Haiku’s discussion feature . . . it works
well to train teachers when sharing on a smaller group level. It’s very informal—like someone says, ‘Oh I need to know how to do that . . . so will you show us?’

**More collaboration needed.** All of the participants reported that more collaboration was needed because much of what they learned about mobile technology integration was on their own. Gayle said:

We don’t use technology to collaborate as we plan. Once I get back to the classroom after a meeting, I work to find different technology that would enhance what I teach. We don’t really collaborate to determine how we will implement this (Interview with Gayle, November, 2014).

Lina agreed with Gayle when she said, “Teachers seem fragmented…not any real collaboration going on” (Interview with Lina, October, 2014). Gayle added, “It would help us to collaborate with teachers at other schools in the district . . . we could talk to the high school and middle school teachers about what they do and how they could help” (Interview with Gayle, November, 2014). When elaborating on the need to collaborate with teachers from other schools, Maria explained:

Since we are a sixth grade school only, it’s harder to collaborate with teachers at other schools. There is no collaboration with anyone outside the district. At one time, we had a fifth to eighth grade science teacher page on Haiku. Teachers didn’t like putting resources on there though because we didn’t want students doing the activities year after year (Interview with Maria, November, 2014).

Continuing the conversation about collaboration needed with other schools, Lina said:

I’ve done a lot of leading and steering the ship as far as collaboration goes. When it comes to implementing, I have directed the implementation. Since this school site is just
one grade level, it is harder to collaborate with other buildings and grade levels. More opportunities for technology round table discussions are needed for grades six through twelve (Interview with Lina, October, 2014).

In the conversation about collaboration with Gayle, the issue of a family mentality and the importance of trust came to the forefront. She explained that the lack of collaboration might be due to teachers’ views of a team approach versus a family approach. Gayle powerfully stated:

We need a team approach, not necessarily a family one . . . everyone on a team has a purpose and a goal—you are there to win . . . the purpose must be for the entire team.

With the family mentality, there is jealousy so we are less likely to share and say I’ll help you and you help me—let’s share. We have to get past this competition—we must trust each other . . . can’t say I don’t want Mrs. Sally Sue to take that idea . . . give credit where credit is due. Hard to feel like others think they are better than you (Interview with Gayle, November, 2014).

Continuing the discussion of collaboration among the schools in the district, I asked Nikita to elaborate on the tools the district has provided for collaboration among its teachers. During this conversation, Nikita discussed the mobile tools provided by the district and the lack of collaboration among teachers for the purpose of learning about how to effectively implement the m-learning initiative. She offered a possible solution to this problem when she said:

Teachers know the resources [to collaborate] are there but they don’t go to the websites to do so. I’m a big believer in empowering others. It’s important to get more people involved in collaboration efforts. [We need to] find those teacher leaders to show what they are doing and celebrate this. Collaboration with tech catches on fire when others see this. It builds a culture that empowers people who have those skill sets. Then more
people get on board. It takes an authentic person or group to get involved. Then others will be more likely to listen. The culture toward collaboration then changes (Interview with Nikita, November, 2014).

**Composite Textual Description**

The composite textural description focused on the group’s description of the adoption and integration process. To write a composite textural description, the themes for each research question discussed above were used.

Regarding teacher experiences with and perceptions of m-learning and implementation, all participants were excited about the vast resources provided for improving their teaching; however, they were frustrated by the problems with student access, server issues, and hardware issues. All but two participants reported that lack of access to Wi-Fi and devices impacted their teaching. In addition, participants reported spending a great deal of time, much of it on their own, learning how to effectively implement the initiative. All participants indicated that a change in school culture was required for successful implementation. In particular, teaching digital citizenship was essential as teachers reported the need for students to view the devices as “tools not toys.”

Regarding participants’ values, beliefs, professional needs, and past experiences with technology, all participants reported a steep learning curve for sixth grade students. Participants used a great deal of time teaching students the rules and procedures for using the devices for learning. Additionally, they felt that there was a “time crunch” as a result of the learning curve. With the additional implementation of the new CCSS, participants felt too much time was used teaching students how to use the devices correctly. Furthermore, participants shared their
concerns about lower state test scores than usual because the students were required to take a computerized exam.

Seven of the participants also indicated their belief that socio-economic and achievement levels impacted how effectively students used the devices. According to teachers, those students with higher socio-economic and achievement levels had received more exposure to the devices. Participants also reported that they worried less about students not using the devices correctly when their students had higher achievement levels.

Every participant desired more ongoing, hands-on professional development. Furthermore, the participants reported that too much information was given in a short amount of time. As a result, they did not receive the guided practice and feedback needed for effective implementation.

Regarding the obstacles to implementing the initiative, all participants felt computer and server issues caused them to always need a Plan B. Additionally, they questioned the sustainability of the initiative because of the large number of outdated computers. According to participants, the lack of student access changed the whole picture of m-learning.

In spite of the challenges faced when implementing the m-learning initiative, all participants saw benefits. They reported that students were engaged and more motivated due to the increase in student collaboration and project-based learning. Additionally, participants reported that vast resources and opportunities to offer authentic, relevant tasks with technology had improved their teaching.

Finally, even though participants used a variety of collaborative sources to create and share information about m-learning, everyone desired more collaboration with other grade levels and schools. Collaboration occurred mainly through informal conversations with their
colleagues, especially with teachers in close proximity. All participants reported PLCs o
provided a source of collaboration, yet several suggested the PLCs were not effective because
too much information was shared over a short time span. Furthermore, a change in culture
would be required for more collaboration to occur.

**Composite Structural Description**

The development of the composite structural description required an examination of how
teachers viewed the adoption and integration of m-learning in the context and setting (Creswell,
2013). The structural description focused on how participants developed their perceptions of the
m-learning adoption process. Their beliefs about the ease of mobile technology integration were
impacted by their previous experiences with the one-to-one laptop initiative.

Seven of the participants reported inappropriate use of the laptops, which resulted in the
loss of 24/7-laptop access for students at the sixth grade school. Tensions existed because many
teachers preferred the one-to-one initiative to the m-learning initiative where laptop carts and
student-owned devices were used. Planning with the feeling of uncertainty hampered teachers’
confidence in designing lessons using technology. Participants undoubtedly felt the lack of 24/7
student access prohibited the development of project-based learning, which required access to a
device and Wi-Fi.

Previous experiences with the laptop initiative also played a role in teachers’ views about
how SES and student achievement levels impacted how effectively students could use the
devices for learning. With almost 60% of the student population qualifying for free and reduced
lunches, the participants held firmly to the mindset that lack of exposure to technology for
students from families with lower SES levels inhibited the types of assignments teachers could
give. Participants reported more success with and confidence in technology integrated lessons with higher performing students.

Participants also reported that more collaboration was needed, yet due to the size of the campus, isolation in planning and learning about how to implement m-learning was more prevalent. As a result, learning how to use m-learning in the classroom was more personalized and on participants’ own time. Some collaboration did occur with teachers in close proximity. Isolation in learning about the effective integration was also hampered by brief professional development where teachers felt too much information was given at one time without the benefit of guided practice and feedback. This practice seemed to encourage teachers to spend time on their own developing skills.

In spite of participants’ past experiences with technology, most did, however, report positive feelings about the vast resources provided through the m-learning initiative. Participants felt that the resources m-learning provided helped improve their teaching practices.

**Textural-Structural Synthesis**

All participants reported multiple stories about their positive and negative experiences with the adoption and implementation process of m-learning. Problems with the computers and the server, along with the lack of access for all students solidified participants’ feelings of frustration. Furthermore, the intense amount of time required learning about the numerous programs increased their feelings of being overwhelmed.

Although participants embraced the top-down adoption and implementation of m-learning, anxiety about inappropriate use by students and the need for teaching digital citizenship were prevalent. Because so much time was spent teaching students how to appropriately use the devices for learning, participants were torn by the demands of implementing this initiative along
with the introduction and teaching of the new CCSS. All participants, especially the ELA teachers, were very concerned about the new assessments requiring students to take computerized tests. Teachers felt pressure for students to perform well on the tests since 50% of the new state teacher evaluation hinged on student test scores. Anxiety was increased because participants did not feel the professional development offered by the district was sufficient for helping them effectively integrate mobile technologies. Participants suggested professional development should be hands-on and ongoing, with plenty of guided and independent practice, along with feedback from the trainers.

In general, all participants reported benefits of the m-learning initiative but shared concerns about its sustainability due to the lack of access for all students and the sub-standard, outdated computers in the classroom. These problems caused chaos in the classroom and ensured loss of valuable instructional time when trying to teach the more rigorous CCSS.

Summary

Through semi-structured interviews, observations, and focus group discussions, the eight participants in this study shared multiple stories about their perceptions of and experiences with the adoption and implementation of m-learning. An analysis of data revealed several themes: (a) frustration, (b) culture change required, (c) steep learning curve, (d) hindrance to increased test scores, (e) ongoing professional development needed, (f) socio-economic and achievement levels, (g) numerous benefits, (h) obstacles with sustainability and access, (i) informal conversations, (j) personalized and self-taught, (k) professional learning communities, and (l) more collaboration needed. Member checking and peer debriefing were utilized to ensure the accuracy of the themes. No changes resulted from these methods of attaining trustworthiness.
Regarding the first research question, the theme of frustration emerged from participants’ stories of lack of student access upon moving from a one-to-one program to a m-learning program utilizing classroom carts and student-owned devices. Additionally, participants were frustrated by the plethora of problems with the outdated computers and the unreliability of the server. Finally, all participants reported the frustration of the large amount of time, much of it on their own, required to implement the m-learning initiative.

Along with the theme of frustration, another theme emerged: cultural change required. All of the participants described the need for students to develop digital citizenship. Students must recognize the devices as tools for learning, not toys. Relating to this need for appropriate use of the devices, participants discussed how the teacher and district response to this issue varied. Six of the participants felt that across-the-board consequences for inappropriate use were not the answer to the problem. Providing 24/7 access to all students was described as beneficial. In particular, participants felt teaching and modeling appropriate use was preferable to taking the devices away.

