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TEACHERS' CONFIDENCE AND PREAPREDNESS FOR TEACHING MOBILE LEARNERS

by

Kelley Kirk Gonzales

A Dissertation Submitted to the Graduate School, the College of Education and Psychology and the Department/ School of Curriculum, Instruction and Special Education at The University of Southern Mississippi in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

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ABSTRACT

Mobile devices, such as tablets, laptops, and Smart phones have changed the landscape of education requiring teachers to integrate technology in the classroom. The integration of mobile devices in the classroom is referred to as mobile learning, and requires teachers to be confident and prepared in their ability to teach mobile learners. This study was an attempt to explore and examine teachers' confidence and preparedness in teaching mobile learners and close some of the gaps in the research. A quantitative method of investigation and analysis was used for this study to draw conclusions relative not only to teachers' confidence and to preparedness, but to examine the possibility of any correlation between the two. Additionally, the study explored the differences in teachers' confidence and preparedness based on whether or not a school provided mobile devices on a 1:1 student basis. In general, the results revealed high levels of teacher confidence, but no correlation between confidence and preparedness. The results also showed no significant differences in confidence and preparedness for teachers teaching in schools with mobile devices provided on a 1:1 student basis and those schools not providing mobile devices on a 1:1 student basis.

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DEDICATION

This process would not have been possible without the grace of Almighty God to whom I owe my life and all blessings bestowed upon me. I owe my deepest gratitude and heartfelt appreciation to many others as well.

To my husband, I am forever grateful for your incredible level of support and understanding during all the time I spent in class and writing the dissertation. To my family and friends, thank you for understanding when I could not spend time with you. Your encouragement, when I felt like giving up, will always be appreciated. All of you have travelled this road with me in some manner for many years, and it is indeed sweet to share this accomplishment with you.

Finally, I dedicate this dissertation and degree to my precious Momma. She was tough on me, but she was also my hero! She encouraged me to pursue my dreams and she prepared me for the world. Although she has gone on before me, I know she would be proud.

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CHAPTER I - INTRODUCTION

Background

This dissertation examined the role of teachers' confidence and preparedness in teaching mobile learners in educational institutions on the secondary level in a southern region of the United States. This study sought to advance knowledge regarding the extent to which teachers' feel confident in using mobile devices to augment student performance, and this study will attempt to measure teachers' level of preparedness possessed by teachers in order to determine whether there is a need for further technology training in relation to current technology competencies. Chapter one defines mobile learning, addresses the advantages and disadvantages of using mobile learning, elements and characteristics of mobile learning, limitations of mobile learning, and the technology competencies needed for successful use in the educational process.

Overview of Mobile Learning

By definition, mobile learning is "learning by means of wireless technological devices that can be carried and utilized wherever the learner's device is capable of receiving unbroken transmission signals" (Oller, 2012 p. 1). Mobile learning gives students the ability to be untethered from a physical building or dwelling that enables them to move about freely as long as there is access to a network or connectivity through Wi-Fi (Oller, 2012). With regard to technologies, 'mobile' means the tool or device that is both transportable and individual. Moreover, mobile learning is perceived as possessing characteristics such as impulsivity, isolation, and transportability while offering a sense of informal education within an on-demand platform that can be learned in "bite-sized" chunks (Traxler, 2005).

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Mobile learning has its origins in the idea of utilizing an electronic medium, or eLearning, which uses a learning management system to deliver educational substance to students under the principle of offering an on-demand platform (Caudill, 2007). ELearning has been transformed by the innovation and use of the Internet (Martin & Ertzberger, 2013). Thus, mobile learning is a form of eLearning that enables students to obtain learning materials at their convenience from anywhere in the world using a mobile device (Ozdamli & Cavus, 2011). Current innovations in mobile technologies have given learners opportunities to become involved in online learning and remain connected to the educational practice without the accountability that tends to restrict participation within the traditional classroom such as punctuality, classroom participation, face-to-face interaction, and classroom policies and procedures (Kim, Kwon & Cho, 2011). Mobile learning can be utilized to augment the overall learning experiences of students and teachers, and with the proper support, the mobility of learning may increase the quality of learning (Oberer & Erkollar, 2013).

Din and Khalid (2011) point out several advantages of mobile learning. These include saving time, learning from movies and animations, book reading capabilities, accessing resources, studying while traveling, note taking, quick retrieving of information, saving space, being entertaining and engaging, wasting less paper, and being portable. "Convenience, flexibility, engagement, and interactivity are all factors that make mobile learning more attractive to students" and can be beneficial for learners (Chen & Denoyelies, 2013).

Whereas mobile devices offer many benefits to users in the learning environment, some limitations do exist including small screen size, limited memory capacity, slow connectivity speed, and a lack of standardization across different platforms. Users with disabilities or physiological issues may encounter problems with accessibility. The lack of psychological restraint such as playing music, texting with friends, or checking social media may also infringe upon pedagogical advancement (Cheon, Lee, Crooks & Song, 2012).

Mobile Devices

According to Pollara (2011), there are now over 5 billion mobile accounts internationally, which represent approximately 77 percent of the entire population of the world. This implies that as learners go about their hectic lives, they are discovering more available study time, easier collaboration with classmates, fewer complications relative to communicating with teachers, and better use of time when completing class assignments (Pollara, 2011). Barbour, Grzebyk, and Eye (2014) agree that accessibility of the Internet with other forms of Web-based learning opportunities is on the rise. In fact, predictions suggest ownership of mobile devices will outnumber the inhabitants of the world by the year 2017, and a large percentage of the entire time spent on the Internet will be completed through the use of mobile devices (Bhatia, 2013).

Because of the pervasive nature of mobile devices, mobile learning is becoming tantamount to the distribution of learning materials as well as the support of learning (Traxler, 2005). Research also shows that mobile learning is increasing in both its importance and impact on learners and their educational experiences (Barbour, Grzebyk, & Eye, 2014). Learners are using these digital tools to create, develop, and share knowledge in fresh, innovative ways transforming mobile learning today into a much different experience when compared to just a few years ago (Pollara, 2011).

Elements and Characteristics of Mobile Learning

According to Ozdamli and Cavus (2011), there are positive elements that are present in mobile learning that make it very different from routine or conventional online learning. With regard to mobile learning, the learner is at the center with the teacher facilitating the educational experience, sharing learning materials, and delivering multimedia and messages, but the characteristics of mobile learning include a number of other factors as well. Those factors include the following:

- Learning is on-demand and contextual.
- Learning is acquired using devices that are portable and small.
- Teaching is delivered in a hybrid manner having synchronous benefits while using asynchronous processes.
- Learning is personal and individualized.
- Learning and teaching can be collaborative and interactive.
- Responses are almost instantaneous.

Along with these elements, mobile learning can increase freedom and flexibility for the learners, which can enhance and augment learner performance and motivation (Ozdamli & Cavus, 2011).

According to Martin and Ertzberger (2013), the "Here and Now" of mobile learning has three predominate characteristics. They include (1) the ability to engage students through the use of instructional design models, multimedia, and feedback, (2) authentic interactivity using real world and contextually based applications, and (3) informal learning that takes place without a teacher directing instruction and sometimes without the student realizing they are actually learning. The ubiquitous nature of the mobile learning environment must accommodate the sense of urgency students have for learning, which is also known as just in time or on-demand learning. Mobile learning must represent the personalization of everyday activities relative to situational learning, which means the student must be able to apply the learning to their individual circumstance. Furthermore, mobile learning must include adaptive learning in the context of the learning community and how this will be relevant to individual students; meaning the students must see a relationship between what is being taught and how it can be used effectively among specified groups of learners (Martin & Ertzberger, 2013). Additionally, a fundamental characteristic of mobile learning is described as learning taking place in the "right place at the right time" for the student creating an "authentic

joy" for the learning process (Ozdamli & Cavus, 2011).