Four themes were revealed when analyzing data for the second research question. This question examined how the values, beliefs, professional needs, and past experiences with technology impacted the adoption and integration process. The theme of a steep learning curve developed as participants shared about the limited experience students had with using mobile devices to enhance learning. Teachers described how much time it took to teach students the rules and procedures for using the devices, along with the multiple platforms and programs students would encounter. A second theme for RQ2 was the participants’ belief that assessing students on their mastery of CCSS on mobile devices such as laptops would lead to lower test scores. A third theme was the participants’ need for ongoing professional development. Instead
of brief PD sessions, participants suggested that the district should offer training that provides guided instruction, independent practice, and feedback. Lastly, the fourth theme for RQ2 was the belief that student SES and achievement levels impacted the ability of students to effectively use the devices to enhance learning.

For RQ3, an analysis of data revealed participants’ perceived obstacles and benefits for mobile technology integration. Perceived benefits included increased student collaboration, engagement, and motivation, as well as improved teaching practices and vast resources available. All of the participants believed their teaching had improved because they were planning more relevant, authentic performance tasks using a wide variety of resources provided through m-learning.

Perceived obstacles included the themes of uncertainty, sustainability, and student access. Seven of the eight participants mentioned their uncertainty about the reliability or sustainability of the m-learning initiative. Participants explained that the need to always have a Plan B caused teachers to hesitate when planning lessons requiring technology. Additionally, they explained that the devices were outdated with lots of wear and tear; thus, sustainability of this initiative was expensive. Student access to Wi-Fi and mobile technologies was also a huge obstacle. All but two of the participants felt that the one-to-one laptop initiative was more successful because it ensured that every student would be guaranteed 24/7 access to technology.

Regarding the collaborative sources participants used to create and share information about m-learning (RQ4), all of the participants shared they used Google Drive and Haiku to collaborate as they shared resources and lesson plans. An analysis of the data revealed the following themes for collaborative sources: (a) informal conversations, (b) personalized and self-taught, (c) professional learning communities, and (d) more collaboration needed. Because the
school only housed sixth graders, participants reported the need for more collaboration among the different schools in the district. Most collaboration occurred through informal conversations and PLCs; however, learning about and creating resources for mobile technology integration was mainly done individually.

In the next chapter, a summary of the findings will be presented, along with a discussion of the themes in relation to the theoretical framework of the study. Additionally, a discussion of the implications of the study, recommendations, delimitations and limitations, and areas for future research are included.
CHAPTER 5: DISCUSSION

Overview

Mobile technologies are being rapidly introduced and utilized in all aspects of life worldwide. From personal to professional and educational use, mobile technologies (laptops, tablets, smartphones) are being used to increase productivity and provide anytime, anywhere access to a plethora of information. Geist (2011) contended, “Mobile technology, the Internet, social media, and a slew of future developments that we currently can’t predict, are and will be a part of [student] life experience and will impact the way they learn and access information” (p. 758). As these innovations rapidly change and impact society, teachers are challenged to educate 21st century learners so they develop global communication and critical thinking skills. As the rapid explosion of mobile technologies continues, the adoption and implementation of these innovations in K-12 schools rapidly increase. Teachers often feel overwhelmed as they are constantly bombarded with change. Fullan (1982) wrote, “Educational change depends on what teachers do and think—it’s as simple and complex as that” (p. 107). Ultimately, the perceptions and beliefs of teachers become the deciding factor when adopting new innovations (Ertmer et al., 2012; Kopcha, 2012; Kopcha, 2010; Wagner, 2008).

Undeniably, teachers are vital to the successful adoption and implementation of any technology initiative. Research on mobile technology integration has indicated teachers remain skeptical about the benefits of mobile technologies in student learning (Ertmer et al., 2012; Fang et al., 2010; Kopcha, 2012; Kopcha, 2010; Wagner, 2008). According to Fang et al. (2010), the rapid changes in technological tools have resulted in challenges for teachers, many of whom lack confidence in using these tools for learning. While technology may be used, a gap in the available technological tools and the effective adoption and integration continues to exist.
(Brockmeier et al., 2010; Ertmer & Ottenbreit-Leftwich, 2010; Fang et al., 2010; Koehler & Mishra, 2009). To determine ways to aid teachers in the adoption and effective implementation of mobile technologies, educational leaders must attempt to understand what teachers experience and perceive during the adoption process.

The purpose of this study was to examine sixth grade teachers’ perceptions of and experiences with the adoption and implementation process as they transitioned from a one-to-one laptop initiative to a m-learning environment. Knowledge gained from hearing the collective voices of teachers during the adoption and implementation process may benefit educational leaders as they provide assistance to teachers adopting and integrating mobile technologies.

Four research questions guided this study:

**Research Question One:** What are middle education teachers’ experiences with and perceptions of the mobile learning adoption and integration process?

**Research Question Two:** In what ways do teachers’ values, beliefs, professional needs, and past experiences with technology impact the adoption and integration process?

**Research Question Three:** What are teachers’ perceived obstacles and/or benefits of mobile learning integration?

**Research Question Four:** What collaborative resources do teachers use to create and share information about mobile learning integration?

These research questions were answered with data gathered from participant interviews, observations, and a focus group online discussion board. After data were transcribed, organized, coded, and analyzed, the significant statements were found and themes and subthemes were revealed. In the previous chapter, the themes and subthemes were reported, along with the composite textural and structural descriptions and the textural-structural synthesis. The narrative
in chapter four described the essence of the lived experiences of the eight participants in this study.

In this chapter, a brief summary of the findings will be presented followed, by a discussion of the findings related to the relevant literature and theoretical framework. Additionally, the implications of the study, recommendations, delimitations and limitations, and future research suggestions are included.

**Summary of the Findings**

An analysis of data revealed several themes relating to teachers’ perceptions of and experiences with the transition from a on-to-one laptop initiative to a m-learning environment where students were able to use school-issued devices on classroom carts or devices brought from home: (a) frustration, (b) culture change required, (c) steep learning curve, (d) hindrance to increased test scores, (e) ongoing professional development needed, (f) socio-economic and achievement levels, (g) numerous benefits, (h) obstacles with sustainability and access, (i) informal conversations, (j) personalized and self-taught, (k) professional learning communities, and (l) more collaboration needed.

The first research question sought to determine teacher perceptions of the m-learning adoption and implementation process. It became clear that participants were very frustrated as I listened to stories about lack of student access when moving from the one-to-one program. Outdated computers and Internet connectivity issues also frustrated participants. Finally, all participants reported the frustration of the large amount of time, much of it on their own, required to implement the m-learning initiative. Frustration was also caused by student misuse of the devices. All of the participants described the need for students to develop digital citizenship. The participants emphasized that students must recognize the devices as tools for
learning, not toys. Relating to this need for appropriate use of the devices, participants discussed how teacher and district response to this issue was varied. All but two of the participants felt across-the-board consequences for inappropriate use was not the answer to the problem. Providing 24/7 access to all students was described as beneficial. In particular, six of the eight participants felt teaching and modeling appropriate use was preferable to taking the devices away.

The second research question examined how values, beliefs, professional needs, and past experiences with technology impacted the adoption and integration process. All participants described a steep learning curve for students. The sixth grade group in this study was the first grade level where students used mobile devices and laptop carts with Chromebooks and MacBooks. Participants shared about the limited experience students had with using mobile devices to enhance learning and how much time it took to teach students rules and procedures for using the devices, along with the multiple platforms and programs the students would encounter. Participants also believed that assessing students on their mastery of CCSS on mobile devices such as laptops would lead to lower test scores. Additionally, participants indicated the need for ongoing, job-embedded professional development. Instead of brief PD sessions, participants suggested that the district offer training providing guided instruction, independent practice, and feedback. Lastly and most importantly, a major belief impacting the adoption and implementation of m-learning was the perception that student SES and achievement levels may help or hinder the ability of students to effectively use the devices to enhance learning.

Research question three asked about participants’ perceived obstacles and benefits of mobile technology integration. Perceived benefits included increased student collaboration, engagement, and motivation, as well as improved teaching practices and the availability of vast
resources. All of the participants believed their teaching had improved because they were planning more relevant, authentic performance tasks by using the wide variety of resources provided through m-learning.

Perceived obstacles included uncertainty about the reliability of the server and computers, as well as sustainability concerns and student access. Seven of the participants mentioned their uncertainty about the reliability or sustainability of the m-learning initiative. Participants explained that the need to always have a Plan B caused them to hesitate when planning lessons requiring technology. Additionally, they explained that the devices were outdated and in poor condition; thus, sustainability of this initiative would be expensive. Student access to Wi-Fi and mobile technologies was an obstacle that should not be overlooked. All but two of the participants felt that the one-to-one laptop initiative was more successful because it ensured that all students would have 24/7 access to the technology.

Lastly, research question four asked about the collaborative sources participants used to create and share information about m-learning. All participants indicated that they used Google Drive and Haiku to collaborate as they shared resources and lesson plans. Data analysis also revealed that most learning about mobile technology integration was gained through informal conversations and PLCs. By far, teachers learned individually and reported that they were more likely to seek information about integrating m-learning on their own time. Every teacher suggested more collaboration was needed. Because the school only housed sixth graders, participants reported the need for more collaboration among different schools in the district. Though most collaboration occurred through informal conversations and PLCs, learning about and creating resources for mobile technology integration was mainly done individually or in isolation.
According to Bloomberg and Volpe (2012), the purpose of chapter five is to synthesize the meaning units or themes presented in chapter four, in order to facilitate a more holistic understanding of the phenomenon and the findings in the study. For this purpose, the themes and patterns presented in chapter four were synthesized into six significant overarching analytic statements or lessons learned. These statements holistically reflect an understanding of the research questions and theoretical framework for this study. The statements are as follows:

1. Feelings of frustration, anxiety, and uncertainty were prevalent.
2. Ongoing, job-embedded professional development is required for effective implementation.
3. Widespread adoption and implementation will take time.
4. More teacher collaboration and less isolation when learning about mobile technology integration are needed.
5. Access to mobile technologies and the Internet is a key element to successful m-learning initiatives.
6. Teacher perceptions about student socio-economic and achievement levels may hinder adoption and implementation.

**Discussion and Implications in Light of the Theoretical Framework**

Two theories provided the framework for this study. The first theory used was Rogers’ Diffusion of Innovations (IDT) theory. Along with this theory, Wenger’s Communities of Practice (CoP) theory provided the basis for the collaboration among participants as they sought to learn more about m-learning and its implementation.

**Rogers’ IDT Theory**

Rogers’s (1995) IDT theory described the process of adopting innovations over time.
Four main elements in the theory included innovation, communication channels, time, and social system (Sahin, 2006). The innovation-decision process involved five steps that are attained in a time-ordered manner. These steps included knowledge, persuasion, decision, implementation, and confirmation. Furthermore, five characteristics were essential for the adoption process: relative advantage, compatibility, complexity, trialability, and observability (Rogers, 1995; Sahin, 2006; Schauer-Crab, 2002). The innovation of mobile technologies was mainly a top-down decision for the school in this study, because the decision to move from one-to-one laptops to m-learning with student-owned devices and laptop carts in the classrooms was made by central office administrators; however, the knowledge-sharing of the innovation required in the adoption and diffusion (Rogers, 1995) of mobile technologies was facilitated through social interactions. Through communication channels, teachers in this study learned about and developed perceptions of and beliefs about the relative advantage, compatibility, and complexity of using mobile devices to enhance learning in their classrooms. As teachers encountered computer and connectivity issues, they formed attitudes about the benefits of the one-to-one laptop initiative. These attitudes were evident in the interviews and the online focus group discussion. All but two of the teachers in the study felt that the one-to-one initiative was beneficial to students because they had constant access. Teachers counted on students having devices available to them, which helped teachers feel confident as they planned lessons that included project-based learning.

This study also supported the adopter categories in a social system as described by Rogers (1995). Throughout the interviews, observations, and online focus group discussions, there were certain teachers who were early adopters (Rogers,1995). When asked about professional development, most of the participants described learning from one of the teachers
next door who was tech savvy. Carrie and Marisa mentioned one of the teachers in their pod was very proficient with technology, so when they had questions regarding how to use Google Drive or Haiku, they asked this teacher. Lina and Nikita were categorized as early adopters, as they were already aware of how to utilize Google Drive. Previously, both teachers had taught workshops on how to implement cloud-based technology to help students access resources and collaborate on project-based assignments. In the data, it was evident that Lina acted as a role model for other teachers as they observed her and inquired about how to use the innovation across content areas. Gayle, Carrie, and Marisa may be categorized as an early majority. These teachers interacted frequently with their colleagues and were eager to learn about utilizing mobile technologies in their classrooms. They described how they sought information about resources and effective strategies after hours. Though assurance was needed, they continued to investigate effective ways to implement mobile technologies in their classrooms.

Karen, Raegan, and Maria may be classified as late majority adopters. These teachers were using mobile devices in their classrooms but doubted the relative advantage of them to enhance learning. Much of this doubt came from the difficulties experienced with the computers and server; however, some of it resulted from the belief that students in their classrooms were unable to use the technology for learning. Rogers (1995) contended that the most important way to reduce uncertainty in potential adopters was by seeking information through others in the social system. These teacher, however, were less likely to interact with other teachers due to proximity; their classrooms were not in the same building as the other teachers so interaction was more difficult. They were further away from the early adopters who were more tech savvy. The possibility that they were more isolated in their attempts to integrate mobile technologies may explain their need for persuasion about the usefulness of mobile technology for their students.
During the interviews and observations of these teachers, frustration was evident as they encountered difficulties. When server and computers issues occurred in these classes, these teachers were frustrated by the resulting chaos as students had to leave the classroom to get more computers from either the help desk or other classrooms. Rogers (1995) asserted that frustration could be a negative force in the rate of adoption. Coping with the complexities of mobile technology integration and managing the classroom were difficult but might have been alleviated if more communication had occurred with others. While relative advantage and compatibility for adopting innovations have been considered more important (Rogers, 1995), the perceived complexity of an innovation may become an insurmountable obstacle in the adoption process. Even though mobile devices were familiar to both teachers and students, the integration of these devices to enhance learning was perceived as a complex task. Teachers were overwhelmed with the number of programs the district required them to use and had difficulty learning enough about them to successfully integrate them in the classroom. Issues with outdated and slow computers along with server problems continually caused teachers to feel a Plan B must always be readily available. Planning lessons requiring technology was pleasing to teachers who felt their teaching had improved, yet the constant need to have a back-up plan caused anxiety and the need for more preparation.

According to Roger’s IDT theory (1995), change is considered an essential component of the innovation diffusion process (Sahin, 2006). When thinking about changing or transitioning from a previous innovation as described in this study, the realization that change takes time is important. Burt (as cited in Rogers, 2003, p. 192), stated, “As much as change is about adapting to the new, it is about detaching from the old.” When adopting and implementing a new innovation, Rogers (2003) asserted that previous ideas and innovations must be discontinued.
When discontinuance does not occur, the rate of adoption is slowed (Rogers, 2003). As evidenced by teachers’ perceptions that the one-to-one laptop program was more compatible with their school’s culture, some teachers were more reluctant to see the usefulness of the m-learning initiative when planning project-based lessons required at-home computer use. In light of teacher perceptions of the benefits of the previous laptop initiative, Rogers’s (1995) idea of time being an important element of the diffusion process was emphasized. Perhaps with more time and support, the teachers in this study might have the opportunity to develop more knowledge about how to effectively use mobile technologies across content areas.

Additionally, time was required for teachers to pass through the innovation-decision process. Through this study, it became evident that more time is essential for teachers to implement the innovation and work through any new concerns or uncertainties. Once completely implemented, teachers then enter the confirmation stage where they make a decision about adoption or rejection and seek support for their decisions (Sahin, 2006). The requirement of time in the adoption and implementation process was supported by Kopcha (2010), who asserted the “process of technology integration is an evolutionary one and that teachers’ beliefs, pedagogy, and technology skills slowly build upon each other and co-evolve as technology is introduced and assimilated into the school culture” (p. 176-177). In this study, teachers felt that the district continued to add more and more programs and platforms to the m-learning initiative, which perhaps led to even more teacher frustration. If teachers were provided time to express their concerns or uncertainties, it would be possible for them to collaborate with district officials about possible solutions. With a top-down approach to adopting new initiatives, however, this important component of the adoption process was overlooked for this study.
Wenger’s CoP Theory

Wenger (2007) posited that groups of people with shared concerns, beliefs, and knowledge work together to accomplish a purpose and improve their practice. Considering the social theory of learning as the foundation of CoP, one’s learning takes place within the context of one’s experiences. Additionally, CoP assumes that learning is a social phenomenon and focuses on social participation, which is an “encompassing process of being active participants in the practices of social communities and constructing identities in relation to these communities” (Wenger, 1998, p. 4). Wenger (1998) contended that communities of practice are an integral part of life; as such, they are informal and not always identified or explored systematically. Learning, which takes place not only within an individual but also within the community and organization, involves mutual engagement and shared practices. By sharing practices, one’s understandings are developed and negotiated (Wenger, 1998). Shared practices then become the basis of unity (Wenger, 1998).

Wenger’s (1998) CoP model contained three aspects: domain, community, and practice. The community is also engaged in learning through knowledge sharing and with mutual respect (Wenger, 1998). For this study, all participants were part of a group that valued learning through social interaction. Their shared vision was to improve their teaching of 21st century students through the adoption and implementation of mobile technologies. Every participant reported how colleagues encouraged each other in the pursuit of this vision. Throughout the interviews, observations, and online focus group discussions, the participant teachers expressed how they purposefully sought out others through informal and formal discussions in an effort to improve their teaching with mobile technologies. Trusting relationships were developed as teachers openly admitted their vulnerabilities with mobile technology integration and asked for help from their
peers. The collective sharing among participants supported the CoP theory because the teachers have “become informally bound by the value that they find in learning together” (Wenger et al., 2002, p. 5).

Another way this study supported Wenger’s theory was that the creation of CoPs occurred naturally in participants’ normal day-to-day activities (Wenger, 1998). Wenger (2002) contended that human interaction is vital for the establishment of one’s identity and usually occurs within a family. However, these interactions may occur anywhere and anytime; thus, CoPs may exist wherever people meet together, share knowledge, and learn to improve practice (Fitzsimmons, 2007). Participant teachers reported that they would share their concerns about m-learning implementation not only during planning meetings and scheduled PLCs, but also in conversations during lunch and before and after school. As teachers in the study shared their struggles, others gave possible solutions to these problems. An example of this informal sharing occurred at a technology round-table discussion. Though the discussion focused on technology needs for the upcoming school year, Lina gained knowledge about how to share with and organize folders for her students on Google Drive. The random conversation between two other teachers helped convey a solution to a problem in practice. She not only integrated the new knowledge in her own classroom, but also shared the newly learned technique with other teachers at her school. This sharing supported Wenger’s (1998) belief that stories are a powerful part of CoPs. As stories were shared in this study, the developing community began to value the sharing of knowledge and innovation as members began to make their practice more visible (Wenger et al., 2002). Perhaps the teachers were not cognizant of the development of a COP, but they definitely benefitted from the shared expertise of others. As they engaged in storytelling, others began to “act out [the] stories” (Wenger, 2002, p. 170) to improve their practice.
Face-to-face engagement among the participants in the study was not the only way these teachers shared stories, learned from others, and developed their identities. Because of today’s global society, the concept of identity has changed (Fitzsimmons, 2007; Kahan, 2004). Accordingly, interactions occurred informally during lunch breaks and virtually via social networking, blogs, and discussion boards (Fitzsimmons, 2007; Kahan, 2004; Wenger, 2002). As interaction expands, an individual’s social circle enlarges as well (Kahan, 2004). Teachers in the study reported the benefits of social media as they sought resources, information, and ideas for implementing m-learning effectively. Raegan shared how she blogged with other English teachers, while Maria discussed the importance of social networking in the area of science. Of particular importance to her was the ability to connect with science teachers across the nation and the world. She emphasized the benefit of sharing resources with teachers who were not in the district because new ideas and teaching strategies could be discovered. Gayle shared about her fascination with Pinterest and YouTube for developing skills in using different components of Google Drive and Haiku Learning. It seemed that social media and networking encouraged teachers to develop more personalized learning for professional development on their on time. The unique perspectives gained from the teachers through personalized learning added to the development of the CoPs as teachers developed their own areas of expertise. Wenger (1998) posited that when members of a CoP developed their own unique style or specialty, their individual identities developed, which in turn brought more interaction among members. Perhaps the increased interaction and diversity among the teachers resulted in an increase in creativity and richer learning (Wenger et al., 2002). Certainly, the teachers in this study seemed to be enthusiastic about the access to knowledge gained through social media like Pinterest, Teachers Pay Teachers, and other educational blogs. The enthusiasm garnered from teachers’
24/7 access possibly led to more motivation for teachers to facilitate lessons that integrated mobile technologies.