Limitations of Mobile Learning

Mobile devices have proven beneficial by offering opportunities to participate in class discussion and engage with the course content (Gikas & Grant, 2013). There are times, however, when the network and infrastructure have posed problems for constant connectivity and "anti-technology" teachers do not provide universal access to the content students deemed necessary for learning. Additionally, students tend to blur the lines between using the mobile device to learn and using it for social media. This may suggest "the adoption of mobile technology does not guarantee the adoption of mobile services centered on learning" (p. 24). This also holds true for formal and informal learning. In other words, students do not see a difference between in-class learning and outside learning (Gikas & Grant 2013).

Technology Competencies

While there are still barriers to mobile learning, advancements in technological devices and using those devices in the educational arena make this pertinent for teachers to gain and retain substantial technological competencies, also known as digital literacy (Hicks & Hawley-Turner, 2013).

According to ISTE and NETS (2008), three of the five standards for teachers are related to technological competencies and digital literacy. The second standard requires teachers to be capable of "designing, developing, and evaluating authentic learning experiences and assessments incorporating contemporary tools and resources to maximize content learning" (p. 1). This includes utilizing "technology-enriched learning environments" (p.1) that allow learners to establish learning goals, manage their own learning, and perform self-assessments. Teachers must address the different learning styles of students and their abilities to utilize available technological resources and tools (ISTE, 2008).

The third standard from ISTE (2008) requires teachers to "model digital age work and learning" (p. 1). Teachers must have "knowledge, skills, and work processes representative of an innovative professional in a global and digital society" (ISTE, 2008, p. 1). Therefore, teachers must be fluent in the use of digital systems and have the ability to transfer knowledge of current applications and devices to new technologies and circumstances. They must be able to communicate using technology, applications, and various devices, and be able to use current technology to analyze and evaluate informational resources to sustain student learning (ISTE, 2008).

Standard four from ISTE (2008) requires teachers to "promote and model digital citizenship and responsibility" (ISTE, 2008, p. 2). Teachers are required to have

knowledge of copyright laws, intellectual property, how to cite sources, and be able to relay that knowledge to students. Teachers must be able to assess students' technology needs and provide appropriate tools, as well as promote a culture of digital etiquette and understanding of global communications and collaboration among students (ISTE, 2008).

According to Thompson (2014), teachers around the country agree on some of the most important technology competencies needed to be successful in the classroom. Those include, but are not limited to, the ability to accomplish the following:

- 1. Competently conduct Web searches.
- 2. Be proficiently skilled in the use of popular applications software.
- 3. Show motivation to gain knowledge of new technologies.
- 4. Connect with others using social media.
- 5. Use of online tools, such as blogs and videos to share, learn, and communicate.
- 6. Fully understanding the potential of mobile devices.
- 7. Communicating with e-mail.
- 8. Utilizing presentation software effectively.
- 9. Successfully using Google.
- 10. Functioning 'in the cloud.'

Thompson (2014) points out educators need to be familiar with interactive whiteboards, digital citizenship, and model acceptable digital responsibilities and behaviors to be effective in a classroom of mobile learners.

In light of the growing abundance of mobile learning technologies (Barbour, Grzebyk, & Eye, 2014; Pollara, 2011) and shifting paradigms relative to how these technologies can be utilized to educate students, teachers are being asked to deliver

effective instruction via mobile methods and student achievement. Therefore, important is to explore teachers' confidence and preparedness in utilizing mobile devices for instruction to ensure current pedagogical strategies are being implemented in such a way as to meet the needs of students in the digital age (ISTE, 2008).

Statement of the Problem

Mobile devices such as tablets, laptops, iPads, iPods, and smart phones have become an integral part of today's society, and these devices have changed the way students are learning as well as how teachers are instructing students. This new way of learning has been termed mobile learning and is a culmination of the devices being mobile including the learners (Rawlins, 2014). A great deal of research has been conducted investigating the way mobile devices are used by students and teachers (Chen & Denoyelles, 2013; Martin & Ertzberger, 2013), perceptions of students and teachers using mobile devices (Gikas & Grant, 2013), and to a small extent, the time spent using mobile devices (Teo, 2015). However, many questions still remain unanswered and gaps are present in the research relative to teachers and their confidence and preparedness in utilizing those mobile devices in the classroom and how this confidence and preparedness may impact student performance. Without empirical testing with regard to the confidence of teachers and their technology preparedness for the purpose of secondary student performance, mobile learning effectiveness will continue to be speculative and chiefly unguided by evidence.

Theoretical Perspective

The theoretical perspective lays the foundation and support for a research study because theory determines what information is seen, how the information is seen, and what information is considered important (Traxler & Koole, 2014). This research study is based on the theories of: (a) Pragmatism by John Dewey, (b) Connectionism by Edward Thorndike, (c) Competition and Cooperation by Mark May and Leonard Doob, (d) Selfefficacy by Albert Bandura, and (e) Constructivism and Connectivism by Jean Piaget and Lev Vygotsky.

These theories were used to help develop this study for the following reasons. First of all, the pragmatic aspect of education stemming from Dewey suggests learning stems from active and social participation in the educational process (Dewey, 1910), and thus, is an underpinning for technology integration into the classroom due to the interactive and social components of today's available technologies. Second, the theory of Connectionism by Thorndike (1910) is based on the behavioral psychology of learning that states learning is a result of a question or activity that provokes some sort of reaction. Technology, especially mobile technologies, provide that connection between the learner and the learning materials. Third, the Competition and Cooperation theory of May and Doob (1937) bring to light the collaborative nature of learning that supports the elements of mobile learning. In other words, students are able to collaborate and interact spontaneously via online communications tools. The fourth reason is based on the selfefficacy theory from Bandura (1977). This theory is based on how one views their own ability to perform tasks and speaks to the teachers' confidence for teaching mobile learners. Next is Constructivism (Nykos & Hishimoto, 1997), purporting that learning is active and interactive, especially mobile technology, makes possible. Finally, Connectivism is the theory of networking and interconnectivity, and is the foundation for the "digital age" of globalization (Reese, 2014), which supports this study's inquiry into

teachers' preparedness to teach mobile learners and the knowledge and skills needed to adequately integrate technology into the classroom.

Purpose of the Study

In order for mobile devices and mobile learning to be successfully implemented on the secondary level, administration, teachers, and students should perceive benefits of and need for their use in the learning process. The purpose of this study is to ascertain the degree to which teachers feel confident in using mobile devices in the classroom to augment student performance. This study will also investigate the measure of preparedness possessed by teachers in order to determine whether there is a need for further technology training in relation to current technology competencies. Moreover, this study will investigate differences between teacher confidence and preparedness, the correlation between teachers in schools employing mobile learning and confidence, as well as the correlation between teachers in schools employing mobile learning and preparedness.

According to Webster's online dictionary (n.d.), confidence refers to a feeling a person has regarding their own abilities, and in the case of mobile learning, one's ability to effectively and successfully deliver instruction via a mobile learning device or devices all the while improving student achievement. The confidence level of teachers in this study will be measured via a Likert scale according to their level of confidence in (a) applying hardware and software applications knowledge, (b) possessing Internet skills, and (c) using online communications or ICT while allowing students to use mobile devices in the classroom.

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Preparedness, according to Webster's online dictionary (n.d.), refers to the state of being prepared or to "be ready for some purpose, use, or activity" in advance. The aim of this research study is to measure teachers' preparedness in terms of technology competencies such as hardware and software applications knowledge, Internet skills, and online communications skills. Hardware and software applications knowledge includes items such as file nomenclature, word processing, spreadsheets, and networks. Internet skills refer to using web browsers, search engines, site navigation and open source documents. Finally, online communications include skills involves using email and social media.

Research Questions

In order to assess the perceptions of confidence and teacher preparedness of teachers, this study analyzes data gathered on five research questions using the Likert Scale and a testing instrument designed by the researcher.

Research Question 1: Are teachers confident in their ability to teach mobile learners relative to computer hardware and software application knowledge, Internet skills, and online communications competence?

Research Question 2: Are teachers prepared to teach mobile learners relative to computer hardware and software applications knowledge, Internet skills, and online communications competence?

Research Question 3: Is there a relationship between teachers' confidence and teachers' preparedness?

Research Question 4: Is there a difference between teachers' confidence in teaching mobile learners in schools employing mobile devices on a 1:1 basis and schools not employing mobile devices on a 1:1 basis? Research Question 5: Is there a difference between teachers' preparedness to teach mobile learners in schools employing mobile devices on a 1:1 basis and schools not employing mobile devices on a 1:1 basis?

Justification

Due to the abundance of and rapidly changing capabilities of mobile devices, the face of education has been changing and growing toward the incorporation of mobile teaching and learning. This has never been more apparent than in schools where students are bringing smart phones to the classroom, as well as being outfitted with tablets and/or laptops funded through school districts to keep them connected to an entire world of information and social media. Mobile learning technologies offer teachers and students a new approach to learning whether this is in the classroom, at home, in a lab, or riding on a bus. The digital natives Prensky wrote about in 2001 are real and prevalent in education today, and have been engaged with the latest and greatest innovations since birth. The age of digital natives necessitates teachers to be adept with current technology and the practice of incorporating technology in the educational process. Currently, researchers (Barbour, Grzebyk & Eye, 2014; Din & Khalid, 2011; Gikas & Grant, 2013; Kim, Kwon & Cho, 2011) are taking a closer look at mobile teaching and learning in an effort to address the effects of mobile learning on students.

Additionally, if educational institutions are to adopt the use of mobile devices in the classroom setting as well as promote the pedagogical use outside the building, mobile learning and teaching must be analyzed. Prior research in this area has focused mainly on faculty and student perceptions (Raulston & Wright, 2010; Yusri, Goodwin, & Mooney, 2014), attitudes toward adoption and use of mobile devices in education (Martin & Ertzberger, 2013; Oz, 2014; Sad & Goktas, 2014), and characteristics of mobile learning (Din & Khalid, 2011; Hashemi, Azizinezhad, Najafi & Nesari, 2011; Ozdamli, 2012; Shuib, Shamshirband, & Ismail, 2015). This researcher finds no evidence that a study has been conducted focusing on professed confidence and preparedness of teachers in using mobile devices. This study proposes an investigation and analysis of these factors in a southern state (Mississippi) of the United States.

This study may be significant insomuch as it may provide information about how mobile devices are changing the need for secondary teachers to be trained regarding the mobile learning process in order to augment student engagement. Moreover, this study may contribute to the larger body of knowledge relative to the relationship of mobile learning to instructional design and basic elements of mobile learning. The results may aid in helping college of education faculty manipulate traditional instruction in such a manner as to positively impact training needs of future teachers and their participation in educational technology courses.

This study also explores potential obstacles relative to technological skills and computer literacy that may prohibit the effective use of mobile devices as educational tools by those teachers. Such findings may inform administrators and teachers as to bestpractices to use in the mobile learning environment and provide guidelines for establishing mobile learning policies. The study may also help create professional development strategies specific to technology training and utilization of technology as a classroom resource based on teacher levels of technological competency and subject area in which they teach.

Delimitations and Assumptions

This study contains the following delimitations. First, the results and their implications come from public secondary educational institutions in the Southern region of the United States. Therefore, the results may not be widespread among other regions in the United States or other countries in the world. Second, the participants are teachers ranging from first-year to veteran status, and therefore, may have widely different experience levels with technology and mobile learning. This study will not measure all levels of experience based on the years of actual teaching in the classroom, which could be a factor. Additionally, the participants may not conduct their teaching in schools where learners are mobile or part of a one-to-one initiative. This means that students in this group may have some, little, or no access to mobile devices during class time that could affect results as this will not be measured. Third, the participants may or may not have had training relative to the specific hardware and software applications, Internet skills, or online competencies (ICT) skills relative to conducting instruction for mobile learners. Further, responses to this study are based on the participants' willingness to honestly report data and rely upon their personal ability to recall information accurately. Finally, the instrument used in this study is based on available instruments and contains questions designed and developed by the researcher, which may or may not impact the reliability of the measuring instrument.

There are two assumptions for this research. First, relative to this sampling of participants, the researcher presumes that all participants will respond accurately and

truthfully. The participants will be assured of confidentiality, and therefore, the researcher can assume the participants will respond to the best of their knowledge. The second assumption would be the participants are responding to the questionnaire without the use of outside resources and without fear of reprimand or conflict of interest.

Definitions

To help understand concepts presented in this study, several terms need to be defined and explained further.

Confidence: One's feelings about their abilities to perform a task (Webster, n.d.)

Electronic Learning (eLearning): Learning that occurs through electronic means and uses a learning management system to deliver educational substance to students under the principle of offering an on-demand platform (Caudill, 2007)

Mobile devices: Refers to a tool or device that is portable, wireless and handheld. Examples include, but are not limited to smartphones, tablets, and laptops (Dictionary.com, n.d.).

Mobile learning: Any and all activities in which an individual may participate via a mobile device that provides learning, interaction, and productivity (Driscoll & Barneveld, 2014).

Preparedness: The state of "being ready for some purpose, use or activity" before having to perform an activity.

ISTE (International Society for Technology in Education): A nonprofit organization supporting teachers utilizing technology in the classroom for educational purposes (ISTE, 2008-2017). UNESCO (United Nations Educational, Scientific and Cultural Organization): An international organization responsible for:

Coordinating international cooperation in education, science, culture and communication to ensure every child and citizen has access to a quality education, cultural experiences that are diverse and meaningful, beneficial scientific advances, and freedom of expression and human dignity (UNESCO, n.d., p. 1).

Summary

As mobile devices are rapidly becoming more pervasive (Pollara, 2011) and mobile learning comes to be more of a staple in the educational process allowing students to move to and fro while still remaining connected to the world (Oller, 2012), mobile learning creates a precedence for teachers to become technologically competent and creative in providing learning activities that produce solid learning materials in an engaging, convenient, and flexible manner (Chen & Denoyelies, 2013). While barriers, like teachers who do not care for technology, do still exist with regard to mobile learning (Gikas & Grant, 2013), national organizations like ISTE suggest teachers be capable of delivering technology-rich learning experiences for students, and this capability requires confidence as well as technological competence. The remainder of this research study will be comprised of the following:

• Chapter two provides the supporting theoretical perspective, an overview of supporting learning theories and models, and current empirical literature relevant to the research questions.

- Chapter three outlines the research methodology, participant selection, research design, demographics, instrumentation and measurement, and data collection and analysis procedures.
- Chapter four presents the results of the study and analyses as they pertain to the research questions, and reports the statistical power and effect sizes of the results.
- Chapter five summarizes the conclusions of the study while revealing consistencies and inconsistencies with the related literature, and provides recommendations for future research in the field of teachers' and their confidence and preparedness for teaching mobile learners.

CHAPTER II – LITERATURE REVIEW

Chapter two of this research study affords a theoretical overview of supporting learning theories and models as a basis for how students learn, and provides a history of mobile devices and how these devices have merged into the education setting. Chapter two also delivers relevant research and reviews with regard to confidence of teachers utilizing mobile devices and suggested technology competencies for teachers. This literature review serves as a lens through which past research is viewed and sets the stage for more and newer research to be conducted relative to today's teachers as well as current technologies.

Theoretical Overview

The beginning of learning theory relative to instructional technology dates back to 1910 when John Dewey visualized a unique connection between learning theory and educational practice based in science in *How We Think*. Dewey suggests that thinking is innate and automatic and cannot be taught. However, thinking can be developed and critical thinking skills can be taught making it essential to teach information in an encouraging and stimulating environment. Schools must be places where curiosity can be social and thoughts are flexible, not where curiosity is lost because of mundane, monotonous book study (Dewey, 1910).