The personalized learning experiences shared by the participants also provided opportunities for teachers to mentor others in developing skills for m-learning integration. Kopcha (2010) researched the benefits of mentoring and CoP during adoption of technology initiatives and found that both offered several benefits to teachers. Kopcha’s (2010) study indicated that mentoring and teacher-led CoP motivated educators to explore new uses of technology while also helping them overcome barriers. Furthermore, decisions on whether to adopt the new technology were based not only their own beliefs about technology, but also on how their peers reacted and accepted the new technology (Kopcha, 2010). Several times in the interviews, the participants in this study shared about tech-savvy colleagues who helped them with integrating mobile technologies. When facing obstacles with computers, the server, management of a m-learning environment, and learning numerous cloud platforms and programs, some of the frustrations and uncertainty seemed to be alleviated by having readily available colleagues who were able to troubleshoot and brainstorm solutions. Perhaps with more administrative support for ensuring tech-savvy teachers are scattered throughout the campus, the frustration caused by technological issues would diminish.

**Discussion and Implications in Light of Relevant Literature**

As discussed earlier in the chapter, the themes and patterns presented in chapter four were synthesized into six significant overarching analytic statements. These statements holistically reflect an understanding of the research questions and theoretical framework for this study. The statements include the following:

1. Feelings of frustration, anxiety, and uncertainty were prevalent.
2. Ongoing, job-embedded professional development is required for effective implementation.

3. Widespread adoption and implementation will take time.

4. More teacher collaboration and less isolation when learning about mobile technology integration are needed.

5. Access to mobile technologies and the Internet is a key element to successful m-learning initiatives.

6. Teacher perceptions about student socio-economic and achievement levels may hinder adoption and implementation.

Feeling of Frustration, Anxiety, and Uncertainty

The participants’ feelings of frustration, anxiety, and uncertainty were prevalent in this study. Frustration resulted mainly from computer and server issues and the perceived loss of instructional time from connectivity and technical problems related to outdated and non-working devices. Problems ranged from low battery life of the computers to having to spend time on maintenance and troubleshooting these issues in class. Teachers reported frustration with having a wonderful lesson planned that utilized mobile technologies and the Internet, only to experience difficulties during the implementation of the lessons. Teachers felt that lesson planning for integration of mobile technologies required a great deal of time and were frustrated that they always had to have a Plan B for teaching each lesson.

Based on observations and interviews, the need for alternative lessons also resulted from numerous days when the server worked for one or two class periods but later stop working. Classrooms with the issues described above fell into chaos, as teachers attempted to troubleshoot the problems themselves before going to Plan B. The only other alternative was to send students
to the help desk, which resulted in a continual revolving door of students leaving and entering the classroom. Some of these issues could be prevented if teachers had access to the administrative username and password, as all that was required at times was to reset the date on the computers or to allow an update. However, access to this information was not allowed. It is possible that providing teachers with access to this information would be an easy solution to this problem. Such a solution would decrease the frequency students need to leave the classroom and as such, administrators could show their support for fewer class interruptions by sharing this information.

Apart from problems with the Internet and computers, another area of frustration was the time constraint teachers felt. With time frames already in place due to the implementation of new CCSS standards, teachers reported feeling increasingly overwhelmed. Because teachers were not certain if the Internet or devices would work day-to-day, they reported many days where they had to revamp an entire week’s plans. Always needing alternate plans caused frustration for teachers who stated that planning lessons using mobile technology was already a time-consuming task. Similarly, Strudler and Schrader (2011) cited that work overload was a cause of frustration for teachers who worked long hours to create and develop lesson plans and locate resources for effective integration of technology. Additionally, teachers spent a great deal of time learning about the multiple programs, platforms, and devices the district expected them to integrate in their teaching practices. Certainly, the need for more time to plan alternative lessons in case of hardware, software, and server malfunctions may have compounded the frustration felt by teachers implementing mobile technology. Teachers in this study conveyed the message that they were also overwhelmed by the amount of new initiatives in the district. Perhaps the district should focus on only one initiative instead of several. I believe this issue has
been the single most concern of teachers for several years, as changes in education occur annually and districts seek to implement the changes necessary to meet students’ academic needs. Quite possibly, the constant change has been caused by top-down initiatives implemented on the federal and state level. With these decisions being beyond teacher control, administrators and technology leaders must find ways to reduce teacher frustration, especially with hardware and connectivity; otherwise, effective mobile technology integration may never happen.

This study’s finding of frustration and uncertainty when integrating technology that may be outdated or not working is consistent with Godfrey’s (2013) study that found that technology integration came to a complete halt when devices malfunctioned. As in Godfrey’s (2013) research, teachers in this study reported the lack of consistent Internet access meant lessons and resources stored in the cloud were inaccessible; furthermore, cloud computing with mobile devices was impossible without a Wi-Fi connection. Findings from Godfrey’s (2013) study were also consistent with those found in this study, where students could not access work begun earlier in the week or lesson because it was stored in the cloud. This happened to Maria during her observation, and though she never claimed to be frustrated, I felt her tension as she tried to troubleshoot the connection and move forward in her lesson while maintaining class control. If connection issues occurred as frequently as stated in the interviews, Maria’s lack of confidence in effectively implementing m-learning could be attributed to such frustration. Additionally, this teacher was one of the two teachers on the second floor of the building, so it is possible she felt even more overwhelmed due to isolation.

Maria and Reagan’s reports of slow, outdated computers were consistent with not only Godrey’s (2013) study, but also research conducted by Kopcha (2010), which reported that non-working computers compounded issues with teacher attitudes about technology integration.
When combined, these barriers were difficult to overcome. Kopcha (2010) asserted, “When teachers are given devices that have not been correctly set-up, or fail to perform to expectations, interest in the device is lost; and, furthermore, their interest in future opportunities may be met with the fear of experiencing the same results” (p. 180). Certainly, this was evident in Maria’s observations. After unsuccessfully trying to troubleshoot the server and computer issues she encountered during one of her social studies lessons, she put the devices away and asked the students to complete an assignment using worksheets, even though she knew this was not a best practice. Her whole demeanor was different and her attitude toward mobile technology integration was not as positive in the following observation and online focus group discussion. This shift in attitude should be a compelling reason to resolve these issues and provide more easily accessible technology support.

**Ongoing, Job-Embedded Professional Development Required**

All of the study’s participants attended scheduled, face-to-face, formal professional development offered by the district. All teachers, however, expressed the desire for more professional development. At the school-level, these teachers had participated in beginning-of-the-year afterschool workshops or PLC meetings. Though this type of PD provided surface-level or introductory knowledge of the software or hardware, participants felt PD was often rushed with overwhelming amounts of information shared. Furthermore, participants felt they received no support for integrating the technology once they went back to the classroom.

These findings were consistent with literature about PD for school initiatives and technology integration. Across the board, most professional development was delivered to teachers through scheduled, face-to-face meetings (Jones & Dexter, 2014; Maker, 2012; Plair, 2008; Tytler, Symington, Malcolm, & Kirkwood, 2009). Participants in this study asserted that
the scheduled professional development did not meet their needs. When they went back to their classrooms and encountered problems with how to set up the discussion boards or use Google Drive for cloud computing, they felt they needed an instructor or mentor who was ready to jump in and help solve the problems they encountered. This finding was consistent with current literature on formal professional development. Considered to be mostly ineffective for teachers attempting to effectively implement mobile technologies, formal professional development has not met the needs of 21st century teachers on a large-scale basis (Blackwell et al., 2013; Goad, 2012; Godfrey, 2013; Jones & Dexter, 2014; Oncu et al., 2008; Ross, 2013; Strudler & Schrader, 2011). Reasons for this ineffectiveness included specificity of time and locale, as well as the lack of timely, on-going support provided (Godfrey, 2013; Mackey & Evans, 2011; Ross, 2013; Walker & Shepard, 2011).

Additionally, teachers expressed uncertainty regarding how to effectively use the technology in their content area. Especially telling was the lack of math teachers who wanted to participate in this study. Other than using the devices for testing or resources, math teachers, as reported by their ELA teachers counterparts, were less likely to utilize the devices for engaging collaborative activities. This lack of utilization by math teachers may result from what Rogers (1995) called relative advantage, where the user doubts the usefulness of the technology for accomplishing established goals. This finding coincided with Liu and Han’s (2010) research that found that teachers in m-learning environments have doubted the worth of m-learning because the perceived task value was low. Though familiarity of the device was evident, teachers doubted the usefulness of mobile devices for teaching and learning (Ertmer et al., 2010; Inan & Lowther, 2010; Liu & Han, 2010). This perceived usefulness has, in turn, impacted school-wide adoption and implementation of mobile technologies. This finding was consistent with research
that reported teachers have remained skeptical about the positive effect of mobile technologies in student learning (Ertmer et al., 2012; Kopcha, 2012; Kopcha, 2010; Wagner, 2008). While I was recruiting participants for this study, I found that math teachers did not want to participate because they did not use mobile devices consistently in their rooms. Quite possibly, their perceptions about the usefulness of the device have impacted integration; thus, ongoing professional development may be needed specifically for math teachers. Otherwise, their students may not consider mobile devices as a useful tool for solving real-world issues involving math.