Dewey (1910) gave a basis from which to form the educational technology foundation moving from just reading books and listening to lectures to interactive inquiry and critical reasoning. He explained thought as acquiring knowledge and developing "appropriate meanings" and "logical conclusions" via exploration, hands-on experimentation, and social interaction. On the heels of Dewey, Edward Thorndike (1910) proposed the Laws and Connectionism Theory that described psychology as a science that primarily studied "the intellects, characters and behavior of animals including man" (p. 5). This perspective identified psychology as it related to the changes in intelligence, personalities, and behaviors of people, and how the science of psychology makes a contribution to education in all of the following categories: aims, materials, means, and methods (Thorndike, 1910).

Thorndike (1910) suggested psychology helped provide measurability for an aim or goal. In other words, he purported that an educational goal is or not attainable based on a person's existing mental materials hindered by any barriers that may keep them from learning. Materials, according to Thorndike, referred to all of the sciences that contribute to one's mental nature such as anatomy, physiology, sociology, anthropology, and history. The means of education is related to the influence of other people, as well as the influence of books, maps, or other equipment upon which humans operate. The methods are derived from the laws of human nature, work experiences, and measurable knowledge and skills attained by individuals (Thorndike, 1910).

A couple of decades later May and Doob (1937) proposed the cooperative and collaborative learning theory. In a book called *Competition and Cooperation*, the authors described competition or cooperation as behavior aimed at the same collective end by at least two individuals, and they aligned both with the term "striving." The individuals were either striving against others (competition) or striving with others (cooperation). The psychology of this theory is related to attainment or achievement, and aspiration of the individuals. This is highly useful in education as the psychology of the theory helps

teachers understand how students learn to work together and support each other in the learning process, how students discuss ideas based on their individual knowledge, the usefulness of teamwork, individual responsibility in completing a task, and possibility of group interaction and effectiveness (May & Doob, 1937).

With regard to teachers' confidence, Bandura (1977, 1986) developed the concept of self-efficacy, which was based on his social development theory. This theory purported the notion that actions or behaviors of an individual are related to the belief in their own competence or ability to successfully perform certain tasks.

Traxler and Koole (2014) suggest that effective research is "grounded in well considered theoretical perspectives that take into account the local and the global theoreticians" (p. 289). The preceding theoretical overview takes into consideration many theorists, both past and more current, and is fundamental to this research study. The psychology of learning and how learners think supports the idea of mobile learning because it ascertained that individuals explore learning through hands-on experimentation, group interaction, competition and teamwork, and connecting with past experiences, (Dewey, 1910; Thorndike, 1910; May & Doob, 1937), all of which can be accomplished by utilizing a mobile device. Self-efficacy and the actions of performing tasks (Bandura, 1977, 1986) is the underpinning factor for teachers' confidence in performing the tasks necessary using mobile technology. The cognitive and social aspects of learning by Nyikos and Hashimoto (1997) emphasized the need to reinforce intellectual development through connecting prior knowledge to present information or tools, suggesting teachers become competent in using the mobile devices that are becoming more prevalent in schools and education.

20

As technologies advance and become more prevalent, many researchers have begun using multiple learning theories to support their studies. The more popular theories include Constructivism and Connectivism. The Constructivist Theory is broken down into cognitive (associated with Piaget) and social constructivism (associated with Vygotsky) whereas cognitive highlights individual acquisition of knowledge and social emphasizes social interaction as a prerequisite to cognitive development and intrinsic absorption of ideas and thinking (Nyikos & Hashimoto, 1997). Connectivism was coined as "the learning theory for the digital age" by Siemens in 2004. This theory took into consideration the newer ways individuals learn through the perspectives of others, by taking into consideration of relationships, collaboration, and connections to prior knowledge, acquiring current information, and utilizing mobile devices for lifelong learning (Reese, 2014).

Mobile Devices in Education

This section provides an overview of the history of mobile devices in education as well as the related literature supporting teachers' confidence and preparedness for teaching mobile learners.

History of Mobile Devices

Mobile devices are often thought of as brand new innovations surfacing at the beginning of the 21st Century, when in fact prototypes began debuting as far back as the 1970s. Alan Kay and Adele Goldberg created a prototype called the Dynabook, which was a forerunner to tablet computers, but it did not progress any further than the development stage. Kay and Goldberg envisioned this device being utilized in areas of

business and engineering. Moreover, these two scholars supported the vision of using mobile devices for teaching and learning (Miller, Moorefield-Lang, & Meier, 2012).

A little more than 30 years later came the emergence of the MacBook and iPad by Apple, followed shortly by PC based laptops and tablets engineered by Microsoft (Miller, et al., 2012) giving teachers and students a connection to the world as well as creating new digital learning environments and levels of engagement.

Early in 2014, Nagel reported virtually all middle and high school students have and use mobile devices for completing schoolwork. Among those students nearly onethird are also utilizing devices provided by their schools. Pearson (2014) however, reported only 16 percent of students were using devices supplied by their schools, and eight out of ten students used laptops for school work. Additionally, Pearson (2014) reported laptops continue to be the most widely used mobile device for completing school work versus smart phones or tablets.

Mobile Learning Device Confidence

While mobile devices have been available for several decades, the literature on teacher confidence and preparedness in the field of mobile learning is rather small because mobile learning is a more recent innovation. One of the earliest studies conducted by Corbeil and Valdes-Corbeil (2007) posit that teachers are not necessarily confident in using mobile learning solely due to the fact mobile devices are available and used on a regular basis. Of the 30 faculty members reporting, 60 percent shared they are ready for mobile learning (Corbeil & Valdes-Corbeil, 2007). This study is limited by the fact it only questions a small number of participants and asks a yes or no question as to mobile learning readiness. Findings also imply that those who use mobile devices to perform activities using various applications can find a way to use them for teaching and learning. The study does not address attitudes or confidence levels for integrating mobile devices in the classroom or the necessary skills or knowledge for successfully incorporating mobile learning into teaching and learning.

In 2010, Raulston and Wright conducted a more detailed study analyzing the attitudes and perceived confidence of teachers subsequent to the implementation of a laptop initiative over a period of one school year in 2007-2008. The study is comprised of two sections. The first section, which is quantitative, included 284 teachers who have been given a laptop to use during the school year and received two days plus two hours of training from professional laptop trainers. Section two includes a qualitative interview process of approximately 40 teachers. The quantitative data has been broken down by the usage in each semester, and then into the six stages of confidence for each semester. In relation to the adoption and perceived use of laptops, the ranking scale increases each semester for both suggesting the teacher laptop initiative helps increase teacher's perceived use. Raulston and Wright (2010) report the largest percentage (33 percent) for confidence in utilizing and integrating technology in the curriculum for *familiarity and* confidence in fall 2007. The ranking rose to the adaption to other contexts category (23 percent) during spring 2008, and to the *creative application to new contexts* (56 percent) in fall 2008. This indicates a correlation between increasing confidence in the ability to integrate technology and the adoption and use of the technology (Raulston & Wright, 2010).

The interviews conducted during the Raulston and Wright study (2010) suggest several recurring themes as to the perceptions of how teachers' technology readiness

affects students and education. Teachers report that using technology helps prepare students for future careers, enhances opportunities for making real-world connections for the students, increases teachers' technical skills, provides convenience and mobility, improves communications and organizational skills, excites and engages students, and helps teachers become technological role models. Although limited by the lack of sufficient information regarding teacher preparedness, the implication of this study promotes the idea that teachers must be technologically trained and skilled in order to be prepared to integrate mobile devices in their classrooms. As teachers are given adequate resources, teachers' attitudes and classroom practices will change (Raulston & Wright, 2010).