Six of the teachers in this study also felt ill-prepared to successfully adopt mobile technologies due to the large number of cloud platforms and programs they had to learn. Current research in the adoption and implementation of mobile technologies found that lack of preparation and PD has impeded the adoption of mobile technologies. Current research has continued to support the findings of this study, as teachers across the nation continue to feel unprepared to adequately implement mobile technologies in their instruction (An & Reigeluth, 2011; Al-Senaidi et al., 2009; Khaddage et al., 2011; Wachira & Keengwe, 2010; Walker & Shepard, 2011). Research has also supported the findings that professional development usually focused on technology skills instead of pedagogical skills needed to integrate such technology effectively (Ertmer et al., 2010; Kopcha, 2010; Mouza, 2008). Furthermore, professional development programs have been too short to sustain change and usually provide too much information without being content-specific (An & Reigeluth, 2011; Garland, 2010). Uncertain feelings about how to successfully integrate mobile technologies have not just impacted the sixth grade teachers in this study; it is a widespread issue throughout the district. This uncertainty must be addressed on a district level; however, the district may want to consider personalized
learning as a possible solution. Participants in this study indicated that PLNs were important for improving their skills because they could focus on what they needed during a time that was convenient for them. It became clear in this study that m-learning is not just appropriate for students; it is also beneficial to teachers, so why not utilize this avenue to train them?

**Time Required for Widespread Adoption and Implementation**

Findings in this study revealed that a significant amount of time is required for widespread adoption and implementation. All participants talked about the large amount of time, much of it on their own, required implementing the m-learning initiative. Furthermore, teachers in this study shared they did not have the time to learn everything about the programs the district required them to use. Some teachers reported that students would go home and figure out how specific programs worked and then come back and teach the class. Planning technology-integrated lessons also required teachers to search for resources and create standards-based instruction on their own time. Participants in this study reported that they needed more time to practice using the technology so that their confidence could develop. This finding was consistent with research into barriers for technology integration (Al-Senaidi et al., 2009; An & Reigeluth, 2011; Blackwell et al., 2013; Ertmer, Glazewski, & Newby, 2010; Garland, 2010; Goad, 2012; Hew & Brush, 2007; Holcomb, 2009; Inan & Lowther, 2010; Kopcha, 2012; Mouza, 2008; Walker & Shepard, 2011; Weston & Bain, 2010). Research has continued to report that time constraints and assessment demands cause teachers to doubt their abilities to effectively integrate mobile devices in the classroom (An & Reigeluth, 2011; Liu & Han, 2010). Current literature also has reported that while lessons are time-consuming to prepare, teachers must also spend extra time determining ways to deal with student misbehavior when using technology (Ertmer et
al., 2012; Ertmer et al., 2010; Kopcha, 2010). Clearly, the continual feelings of being pressed for time caused great frustration for the teacher participants.

Another finding in the study revealed that more time is needed to change the culture on how students use devices in class. Past experiences with the one-to-one laptop initiative revealed that students’ misuse of the devices caused the district to discontinue the program and move to classroom carts and student BYOD. Teachers discussed the need for students to use the devices as learning tools instead of social media and entertainment devices. This finding was also evident in current research that suggested students are more motivated to use technology to socialize or play games (Clark, 2013; Goad, 2012; Holcomb, 2009; Junco & Cotton, 2012; Kessler, 2011; Kerschner & Karpinski, 2010; Ross, 2013; Ryan, Scott, & Walsh, 2010; Weston & Bain, 2010; Wood, Zivcakova, Gentile, Archer, DePasquale, & Nosko, 2012). All of the participants discussed how much time they spent at the beginning of the year teaching students acceptable use; however, they still felt that online games and social media distracted students during class. It became clear that student maturity in handling mobile devices was a deterrent for teacher implementation of m-learning in the classroom. For students to begin viewing technology from a different standpoint, the district must provide more time for teachers to work with students on digital citizenship and strategies for keeping students focused on learning with the devices instead of playing. This finding was consistent with current research that posited that students had difficulty staying focused when using mobile devices (Clark, 2013; Ertmer et al., 2011; Holcomb, 2009; Junco & Cotton, 2012; Kessler, 2011; Miranda & Russell, 2011; Ross, 2013). Research conducted by Kessler (2011) revealed that 38% of college students could not go more than 10 minutes without looking at notifications on Facebook or Twitter. Junco and Cotton (2012) studied college students and found that those who engaged more frequently with social
media had lower achievement based on their grades. The multitasking possible while using mobile devices may be a benefit to this technology; however, sixth grade students may not be mature enough to complete learning tasks and use social media simultaneously. When looking at the time constraints teachers felt while implementing the CCSS standards, it became obvious that participants in this study believed that students who were distracted by the use of mobile technologies required even more time to complete standards-based assignments. In this study, Lina reported that her students needed more time to complete assignments than in previous years. For this reason, she asked her students to continue working on their assignments at home. Similarly, in a study of college students, researchers found that off-task behavior caused students to need more time when completing assignments (Bowman, Levine, Waite, & Gendron, 2010). In Bowman et al.’s (2010) study, students who were engaged in and interrupted by text messaging took 20% longer to complete reading comprehension assignments. Because of the perceived student distractions, it is evident that more time is needed for teachers to develop strategies for managing m-learning environments. Sixth grade students who have never used mobile devices for learning tools may require teachers and other stakeholders to not only develop strategies for managing the environments, but also ways for developing digital citizenship.

**More Teacher Collaboration and Less Isolation Needed**

Surprisingly, findings in this study revealed that personal learning was the main source of gathering information and resources for integrating mobile technologies. Teachers in this study consistently reported that they learned techniques for implementing mobile technologies by watching YouTube videos, searching the Internet, or participating in social media and blog websites. Though PLCs were scheduled for the teachers and departmental meetings were held weekly, most participants left these meetings and conducted research on their own. Another way
teachers learned about mobile technology integration was through their tech-savvy colleagues. This allowed teachers to choose the time, content, and method for learning. Because of the informal learning that took place through these tech-savvy individuals, the response time for technology support for some teachers improved. Though participants did not mention they felt isolated in their technology integration, I surmised that two of them did. The school’s use of pods, or teams, seemed to lend itself toward isolation, especially for teachers on the second floor of the building. Two of the participants did not have ready access to the same informal learning through tech-savvy teachers unless they went to another building on the campus. I believe their location led to isolation. For this reason, these teachers seemed to demonstrate less perseverance than those teachers surrounded by the more knowledgeable teachers. Supported by current research, this finding has demonstrated the tremendous need for timely, ongoing technology support in the classroom (Al-Senaidi et al., 2009; An & Reigeluth, 2011; Bielefeldt, 2012; Hew & Brush, 2007; Khaddage et al., 2011; Ross, 2013).

In response to the trend toward isolation in the teaching profession, Dufour et al. (2008) emphasized the importance of collaboration for improving teacher practice with technology integration, and warned that teachers must avoid isolation, which affords little time or opportunity to discuss concerns about technology integration. Certainly, Raegan and Marie were more isolated than their colleagues who participated in this study. During observations, these two teachers seemed to have higher frustration levels and less perseverance when encountering technical difficulties. If they had been in closer proximity to the tech-savvy teachers in the other building, I believe they may have persisted in troubleshooting the technology issues they encountered.
Participants in this study also desired more collaboration with teachers outside of their school. With the school only housing sixth grade students, teachers felt isolated in their attempts to integrate mobile technologies effectively. Dewey (1916) proposed that reflection upon and discussion about a teacher’s own practice is a social process and not an isolated activity. Dewey asserted that reflection was the “product of practices embedded in community settings” (Riveros et al., 2012, p. 206). Due to teacher isolation, participants in this study had only brief amounts of time or opportunities to discuss their concerns about technology integration. Triggs and John (2004) asserted that isolation among educators is “powerful” and “fueled by external and internal pressures, of no time or opportunity to reflect on or discuss teaching with colleagues” (p. 437). Teachers in this study certainly felt time constraints with the implementation of both CCSS and m-learning. Because state testing with PARCC was a monumental undertaking during the first year of implementation, teachers felt the need for more collaboration and planning that focused on CCSS. This emphasis left little, if any, time for collaboration about the integration of mobile technologies.

In this study, collaboration occurred mainly through informal conversations with colleagues, especially with teachers in close proximity. Two of the teachers in this study were on another part of the campus, so the feelings of isolation from these two teachers may have been more prevalent. Due to feelings of isolation and the need for on-demand PD, personalized learning was the most used method of learning for these teachers. While they did share their resources and lessons, these teachers were more likely to develop their skills through PLNs because much of their learning was based on their own needs. As they struggled with certain aspects of integration, these teachers were motivated to seek out resources that would answer their questions or provide solutions to their problems. In general, it became clear that these
teachers were not willing to give up even though they struggled with implementation. Even though this study found that more collaboration is needed, these teachers shared the burden as they pursued school-wide adoption of m-learning for their students. Certainly, the availability of resources played a role in their decision to try to be effective in their implementation of this initiative.

These findings were consistent with current research on how teachers learn about technology integration. Jones and Dexter (2014) reported that the widespread availability of personalized learning sites such as blogs, podcasts, wikis, and discussion boards has provided teachers with anytime, anywhere access to a plethora of learning resources. Teachers in this study also reported this type of learning was convenient and could be done on their schedule. Independent learning provided them with a way to provide support for issues not discussed in professional development. While teachers did not collaborate among themselves, collaboration occurred through shared learning experiences with other teachers on the World Wide Web. As teachers gained knowledge about certain techniques and strategies, they shared them with their colleagues in formal PLCs and through informal discussions. These findings were supported by current research that suggested teachers are using online networks to learn about technology integration because online learning tools provide current, relevant, and just-in-time information about a wide-variety of technological needs (Alderton, Brunsell, & Bariexca, 2011; Hur & Brush, 2009; Jones & Dexter, 2014).