Yusri, Goodwin, and Mooney (2015) gathered data in 2013 from 308 teachers regarding their mobile learning perceived confidence and found that 42.2 percent liked the idea of mobile learning better than conventional learning. Also, most of the teachers (89.8 percent) agreed or strongly agreed that mobile learning should be integrated into the classroom. Only 37.5 percent of teachers did not think they wanted to participate in mobile learning, and only 22.2 percent perceived they were ready to implement mobile learning at the current time, which was in stark contrast to the earlier Corbeil, et al. (2007) study where 60 percent of teachers shared they were ready for mobile learning. However, 76.9 percent stated they would be ready to implement mobile learning in two years (Yusri, et al., 2015). This study was limited in the fact the research had been conducted in Indonesia and did not necessarily reflect teachers in the United States.

Sad and Goktas (2014) researched pre-service teachers' perceived confidence about using mobile devices in education as a tool for learning. A total of 1087 preservice
teachers participated in the study. The results largely showed attitudes were favorable toward the use of laptops, but not as extremely positive towards the use of mobile phones for educational purposes. A total of 78.8 percent of the participants stated they would use a laptop as a learning tool, while only 50.6 percent would use a mobile phone as a learning tool. A total of 77.8 percent suggested that laptops should be commonly used in education, while only 50.2 percent thought mobile phones should be commonly used. When asked if the participants would use a mobile device in every lesson, 64.2 percent said yes for laptops, but only 48.2 percent said yes to mobile phones (Sad & Goktas, 2014).

Although some research in the field of mobile learning has been conducted, there is much to be done in order to determine teachers' confidence levels and competencies, especially in the Southern region of the United States. Deeper research in the field of mobile learning will not only create a strong basis for those working in the field, but can aid teachers in staying abreast of new technologies, increase personal knowledge and use of mobile devices, and increase use by both students and teachers, all of which will enhance the potential for improving student achievement.

History of Technology Competencies for Teachers

The original technology competencies, also known as standards for teachers, were delivered by ISTE in 1998 and targeted on "how" to use technology. The standards were subsequently updated in 2007 and published in 2008 shifting the focus from how to use technology to the use of technology to facilitate learning (Barr & Sykora, 2015). A larger organization, the United Nations Educational, Scientific, and Cultural Organization (UNESCO), worked collaboratively with several organizations, including ISTE, to create

a complementary framework (see Figure 1) for teachers representing the progression of technology skills from beginner to advanced (Barr & Sykora, 2015). Though both models provide a list of competencies and skills teachers should possess in order to prepare learners, the ISTE Standards for Teachers were "developed to encourage support for the implementation of the ISTE Standards for Students" (p. 3) while the UNESCO model is more of a stand-alone framework that provides a measurement of teachers' competencies. According to Barr & Sykora (2015), the UNESCO framework is more of a knowledgebased measuring tool and the ISTE Standards for Teachers includes performance-based descriptors and "demand a higher level of evidence to demonstrate mastery (p. 3).

THE UNESCO ICT CON	ISTE STANDARI			
	TECHNOLOGY LITERACY	KNOWLEDGE DEEPENING	KNOWLEDGE CREATION	FOR TEACHERS
UNDERSTANDING ICT	Policy awareness	Policy understanding	Policy innovation	1. Facilitate and insp student learning a
CURRICULUM AND ASSESSMENT	Basic knowledge	Knowledge application	Knowledge society skills	 Design and develor learning experience
PEDAGOGY	Integrate technology	Complex problem solving	Self management	3. Model digital age
ICT	Basic tools	Complex tools	Pervasive tools	4. Promote and mod
ORGANIZATION AND ADMINISTRATION	Standard classroom	Collaborative groups	Learning organizations	and responsibility
TEACHER PROFESSIONAL LEARNING	Digital literacy	Manage and guide	Teacher as model learner	5. Engage in professi and leadership

)S

- nd creativity
- p digital age s and assessments
- work and learning
- el digital citizenship
- ional growth

Comparing Structures: UNESCO framework and ISTE Standards UNESCO, ICT Competency Framework for Teachers, 2011, http://unesdoc.unesco.org/images/0021/002134/213475e.pdf

Figure 1. The UNESCO ICT Competency Framework for Teachers

This figure illustrates the collaboration between UNESCO and ISTE to establish the framework for ICT competences (UNESCO, 2011).

Supplemental to the ISTE and UNESCO standards, researchers have produced

articles over several years pertaining to the need for specific technology skills for

teachers to successfully integrate technology into the classroom. For example, back in

2005, Laura Turner authored the article "20 Technology Skills Every Educator Should

Have" for *The Journal* (pp. 1-2). The list includes skills in word processing, spreadsheet,

database, electronic presentation, Web navigation, Web site design, e-mail management, digital camera use, computer network knowledge application, file management, software downloading, computer software installation, learning management software, videoconferencing, computer-related storage devices, scanner operation, personal digital assistants, deep web knowledge, copyright, and computer security. Turner (2005) points out that the many technological devices available make technology competencies a necessity for all teachers on all levels of education.

In 2010, during the early stages of social media, Doug Johnson listed a "Top Ten Social Media Competencies for Teachers" on *The Blue Skunk Blog*. Johnson suggests K-12 teachers to use ten social learning and networking skills that includes the following:

- 1. Be able to assist students with Web2.0 tools in order to solve problems and collaborate with peers and teachers.
- 2. Be familiar with Web2.0 categories useful in completing activities, and know which tools are allowed and supported by the school system.
- 3. Be able to utilize communication tools to contact students, parents and colleagues.
- 4. Know how to access, navigate and create content on Websites.
- 5. Be able to create, use and maintain a personal social media site and assist students in creating their own social networking site.
- Know, understand, and follow district policies and procedures related to social networking.
- 7. Know and be able to share understanding of copyright laws, security, and privacy laws related to social media.

- 8. Comprehend the importance of threats to identity protection and reputation awareness.
- 9. Be able to develop lesson plans incorporating social media trends and applications.
- 10. Contribute to the district's knowledge base for social media and its contribution to the educational environment. (p. 1)

In 2013, Johnson produced an article *Technology Skills Every Teacher Needs* based on the ISTE standards and Charlotte Danielson's *A Framework for Teaching*, which stresses the proper use of technology in the classroom. The four categories include:

- 1. Planning and Preparation-Teachers are encouraged to build lesson plans and design activities integrating technology and utilizing digital resources.
- Classroom Environment-Teachers should project an optimistic approach to technology, utilize and require appropriate use of technology, encourage collaboration among students, and monitor online behavior.
- 3. Instruction-Teachers utilize various technological devices and modalities to teach lessons, and allows students to use online resources during class.
- 4. Professional Responsibilities-Teachers utilize technology for online grading, communication, and collaboration with colleagues. (pp. 84-85).

Although Johnson (2013) espouses there may never be a definitive answer to the technology skills questions and exactly what teachers need, he emphasizes that "Good teaching practices should drive technology use instead of technology driving the practice of teaching" (p. 85).

Adding to the list of competencies for teachers, Mike Dappolone authored an article for the Association for Supervision & Curriculum Development (2013) that helps make integration of technology into the classroom even better. These competencies include "building and maintaining a class website, using QR codes, encouraging online research, sharing or creating screencasts, and using blogs to teach writing" (pp. 69-72).

Also in 2014, Nadelson, Bennet, Gwilliam, Howlett, and Oswalt from Boise State University listed several different instructional technologies that teachers may use in the classroom. These technologies include: virtual worlds, podcasts, simulations, subjectspecific software, video conferencing/webinars, gaming, Web 2.0 tools (blogs, wikis), SMARTBoards, tablets, student response devices (clickers), spreadsheets, databases, and word processing, online classes and videos, presentation software, social networking sites and email, smartphones, learning management systems, calculators, Internet research, Television/videos, and laptop computers.