Access to Mobile Technologies and Internet Importance

Access to mobile devices and the Internet seemed to be a tremendous factor in teacher attitudes toward the successful implementation of this initiative. All participants in this study considered student 24/7 access to mobile devices and Wi-Fi or Internet a “game changer.”
and over again, teachers indicated the lack of access to technology negatively impacted the types of lessons and assignments they were able to give. Additionally, the lack of access for all students hindered teachers’ perceived usefulness of m-learning environments. All but two of the participants felt the school should return to the one-to-one laptop initiative in which all students were given a school-owned device for both school and at-home use. Teacher perceptions about the importance of every student having constant, ubiquitous access have also been discussed in current research. Research into barriers for technology integration and mobile devices included access not only to the devices themselves, but also to the Internet (An & Reigeluth, 2011; Dewitt, 2007; Ertmer, Glazewski, & Newby, 2010; Hew & Brush, 2007; Inan & Lowther, 2010; Norris & Soloway, 2011; Oncu, Delialioglu, & Brown, 2008; Ross, 2013; Warschauer & Matuchniak, 2010).

Teachers in this study shared the reported advantages of access. Students accessed resources on the cloud platforms like Haiku and Google Drive. Additionally, students collaborated with others on group projects outside of the classroom. Nikita emphasized that students could “just Google it” to find vast resources and information about any topic. Students without access were less likely to have support at home and less likely to effectively seek Internet resources online and evaluate their credibility. Norris and Soloway (2004) explained that the value of students having access to these devices was that all students were provided with continual access to valuable resources and learning opportunities. In m-learning environments, the most advantageous aspect of utilizing mobile devices has continued to be their ability to access the Internet (Murphy, 2012; Norris & Soloway, 2004; Robb & Shellenbarger, 2012). According to Robb and Shellenbarger (2012), “the increase in information and communication technologies provides students with unlimited access to the information superhighway” (p. 260).
Undoubtedly, teachers’ perception about access has hindered their acceptance of the m-learning initiative. It became clear that perceptions were a deterrent for teacher implementation as participants shared how lack of access impacted the types of assignments they would give their students. In many cases, these teachers were not able to assign homework due to a lack of access to the reading materials.

**Perceptions About Socio-Economic Levels and Student Achievement**

Along with issues regarding access to devices, the study found that teacher beliefs about SES and student achievement impacted the types of assignments they planned and gave to their students. For teachers in this study, lack of access, whether to a device or the Internet, hindered their abilities to plan for project-based learning that would require some outside-of-class collaboration, research, or reading. Teachers felt that students without at-home access were also less able to develop ICT literacy skills than those with easily accessible devices and Internet. The lack of skills increased the learning curve for those students, many who were the most at-risk students for academic achievement. For teachers of lower achieving students, the loss of instructional time due to teaching students how to use the devices only compounded the difficulties for students as they were learning more rigorous CCSS standards. These findings were consistent with research conducted by Dewitt (2007) and Norris and Soloway (2011), who found that when planning for instruction, teachers felt constrained because of their perceptions of SES and device availability at home. Additionally, findings in this study coincided with research that reported less use of technology exists in lower SES and achievement classrooms due to time constraints felt by teachers attempting to raise student achievement on state standards and mandated testing (Blackwell, Lauricella, Wartella, Robb, & Schomburg, 2013; Blazer, 2008; Hohlfeld, Ritzhaupt, & Barron, 2007). Several teachers in this study perceived the district’s use...
of mobile technologies were related to the new online PARCC tests that required students to demonstrate mastery of content through reading text on computer screens and manipulating online tools to answer multiple choice questions and type constructed response essays. The teachers were frustrated by the large amount of time used for district common assessments that required students to take tests on Engrade, Case 21, and ELS online testing platforms. The perception of teaching students to take online tests may have further inhibited teachers because they felt pressured to gear their instruction to test-taking strategies for computerized exams.

Another area of inequity, the way in which teachers used technology in the classroom, was found during the observations and interviews. During the observations of participants, teachers of lower performing students were more inclined to use the devices for remediation of skills or to create slide show presentations. Lower-level skills and practice seemed to be the predominant use for the mobile devices. In classes with higher-performing students, teachers used the devices to facilitate learning as students conducted research, evaluated sources, and created brochures, books, or commercials. The way teachers implemented mobile technology in their classrooms has been reported as another concern for equity and access. Ertmer and Ottenbreit-Leftwich (2010) contended that teachers must change their method of teaching so that the needs of all 21st century students are met. Best practices for mobile technology integration no longer accept teacher use of technology to support lecture-based instruction. Instead, students need teachers who will facilitate student learning through authentic real-world application. During observations in Gayle and Lina’s classrooms with higher performing and gifted students, student engagement was evident as these teachers facilitated learning for their students in real-world applications. For the most part, teachers in classrooms with lower achieving students were relying on teacher-directed approaches instead of student-centered approaches. Teachers were
using PowerPoint or Keynote presentations to teach students while students would take notes in notebooks or type them in Google Drive. Students in higher achieving classrooms were utilizing technology to construct deep, connected knowledge and develop important problem solving and critical thinking skills. Current literature has emphasized that these practices continue to marginalize students—some students lack access to devices outside of school and access to the same type of instruction inside of school (Goad, 2012; Jones, 2009; McDaniel, 2012). With current school reform efforts occurring across the nation, it would seem that marginalizing these students may prove detrimental to efforts to improve their academic performance. Perhaps the district should consider ways to provide mobile devices and Internet connections for these students.

**Limitations**

Limitations are an inherent aspect of qualitative research (Creswell, 2013). In this study, several limitations existed. First, the sample size of eight participants was small. Though this sample size was appropriate for the methodology used, the results may not have been generalizable to other populations of teachers or schools. Additionally, the study was limited to sixth grade teachers because research revealed a gap in the literature for middle grades implementing m-learning—earlier grade levels had not implemented m-learning so students had not previously used mobile devices as learning tools. For this reason, teachers in other grade levels may have reported different experiences.

Another limitation was the subject or content area taught by teachers. In this study, even though all teachers were solicited, only ELA and science teachers volunteered to participate. As such, only ELA and science teachers shared their perceptions and experiences with m-learning adoption and implementation. Consequently, no assumptions can be made about the experiences
of math and elective teachers except for the perspectives that the participants reported regarding their colleagues. The conclusions resulting from this study may only be directly applicable to other sixth grade ELA and science teachers.

A third limitation of this study related to the subjectivity of qualitative research, which may lead to bias about the research topic. As a teacher in the one-to-one laptop initiative at another school in the district, I acknowledged any bias that I might have regarding technology integration in the district. Throughout the research and data analysis, I wrote in a reflection journal to bracket my own personal opinions regarding mobile technology integration. I also combed through the data numerous times in an effort to see patterns from different angles or perspectives.

To ensure trustworthiness in this study, I asked for participant validation of the transcripts, themes, and findings. Colleagues who were aware of the research and knowledgeable about technology integration frequently reviewed and discussed the findings with me throughout the multiple stages of data analysis. Additionally, the research methodology included three sources of data collection. Cross-analysis of data was conducted numerous times to make comparisons between the multiple perspectives of participant experiences. Finally, all memos, notes, and transcriptions were kept in order to provide clear documentation of the decisions made during the study.

**Implications of the Study**

“Raised amidst pervasive, multi-gigabit wireless networks, the high school class of 2030 will be a truly digital generation—more empowered and more challenged—than any who have come before” (Murray, 2008, p. 39). In light of today’s global connectedness, 21st century students must be taught to effectively use mobile technologies as a tool for enhancing
communication, collaboration, critical thinking, and problem solving. As today’s educators face the continual demands of adopting and integrating constantly changing technologies, the urgency of hearing their voices as they adjust their practices to meet the needs of *iGeneration* students has never been greater.

The most interesting finding in this study was based on participants’ perceptions about student achievement, SES, and the perceived expertise with technology. Certainly, research has indicated students from lower SES brackets have less experience with technology and usually fewer role models who use technology as a learning tool (Warschauer & Matuchniak, 2011). In many cases, the majority of students whose academic achievement levels were in the bottom 25% were from homes with lower SES levels. Because the perceived learning curve for these sixth grade students was considered greater than their higher achieving peers, teachers of students with lower achievement and SES levels felt considerable stress about meeting academic goals while also implementing the m-learning initiative. They were torn by time constraints because of trying to meet the new CCSS standards while simultaneously teaching these students to take online assessments and use the devices. These students, therefore, were less likely to use technology for project-based learning assignments that required the development of critical thinking skills. Administrators and technology coordinators must look for ways to support these teachers and students as they seek to effectively use these tools not only for remediation purposes, but also for improving communication, collaboration, and critical thinking. Teachers of higher performing students seemed to have more confidence and persistence when implementing and troubleshooting the new technology. Professional development geared toward teachers of lower performing students, along with community-led technology classes, may help not only the teachers, but parents and students as well. With more support for learning ICT
skills, the students might approach learning tasks requiring technology with more efficacy, and teachers of lower achieving students might feel more confident in integrating technology without fear of losing valuable instructional time.