Nine years after the Turner article, an update from a survey of almost one hundred teachers has helped compose another list of skills that teachers should possess (Thompson, 2014). The list, according to Thompson, "dovetails" with the earlier Turner article and is as follows:

- 1. Competently conduct Web searches.
- 2. Be proficiently skilled in the use of popular applications software.
- 3. Show motivation to gain knowledge of new technologies.
- 4. Connect using social media.
- 5. Use of online tools, such as blogs and videos to share, learn, and communicate.
- 6. Fully understanding the potential of mobile devices.

- 7. Communicating with e-mail.
- 8. Utilizing presentation software effectively.
- 9. Successfully using Google.
- 10. Functioning 'in the cloud.' (pp. 1-4)

Furthermore, Poole (2015) suggests teachers should have proficiencies in certain skills. These skills include using productivity tools such as word processing, troubleshooting common issues such as rebooting a network, knowing where to obtain technical assistance, becoming familiar with Web resources in their subject areas, conducting Web searches efficiently, and having an interest in using technology to motivate student learning. Poole (2015) emphasizes teachers who expect to do well in a technology-rich environment must remain vigilant in the search for new ideas and how to incorporate them into the learning process.

Also, the EdTech Team (2015) posted *The 20 Digital Skills Every 21st Century Teacher Should Have* on the Educational Technology and Mobile Learning Website. The skills address several areas of concern including the use and editing of digital resources (e.g., audio, video, tutorials), sharing of resources, using various Web 2.0 tools, creating e-portfolios, identifying ethical behaviors (e.g., copyright), producing and sharing content on the Web and through social networks, using digital assessment tools, evaluating authentic Web sources, using task and time management software, using infographics for visual presentations, and using digital sources to engage students.

According to the 2016 National Education Technology Plan,

When carefully designed and thoughtfully applied, technology can accelerate, amplify, and expand the impact of effective teaching practices.

However, in order to be transformative, educators need to have the knowledge and skills that enable them to take full advantage of technology-rich learning environments. (p. 3)

Although technologies and digital skills have changed over the past twenty years, the 2016 National Education Technology Plan supports the notion that it is essential for teachers to acquire the digital skills necessary to become confident and prepared to teach mobile learners within their classrooms. In order to determine whether such skills are being acquired, conducting research in this field is necessary and the reason for this particular research.

Teachers' Confidence in Technology Competencies

Although technology competencies have evolved as hardware and software have changed over the years, little research has been conducted in relation to teachers' confidence regarding their own competency levels in their use of technologies, and even less research has been conducted relative to the actual measurement of teachers' technology competencies. For the sake of this research, technology competencies include basic hardware knowledge, software applications knowledge, Internet skills, and online communication skills.

Oluwatayo (2012) conducted a study comprised of a self-assessment regarding the level of computer literacy among secondary teachers in Nigeria. Data were collected from 300 teachers from 30 public schools, both rural and urban, within the Ekiti State. The questionnaire consisted of 25 items on a four-point scale related to basic computer literacy skills such as basic hardware operations, file management, word processing, email, Internet usage, and saving and retrieving information. Results showed 27.7 percent of teachers scored their confidence on a very low level, while 38.3 percent scored on a low level for a total of 66 percent. A total of 23.7 percent scored on a high level, while only 10.3 percent scored on the highest level resulting in a discouraging 44 percent of teachers ranking their skills on a high level. While this study reports practicing teachers' confidence levels in using some key computer functions, it is limited in that specific instructional technologies and their operations are not measured individually as the sample is very small and the study does not take place in the United States.

In the same stratum as the previous study, Umar and Yusoff (2014) conducted a study in Malaysia with respect to practicing teachers' level of ICT skills surveying 2,661 teachers in both primary and secondary schools, and urban and rural schools. Teachers were asked to rate their confidence level as low (0.00-1.33 mean range), moderate (1.34-2.66 mean range), or high (2.67-4.00 mean range) in the areas of basic ICT skills, Advanced ICT skills, Internet skills for accessing and sharing information, and Internet use for communication. Within the basic ICT skills section, areas such as word processing, spreadsheets, and slide presentations have been listed; the advanced ICT skills in graphics animation, and multimedia design and production. Internet use for accessing and sharing information refers to the ability with which teachers find appropriate information and disseminate that information to others, while Internet use for communication refers to the ability to use email, chat rooms, social networking, Web cameras, and teleconferencing (Umar & Yusoff, 2014).

With respect to basic ICT skills, teachers rated themselves as having a high skill level with a mean of 3.13 and reported a moderate skill level for the advanced ICT skills with a mean of 2.31. Furthermore, the study revealed teachers rated themselves on a high

skill level for both Internet research and sharing (mean of 3.35) as well as Internet use for communication (mean 3.01) revealing that, in general, Malaysian teachers were confident in technology competencies (Umar & Yusoff, 2014).

The Umar & Yusoff (2014) study was conducive in purporting confidence levels for practicing teachers, yet it did not reveal individual findings for each specific competency. Although this study was conducted on a fairly large scale surveying over 2,500 participants, it surveyed both primary and secondary teachers and did not include technology competency preparedness. The final limitation of this study was that the research was not conducted within the United States, and therefore, may not be reflective of the confidence levels that may be reported by teachers in the United States.

In contrast, Duncan-Howell (2012) reported findings regarding confidence levels from 100 undergraduate pre-service teacher education students enrolled at an Australian university. Among those surveyed, 71 percent reported being a confident user of most technologies, approximately 18 percent were experienced and fearless users, while 10 percent were beginners and nervous about trying new technologies, and only one percent were not able to use or barely able to use technologies.

Current technology behaviors, familiarity and competence with Web 2.0 tools, and recognition of common terms were also surveyed during this study (Duncan-Howell, 2012). A majority (73.3 percent) of the respondents reported using or having used social media and 97 percent participated in chat program. Web-based calling services were used by 66.7 percent of the respondents, but VOIP phones were utilized by only 5.1 percent. Use of email was also included with 81.4 percent reporting they maintained 1-3 personal email accounts followed by 89.7 percent using educational accounts. A total of 89.7 percent reported visiting sites with digital content, such as *YouTube*, but only 10 percent visited the site for the purpose of uploading videos. Wikis were visited by 38.9 percent, yet on 2.1 percent had their own wiki. The majority of those surveyed (77.1 percent) did not have a blog and those who did (22.9 percent) used it regularly and made contributions (Duncan-Howell, 2012).

In reference to digital images, podcasts, and vodcasts, the study had interesting findings. Fifty-one and a half (51.5%) percent of the respondents were confident with basic editing skills, 10.3 percent reported having sophisticated editing skills, and 15.5 percent reported having no editing skills. Podcasts were downloaded by 49.5 percent, but only 8.2 percent had experience with uploading podcasts for the purpose of being used by others. Additionally, 13.4 percent of those surveyed had never heard of a podcast. An overwhelming 81.4 percent of respondents had never heard of a vodcast, 20.6 percent regularly downloaded or watched vodcasts, and 5.2 percent had uploaded vodcasts to the Internet (Duncan-Howell, 2012).

With regard to common terms and acronyms, the study found that the terms scoring the highest (over 30 percent) were "html, pdf, jpeg, Bluetooth, bmp, gif, ppt, hyperlink, wiki, skye, and wi-fi." Those terms least recognizable were "css, rss, swf, tif, pps, ISP and VOIP (Duncan-Howell, 2012, p. 833)." The common terms and acronyms found in this study are foundational in the development of the questionnaire created by this researcher as the terms and acronyms speak to teachers' preparedness for teaching mobile learners.

Although Duncan-Howell's (2012) study is significant in the indication that preservice teachers are consuming information and using digital content, it does not provide evidence that they are creating and generating content, and their level of 'digital comfort' or confidence is not indicative of technology proficiency. The study is also limited due to the low number of participants, the fact that the participants are not yet working in a teaching capacity, and the study was conducted outside the United States.

Another study conducted by Nadelson, et al. (2013) surveyed 52 pre-service teachers at universities in the Rocky Mountain area of the Western United States. As shown in Table 1, pre-service teachers reported high levels of confidence when coming to using online videos, presentation software, social networking, learning management systems, word processing, Internet research, email, and general computer/laptop operations rating all above a 4 on a scale of 1-5.

Table 1

Technology	Mean	Standard Deviation
Online videos	4.24	1.05
Presentation software	4.25	0.96
Social networking	4.33	1.03
Learning management system	4.41	0.84
Word processing	4.51	0.87
Internet research	4.57	0.61
Email	4.84	0.43
Computer/laptop basics	4.86	0.41

Teachers' Confidence Levels for Using Instructional Technology

Confidence levels were measured as moderate for podcasts, video conferencing, Web 2.0 tools like blogs and wikis, student response systems, spreadsheets, databases, and online classes with those items rating between a 2 and 3.99 on the same 1-5 scale (see Table 2). Table 2 *Teachers' Confidence Levels for Using Instructional Technology*

Technology	Mean	Standard Deviation
Podcasts	2.17	1.29
Video conferencing	2.77	1.31
Web 2.0 (blogs, wikis)	2.98	1.25
Student response systems	3.43	1.37
Spreadsheets	3.45	1.26
Databases	3.51	1.29
Online classes	3.69	1.25

Like Duncan-Howell's (2012) study, Nadelson et al. (2013) surveyed pre-service teachers and confidence levels with regard to specific instructional technologies. However, unlike Duncan-Howell, Nadelson et al. study did not produce an overall, general picture of how confident pre-service teachers were with the use of technology. The Nadelson et al. study sampled a very small number of participants who were not yet practicing teachers and did not measure technology competencies. The study was conducted within the United States, and thus, more relevant to this current study.

While the previous literature denotes some technological areas in which preservice and practicing teachers report moderate to high levels of confidence in technology competence, there are areas in which improvements can and should be made. Also important to note is that no previous research based on teachers' confidence in technology competencies had been conducted in the Southern region of the United States where mobile devices and mobile learning have begun to take hold, nor has the previous research reported any measurement of preparedness of teachers for teaching mobile learners via testing for technology competency acquisition and/or knowledge. This research study seeks to build upon the existing set of research by identifying teachers' confidence and preparedness for teaching mobile learners.

Summary

Chapter two presented the literature review for this research study and included a theoretical overview, a historical perspective of technology and competencies for teachers, and presented the results of studies conducted relative to teachers' confidence in using technology in the classroom. The theoretical overview contained a brief explanation of the connection between learning theory and education, the psychology of learning, and the underpinning of intellectual development. The historical perspective section captured the history of technology and mobile device usage in the classroom as well as teachers' confidence in using the technology and mobile devices. Finally, chapter two revealed the foundational competencies needed for teachers to be successful in teaching mobile learners.

This study investigated some of the gaps in literature that currently exist in an attempt to provide the field of mobile learning with an understanding of how teachers perceive their level of confidence for teaching mobile learners as well as provided a measurement of teachers' actual technology competencies. The study also attempted to identify any differences that exist between teachers' confidence and preparedness for

teaching mobile learners. Furthermore, the study investigated whether there is a difference between teachers in schools employing mobile device and schools not employing mobile devices and their confidence and preparedness in teaching mobile learners, which is consequential in terms of investigating the readiness of secondary teachers to incorporate mobile learning in their classrooms.

CHAPTER III - METHODOLOGY

Chapter three affords a general idea of the methodological approach to the research questions in order to gain an understanding of teachers' confidence and preparedness in teaching mobile learners. Chapter three addresses the participants and how they were selected for this study. An overview of the research design, instrumentation, data collection procedures, and the data analysis process are also covered.

Rapid changes and development of modern technologies over recent decades have made computer training imperative for teachers to have solid technology competencies in order to be prepared to teach mobile learners. Teachers are expected to make functional use of mobile devices, especially in school districts where mobile learning initiatives have taken place. Many teachers however, still feel ill-prepared and measuring those technology competencies continues to be an issue among researchers (Tondeur, Aesaert, Pynoo, Braak, Fraeyman, & Erstad, 2016). Thus, this study examined teachers' confidence and preparedness to teach students using mobile learning technologies.

There are five research questions for this study. The questions investigate teachers' levels of confidence and how well the teachers are prepared to teach and use mobile technologies in the classroom. The research questions also examine differences between schools that employ mobile devices on a 1:1 basis and those that do not. The research questions include:

Research Question 1: Are teachers confident in their ability to teach mobile learners relative to computer hardware and software application knowledge, Internet skills, and online communications competence? Research Question 2: Are teachers prepared to teach mobile learners relative to computer hardware and software applications knowledge, Internet skills, and online communications competence?

Research Question 3: Is there a relationship between teachers' confidence and teachers' preparedness?

Research Question 4: Is there a difference between teachers' confidence in teaching mobile learners in schools employing mobile devices on a 1:1 basis and schools not employing mobile devices on a 1:1 basis?

Research Question 5: Is there a difference between teachers' preparedness to teach mobile learners in schools employing mobile devices on a 1:1 basis and schools not employing mobile devices on a 1:1 basis?

Additionally, this research examined teachers' confidence in and measurement of technology competencies. Currently, the confidence level of teachers teaching mobile learners and technology competencies relative to classroom instruction has not been studied in this manner and setting. The process, analysis, and results of this study adds to the research of teacher confidence levels of teaching mobile learners, preparedness of teachers' in terms of the measurement of specific technology competencies, and provides avenues for continued research.

Methodology

The general methodology of this research study involved gathering quantitative data through a sampling of secondary teachers located in the southern part of the United States, specifically Mississippi. The researcher-developed questionnaire (see Appendix A) was distributed during the fall of 2017 and data were collected over a period of approximately one month through Qualtrics. Data were statistically analyzed using SPSS software and subsequently reported within this paper.

Pilot Study

A pilot study was conducted to ascertain the reliability of the *Teachers' Confidence and Preparedness Questionnaire* (see Appendix A). The pilot study was conducted with a group of 46 participants and was made available by the researcher for a total of eleven days. Using the software Qualtrics, a questionnaire was created and sent via email link along with a letter (see Appendix B) to the superintendents of school districts in Alabama and Arkansas containing secondary schools. All the participants were teachers in the Southern region of the United States and have similar demographics to the Southern state (Mississippi) in which the final study was conducted. The participants in the pilot study were secondary education teachers, who had varied experience in the number of years taught, age level, subject areas taught, accessibility to mobile learning, and professional development related to computer literacy.

The results of the pilot study were entered into the SPSS software program. A Cronbach's alpha, a measure of reliability, was calculated for the scale and three subscales for items measured on the 5-point Likert scale. Pertaining to Teachers' Confidence Levels with an overall alpha of .924. The first subscale, Hardware and Software, produced an alpha of .862. The second subscale, Internet Skills, had an alpha of .805, and the third subscale, Online Communications, produced an alpha of .712. All the alphas for the 5-point Likert scale were above .7, which according to Field (2013) is an acceptable alpha for statistical research. An overall alpha was run for the multiplechoice questions contained in the questionnaire. This scale score appeared to be problematic, but data were reviewed and further examined during the final research study.

Participants

Following approval from the Institutional Review Board (see Appendix C) and school district superintendents, the researcher disseminated the research study questionnaire, *Teachers' Confidence and Preparedness Questionnaire* (see Appendix A) and a letter (see Appendix B) sent via email to all public school district superintendents in the Southern area of the United States, specifically Mississippi, via the Qualtrics Webbased platform. Just as in the pilot study, these participants were selected due to a gap in the research that conducted in this area of the United States relative to teachers' confidence and preparedness for teaching mobile learners. The participants were selected as part of a random sampling method whereby questionnaires were sent to 133 superintendents of secondary institutions in the State of Mississippi. The email addresses for school district superintendents were available online through the Mississippi State Department of Education (see Appendix D and E) and were utilized to send the letter of invitation (see Appendix B) and obtain permission to conduct the study in each school district.