Another interesting finding was the teachers’ preferences for the one-to-one laptop program. This preference was due to the uncertainty teachers felt about students having at-home access to mobile technologies that would be appropriate for research or accessing cloud-based resources and assignments, and for creating slide show presentations or documents. Additionally, reading assignments posted on the class website or on Google Drive would not be possible for students without some type of mobile technology. Based on the school’s previous experiences with inappropriate at-home use of school-issued laptop computers, it was surprising that all but two of the participant teachers preferred the laptop initiative. Regardless of who made the decision to discontinue the one-to-one laptop initiative, future 21st century learning must include frequent use of technology across multiple platforms. Important to any future technology initiatives with student-owned or school-owned devices would be stakeholder buy-in. Stakeholders must realize the importance for all students to have access to mobile technology both in school and at home. Norris and Soloway (2011) contended that parents and schools must begin to see the value of 24/7 one-to-one access for all students. Just like textbooks and other resources, students must have the essential tools for learning. In the 21st century, one of those essential tools is mobile technology. The district’s BYOD policy, as well as the provision of student-owned devices, should be re-examined so that all students have at-school and at-home access to technology. This implication is especially important since most of the students without access are from lower SES homes or are in the bottom 25% of student achievement based on state test scores.
Another implication of this study is that teachers and district leaders need more time for widespread adoption and implementation of m-learning. More time is needed to help teachers develop best practices for mobile technology integration and to help district officials improve the infrastructures for hardware and connectivity. Teachers need more professional development with on-going support and feedback. Instead of being overloaded with information and little practice, teachers must have professional development that focuses less on technology skills and more on the pedagogical skills needed to effectively integrate mobile technologies. More time to practice using technology effectively for instruction might build teacher confidence in helping students develop digital citizenship and use the devices as tools for learning. District officials also need more time. As feelings of frustration were prevalent in this study, district leaders and other stakeholders need additional time to seek funds to provide working devices, consistent Internet connectivity, and easily accessible technology support. Additionally, all stakeholders must determine ways to ensure all students have access to mobile devices both at home and at school.

Finally, the importance of personal learning was emphasized through the results of this study. Teachers in this study seemed to be learning more about mobile technology integration by in isolation through PLNs. While this learning met teachers’ on-demand needs, participants in this study desired more collaboration with other schools. These schools might be elementary, middle, and high schools throughout the same section of the state or other schools in the district. Communities of practice were developed in small pockets of the school in response to teacher PD needs. Informal learning through CoPs and PLNs met the needs of some teachers, but it became clear that other teachers felt isolated due to proximity. For this reason, it might be advantageous to place subject area teachers closer together. This could provide the impetus
needed for more informal learning to develop within subject areas. Seeing other teachers successfully implement m-learning within the content area might be beneficial for those who are struggling. Informal learning could then be used to determine the need for more ongoing, job-embedded professional development.

**Recommendations for Future Research**

Based on the findings in this study, several areas should be considered for future research. Because math teachers did not volunteer to participate in this study, one area of future research should consider other content area teachers’ perceptions of and experiences with m-learning. Only teachers who taught ELA and science participate in this study; therefore, future research might investigate the use of mobile technologies in math classes, specifically how teachers perceive the relative advantage of mobile devices in math.

Another area needing future research is the issue of access for all students. In this study, teachers perceived access as an essential component of m-learning. Certainly, this perception impacted teachers’ integration of mobile devices for project-based learning. Future research should investigate the experiences of students who do not have access to at-home mobile technologies and the Internet. Questions to consider might be how lack of access impacts students’ confidence and motivation, as well as their attainment of 21st century skills. It would be valuable to hear from these students and their parents, as their voices must be considered if future efforts at m-learning adoption and implementation are to be successful.

Also, of significance in this study was the teachers’ preference for 24/7 student access. Because of this preference, teachers perceived the laptop initiative to be more beneficial to their students. Future research also might investigate the differences in student achievement based on mobile device access at school versus 24/7 mobile device access. Definitely, if student
achievement in the CCSS and 21st century learning skills improved with 24/7 access, future research in this area would be important for district officials implementing this type of initiative.

Additionally, future research should investigate the impact teacher isolation has on teacher adoption and implementation of innovations. In this study, teachers who were isolated in their practice seemed to have less perseverance regarding troubleshooting and finding alternative ways to use technology when problems occurred during class. Two teachers in this study were more isolated because of their proximity to tech-savvy teachers. This isolation impacted their implementation of m-learning in their classes. Future research might compare teacher efficacy with mobile technologies in correlation to teacher collaboration with other tech-savvy teachers.

Finally and most importantly, with teacher perceptions of SES and academic levels impacting the learning curve and the types of assignments teachers plan, future research should investigate how students with differing academic achievement levels use mobile technologies for learning. This area needs further research because it became clear that teacher perceptions of how students from homes with lower SES levels and students with lower achievement based on state test scores impacted teacher adoption and implementation. Since teacher perceptions in this area impacted how they integrated technology, it is urgent that this area receive more research so educational and curriculum leaders can successfully determine steps to avoid marginalizing these students.

Summary

Using Wenger’s (1997) CoP and Rogers’ (1995) IDT theories as a theoretical framework, this study sought to investigate the perceptions and experiences of sixth grade teachers during their first year in a m-learning initiative. Through teacher interviews, observations, and online focus group discussions, an analysis of the data revealed several significant findings. First,
participant frustration was prevalent. This frustration occurred because of several factors, including computer and connectivity issues and time constraints when implementing both CCSS and the m-learning initiative. Additionally, teachers were overwhelmed with the amount of time needed to create lessons that integrated m-learning and to teach sixth grade students how to use the devices to enhance learning. Teachers perceived a steep learning curve existed for students as they learned how to use the devices for computerized, standard-based assessments. Furthermore, teachers were uncertain about whether Internet access would exist each day. This uncertainty caused teachers to always need a Plan B. The necessity for always having an alternate plan caused teachers to need even more time for planning.

Next, teachers desired to receive more job-embedded professional development. For the most part, professional development was offered through scheduled training or PLCs. Teachers expressed that more on-going training with frequent feedback was needed so that technology support might be timelier. Informal conversations with tech-savvy teachers proved to be beneficial to these teachers, yet the more isolated teachers did not receive the same support. This perceived lack of support caused some teachers to feel less confident when hitting roadblocks during class instruction. Definitely, these participants desired more collaboration, not just within the school, but also with other schools in the district.

One of the most important findings involved teacher perceptions regarding access. Teachers in this study believed 24/7 student access to mobile technologies and Wi-Fi connectivity was essential; in fact, teachers said these were game changers for implementing m-learning. The lack of access for all students impacted the types of lessons teachers planned and led to differences in how teachers implemented m-learning in classes with students from lower socio-economic levels. Similarly, teachers perceived students from lower achievement levels
were less able to develop ICT skills; therefore, the time constraints teachers felt when teaching these students were even greater. Results from this study indicated teachers were torn between the need to teach students new, more rigorous standards and the time required to help these students learn to use mobile devices to enhance learning. As a result, inequity in access and the types of assignments given to lower performing students further marginalized these at-risk students.

Findings from this study revealed more time is needed for widespread adoption and effective implementation of m-learning. With additional time, teachers may receive more, job-embedded professional development, learn best practices for mobile technologies, and develop lessons that incorporate project-based learning and 21st century learning skills. With more time, district officials may alleviate some of the frustrations teachers felt by improving the infrastructure for implementing m-learning and developing a framework for ongoing, job-embedded professional development. Furthermore, more time would provide all stakeholders with opportunities to brainstorm possible solutions for ensuring all students have continual access not only to mobile devices but also to Wi-Fi connectivity.

As I listened to the participants share their experiences with mobile technology integration, I gained a greater understanding of the unique struggles teachers faced as they transitioned from a one-to-one laptop environment and implemented the m-learning initiative with students who had little or no experience with using mobile technology as a learning tool. With fast-paced changes in technology initiatives, educational leaders must provide relevant, ongoing, job-embedded professional development, along with mentoring relationships that develop communities of practice for teachers who seek to adopt and implement m-learning initiatives in ways that may enhance student learning. As educators face the task of teaching 21st
century learners while meeting the rigors of CCSS curriculum, it is essential for administrators to
determine ways to help teachers become more proficient with using mobile technology to reach
federal and state standards. Teachers play a vital role in the adoption and implementation of any
educational technology. Additionally, teachers will continue to experience time constraints as
they encounter an ever-changing curriculum. For these reasons, administrators and curriculum
leaders will be challenged to understand how teachers’ perceptions about and experiences with
mobile technologies impact widespread adoption and implementation.
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APPENDIX A

IRB Approval Letter

July 23, 2014

Tina Fitts
IRB Approval 1924.072314: Teacher Implementation of “Bring Your Own Device (BYOD)” at a Sixth Grade School: A Phenomenological Study

Dear Tina,

We are pleased to inform you that your above study has been approved by the Liberty IRB. This approval is extended to you for one year from the date provided above with your protocol number. If data collection proceeds past one year, or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.

Please retain this letter for your records. Also, if you are conducting research as part of the requirements for a master’s thesis or doctoral dissertation, this approval letter should be included as an appendix to your completed thesis or dissertation.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,


Liberty University

Liberty University | Training Champions for Christ since 1971
To: Tina Fitts  
From: [Redacted] Assistant Superintendent  
RE: Research  
Date: July 19, 2014  

Tina Fitts has permission to conduct research in the [Redacted] Public School as part of the requirements for an Ed. D degree in Curriculum, Instruction, and Assessment. The title of her research project is Teacher Implementation of "Bring Your Own Device (BYOD) at a Sixth Grade School: A Phenomenological Study." The purpose of her research is to investigate teachers' perceptions of and experiences with the adoption and integration process as teachers in the [Redacted] Public School and [Redacted] (all participant and institutional names will remain anonymous) transition from a one-to-one laptop initiative to a school-wide adoption of BYOD mobile learning.
APPENDIX C

Recruitment Letter

Dear Sixth Grade Teacher:

As a graduate student in the Education Department at Liberty University, I am conducting research as part of the requirements for a Ed. D degree in Curriculum, Instruction, and Assessment. The purpose of my research is to investigate the perceptions of and experiences with the BYOD implementation, and I am writing to invite you to participate in my study.

If you are a sixth grade teacher at [redacted school], we are participating in the adoption and implementation of BYOD mobile learning, and are willing to participate, you will be asked to do the following:

- Participate in digitally audio recorded interviews;
- Review the transcripts of your interview to check for accuracy;
- Participate in digitally audio recorded observations of the mobile learning environment in your classroom;
- Review observation field notes for accuracy;
- Participate in digitally audio recorded focus group;
- Review the focus group transcript for accuracy;
- Review a description of your experience with BYOD for accuracy.

It should take approximately 2-3 hours for you to complete the procedures listed. Your participation will be completely anonymous, and no personal identifying information will be required.

To participate, read and complete the consent document. Please include your contact information. Then return the document to me at [redacted email]. I will then contact you to schedule an interview appointment, and schedule an observation. After the interview and observation are complete, I will contact you to set up a focus group meeting.

A consent document will be given to you at the initial faculty meeting in August. The consent document contains additional information about my research. Please read and sign the consent document and return after the faculty meeting.
APPENDIX D

Consent Form

Teacher Implementation of Mobile Learning Initiative
at a Sixth Grade School: A Phenomenological Study
Tina Fitts
Liberty University

You are invited to be in a research study of Teacher Implementation of Mobile Learning Initiative. You were selected as a possible participant because you volunteered and met the criteria for participation in the study. I ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by: Tina H. Fitts, School of Education, Liberty University.

Background Information

The purpose of this study is: to understand the experiences of teachers in mobile learning environments as they transition from a one-to-one laptop initiative to a mobile learning initiative.

Procedures:

If you agree to be in this study, I would ask you to do the following things:
Participate in audiotaped interviews;
Review the transcripts of your interview to check for accuracy;
Participate in audiotaped observations of the mobile learning environment in your classroom;
Review observation field notes for accuracy;
Participate in an online discussion board focus group;
Review the focus group transcript for accuracy;
Review a description of your experience with mobile learning for accuracy.

Risks and Benefits of Being in the Study

The study has several risks, which include those associated with interviews and focus groups where you will discuss your experiences with the mobile learning school initiative. As participants will be discussing perceptions and obstacles encountered, there is a risk that conflict may arise between the school’s adoption and implementation process and the participant. The interviews, observations, and focus groups will be digitally recorded and transcribed; however, all recordings and transcriptions will be stored on an external hard drive and will be locked in a file cabinet in my home. At the end of the study, the recordings and transcripts will be destroyed. Though school and district administrators will be provided with a copy of the findings of the study, they will not be granted access to any digital recordings or transcripts.
The benefits to participation are:

Being a participant in the study, you may realize the benefit of gaining a better understanding of your perceptions and experiences during implementation of the mobile learning initiative and how the use of mobile technologies impacts your teaching. An understanding of teachers’ perception will give a voice to teachers as they encounter challenges when integrating technology effectively. As a result, educational leaders can be more prepared for future mobile learning adoption and implementation as they address the issues revealed in this study.

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 I might publish, I will not include any information that will make it possible to identify a participant. Research records will be stored securely in a locked file cabinet and only the researcher will have access to the records. As a participant, you will be assenting to allow classroom observations, and to participate in interviews and a focus group session. Your name, however, will not be associated with the research findings in any way; thus, confidentiality will be maintained at all times and your identity will not be revealed.

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 or Tupelo Public Schools. If you decide to participate, you are free to not answer any question or to withdraw at any time without affecting those relationships.

To Withdraw from the Study:

To withdraw from the study, please send an email to tfitts@liberty.edu or contact me at 662-840-8090.

Contacts and Questions:

The researcher conducting this study is: Tina H. Fitts. You may ask any questions you have now. If you have questions later, you are encouraged to contact me at Tupelo Middle School, 662-840-8090, Email: tfitts@liberty.edu. You may also contact my dissertation chair: Dr. Randall Dunn, Dissertation Chair, School of Education, Liberty University, Phone: 424-582-2445, Email: rdunn@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, Suite 1837, Lynchburg, VA 24515 or email at irb@liberty.edu. Please notify the researcher if you would like a copy of this information to keep 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.

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS IRB APPROVAL INFORMATION WITH CURRENT DATES HAS BEEN ADDED TO THIS DOCUMENT.)

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

Signature:_______________________________________Date:____________________

Signature of parent or guardian:______________________Date:____________________

(if minors are involved)

Signature of Investigator:___________________________Date:____________________
APPENDIX E

Interview Question Protocol

1. Is this your first experience with using mobile initiatives to enhance student learning? (If teacher answers yes, I will continue the interview. If the teacher answers no, I will thank him/her for participating in the interview. This question ensures all participants meet the criteria of being a participating teacher in a mobile learning environment.)

2. In what ways does the use of mobile technologies impact how and what you teach?

3. What teaching philosophy and instructional approaches did you use before the mobile learning program?

4. How has your philosophy changed since the implementation of the mobile learning program?

5. How has the mobile learning program impacted the type of resources you use in your teaching?

6. What additional resources are needed to enhance the implementation of the mobile learning program?

7. What role does the mobile learning program have on your decision-making when planning your lessons?

8. What do you do to prepare your students for utilizing mobile devices for developing reading, writing, math, science, or social studies skills?

9. What do you wish district officials and curriculum leaders knew about teaching and learning as it corresponds to the mobile learning program?
10. What professional development, if any, have you received to assist you in integrating technology into your daily lesson plans?

11. How has professional development benefited you in terms of integrating the technology into your teaching practices?

12. What communities of practice have developed as a result of the mobile learning adoption and implementation?

13. How has collaboration benefited you in terms of implementing mobile learning in your classroom?

14. What benefits, if any, have the mobile devices brought to student engagement, motivation, and achievement?

15. What challenges, if any, do students and teachers encounter as they learn to use the technology and how do these challenges affect them?

16. What challenges, if any, are you faced with in terms of integrating technology into the curriculum?

17. In your opinion, what are the strengths of the mobile learning program?

18. In your opinion, what are the areas of concern within the mobile learning program?

19. Do you feel the mobile learning has been beneficial or obstructive in preparing your students for the district Common Core assessments and the state achievement tests? Explain.

20. What are your perceptions about the adoption and implementation process of mobile learning?

21. Is there anything else you’d like to tell me about mobile learning or educational technology?
APPENDIX F

Observation Protocol

Name (pseudonym): ____________________________

Date and Time: ________________________________

Content/Subject Taught: __________________________

Observations of mobile technology integration and teaching practices:

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

Comments/Summary:

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________
APPENDIX G

Focus Group Protocol

1. Based on interviews and observations, each of you has experienced the computer and server issues. On a typical day, how frequently do these issues occur?
   a. How do these issues impact your confidence in utilizing the computers for project-based or research assignments?
   b. How much time do these issues take to resolve?
   c. When they do occur, how likely are you have plans for other activities that do not use the computers?

2. When thinking about your students' academic levels, what impact do you think this has on your students' ability to utilize mobile devices to enhance learning? Please describe your thoughts in detail and give examples of your observations with students.

3. When thinking about your students' socio-economic levels, what impact do you think this has on your students' ability to utilize mobile devices to enhance learning? Please describe your thoughts in detail and give examples of your observations with students.
## APPENDIX H

Example of Coding and Memoing

<table>
<thead>
<tr>
<th>Memos</th>
<th>Maria - Interview</th>
</tr>
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<tbody>
<tr>
<td>In what ways do mobile technologies impact the way you teach?</td>
<td>I have MacBook carts, teacher computers, chromebooks, students bring their own device, smart scope technology with science.</td>
</tr>
<tr>
<td>What teaching philosophy and instructional approaches did you use before the BYOD program?</td>
<td>Teaching was different because she had to mainly rely on resource books and textbooks. I mainly used lecture or showed PowerPoint presentations to students. Gave handouts to students — more worksheets. I had to search for resources. There were concepts in the book that were obsolete. I was more dependent on textbooks but the textbooks would not be current or up-to-date. With science, that’s a big deal.</td>
</tr>
<tr>
<td>How has your philosophy changed since the implementation of mobile learning?</td>
<td>With ML students are in more control of their learning — more research and project-based. I’ve become more of a facilitator. I give them research based/project based collaborative learning for students.</td>
</tr>
</tbody>
</table>

This file was opened in Text View. You can format it or copy it into another program.

This file has been edited and has comments attached.
## APPENDIX I

<table>
<thead>
<tr>
<th>Open-Codes</th>
<th>Enumeration of open-code appearance across data sets</th>
<th>Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer/Hardware Problems</td>
<td>33</td>
<td>Frustrating Process</td>
</tr>
<tr>
<td>Server Issues</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Student Access</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Time-consuming Implementation</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Inappropriate Use of Devices</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Perception of Laptop Carts vs. 1:1 Laptops</td>
<td>12</td>
<td>Culture Change</td>
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<td>Parent Buy-In</td>
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<td></td>
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<tr>
<td>Teacher Beliefs</td>
<td>15</td>
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<tr>
<td>Mobile Device Policy</td>
<td>5</td>
<td></td>
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<tr>
<td>Using Devices for Learning</td>
<td>18</td>
<td></td>
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<tr>
<td>Teaching and Learning Cloud Platforms &amp; Programs</td>
<td>12</td>
<td>Steep Learning Curve for Students</td>
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<tr>
<td>Computerized Assessments</td>
<td>7</td>
<td>Perceived Impact on Students and Test Scores</td>
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<tr>
<td>Keyboarding Skills</td>
<td>8</td>
<td></td>
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<tr>
<td>Takes Time to Teach</td>
<td>13</td>
<td>On-going Professional Development Desired</td>
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APPENDIX J

Change in Protocol I

Good Morning Tina,

This email is to inform you that your request to change the focus of your study from BYOD to mobile learning because the school does not have any students bringing their own devices this year but students and teachers are participating in mobile learning and cloud computing as a Google Apps for Education school and to change the title of your study as a result of this change has been approved. Thank you for submitting your revised focus group questions, interview questions, recruitment letter, and consent document for our documentation.

Thank you for complying with the IRB’s requirements for making changes to your approved study. Please do not hesitate to contact us with any questions.

We wish you well as you continue with your research.

Best,

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APPENDIX K

Change in Protocol II

Good Afternoon Tina,

This email is to inform you that your request to conduct your focus group via an online, asynchronous, Haiku discussion board instead of face-to-face by posting the focus group questions over a three-day period for logistical reasons has been approved. Thank you for submitting your revised recruitment letter and consent form for our review and documentation. Your stamped, revised consent form is attached.

Thank you for complying with the IRB's requirements for making changes to your approved study. Please do not hesitate to contact us with any questions.

Best,

Liberty University