The target sample for this quantitative comparative study included a sample size of 144 public secondary school teachers from the 12 school districts in which the superintendents approved and forwarded the questionnaire. The participants taught varying subjects and ranged in age, years of teaching experience, and subject area. The teachers may or may not have taught in a school employing mobile technology, and the teachers may or may not have had professional development training relative to computer

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literacy. The sample was completely voluntary, and emails and links to the questionnaire were sent electronically to the teachers allowing for maximum participation and representation without fear of repercussion. Participant information remained confidential throughout the study.

Research Design

The method for this study used a quantitative comparative approach with a survey design (Creswell, 2014). This design enabled the researcher to gather information based on "trends, attitudes, or opinions of a population by studying a sample of that population" (p. 155). This research study attempted to identify confidence levels of teachers in teaching mobile learners by administering a questionnaire called *Teacher Confidence and Preparedness Questionnaire* (see Appendix A) consisting of three parts. Demographics was included in Part I and Part II as a measuring instrument that included a 5-point Likert scale for assessing teachers' confidence partially based on the Technology Pedagogical Content Knowledge (TPACK) framework, the Technology Acceptance Model (TAM), and the Technology Proficiency Self-Assessment (TPSA).

Teachers' preparedness was measured utilizing questions developed by the researcher in Part III of the questionnaire called *Teacher Confidence and Preparedness Questionnaire* (see Appendix A) with content based on the Computer Skills Placement Test or CSP (See Appendix G), Technology Applications Inventory or TAI (see Appendix F), and computer training modules from GCFLearnFree.org (see Appendix H). While participant confidence was measured using the 5-point Likert scale, teacher preparedness was measured using multiple-choice and true/false questions to ascertain teachers' information and communications technology (ICT) knowledge, such as hardware and software applications, communication applications, and usage of the Internet (see Appendix A). The questionnaire includes three parts: (1) Demographics, (2) Confidence, and (3) Preparedness. The questionnaire was longitudinal whereas data were collected over a period time via Internet and email.

Demographics Instrumentation. Part one, consisting of questions 1 through 13, or the demographics section of the Teacher Confidence and Preparedness Questionnaire (see Appendix A), gathers informational data regarding the participants such as verification of adulthood, age group, years of teaching experience, and subject area. Part one also gathered school name and district, mobile device availability, whether or not computer literacy training was made available, and whether or not the participant has been involved in professional development relative to computer literacy. Demographic data was collected to validate the participants involved are a representative sample of the target population and is used for overview purposes (Salkind, 2012). In the case of this research study, demographic information revealed the participants were secondary public school teachers that varied in age, length of service as a teacher in the State of Mississippi, subject area taught, and the school district and school in which they teach. The demographic data also provided information regarding the status of mobile technology devices within the school/school district and was pertinent to answering the research questions.

Teachers' Confidence Instrumentation. Part two, the section of the *Teacher Confidence and Preparedness Questionnaire* (see Appendix A) regarding confidence, asked questions pertaining to the participant's level of confidence in utilizing mobile devices in education and for educational purposes, as well as the participant's confidence in their ability to perform specific computer tasks relative to information and communications technology. These questions were asked in an attempt to determine the level of confidence teachers possess relative to the most current technologies and skills, such as utilizing the Internet for educational purposes, recognizing phishing and spam in online communications, using SMS, Web2.0 tools and social media, and confidence in using software applications.

A Likert scale ranging from 1-5 is used for assessing teachers' confidence for this study is the *Teacher Confidence and Preparedness Questionnaire* (see Appendix A) and is partially based on the Technology Pedagogical Content Knowledge (TPACK) framework, the Technology Acceptance Model (TAM), and the Technology Proficiency Self-Assessment (TPSA). Adaptations were made to the TPACK, TAM and TPSA to reflect more current technologies and terminology, such as asking participants to recognize the difference in spam and phishing, identifying the meaning of a URL, and recognizing the significance of Boolean search parameters. The measurement scale provides participants with the options to answer Strongly Agree (1), Agree (2), Undecided (3), Disagree (4), and Strongly Disagree (5).

While the Technology Pedagogical Content Knowledge (TPACK) framework was developed back in the 1990s, it has been used as recently as 2016 by Heitink, Voogt, Verplanken, Braak, and Fisser for the reason that the instrument "assumed teachers' technological knowledge should be an integrated part of pedagogical content knowledge" (p. 71). In other words, teachers' knowledge of technology skills heightens their confidence and assists in the ability to use technology to enhance the instructional process. Heitink, et al. (2016) further deduced that technology void of a "fit" within the pedagogical framework of the subject matter being taught may produce a harmful outcome on student learning.

Originally, the Technology Acceptance Model (TAM) was developed to ascertain the adoption levels of technology in the workplace, the perceived usefulness, and the ease of use relative to those utilizing computer technologies. The tool was created in 1989 by Fred Davis and expanded by MacCallum, Jeffrey, and Kinshuk in 2014 to include the following three new variables: "digital literacy, ICT anxiety, and ICT teaching selfefficacy" (pg. 1). The expanded measuring instrument was directed more toward individual teachers' belief and attitudes toward technology acceptance, and the use of these technologies in the classroom (MacCallum, et al., 2014).

The Technology Proficiency Self-Assessment (TPSA) was originally developed in 1999 by Ropp to determine the level of confidence of teachers when utilizing technology in the classroom, and the assessment contained 20 items. The assessment tool was modified in 2000 by Christensen and Knezek, along with Ropp, to include newer technologies such as email, the Internet, software applications, mobile learning, social media, and the integration of technology for educational reasons. The modified assessment tool also contained 14 additional items (Christensen & Knezek, 2014). Following administration of the instrument to 72 pre-service and in-service teachers, along with some revisions to the verbiage of the assessment, it was the conclusion of the authors that the new version (Version 2.0) of the tool was consistently functional and reliable (Christensen & Knezek, 2014).

Teachers' Preparedness Instrumentation: Teachers' preparedness was measured using the same questionnaire developed by the researcher named *Teacher Confidence*

and Preparedness Questionnaire (see Appendix A) with content based on the Computer Skills Placement Test (see Appendix G), Technology Applications Inventory (see Appendix F), and Basic Computer Skills Certificate modules from GCFLearnFree.org (see Appendix H).

The Computer Skills Placement test (CSP) was developed by Northstar Digital Literacy Project to assess computer literacy skills through self-paced, online modules. The instrument consists of 9 modules and covers the following six areas: (1) Basic computer concepts, (2) Internet Skills, (3) Windows, (4) Email, (5) Word Processing, (6) Social Media, (7) Microsoft Excel, (8) Microsoft PowerPoint, and (9) Information Literacy. "The standards informing the Assessments were developed through a collaborative, community-based process in the Twin Cities, Minnesota, while the process was suggested by the St. Paul Public Library, and hosted by the St. Paul Community Literacy Consortium" as stated in the FAQs general information "Who developed the assessments?" found at https:///www.digitalliteracyassessment.org/faq (2017, p. 1). All ten sections of the Northstar Digital Literacy Project were influential in the development of the *Teacher Confidence and Preparedness Questionnaire* (see Appendix A).

The Technology Applications Inventory (TAI) was created and developed by Patsy Lanclos in the State of Texas in 1995 and 1996 (see Appendix B). The standards for the instrument were updated in 2011 to better align with newer software and hardware versions, but the basis for the assessment remained the same. The instrument asked Yes/No questions relative to the technology experiences of the users and included the following sections: (1) Computer foundations, (2) Information acquisition, (3) Solving problems with technology tools, and (4) Communications. For this research study, questions found in the *Teacher Confidence and Preparedness Questionnaire* (see Appendix A) are comparable to all four sections in the TAI.

GCFLearnFree.org is a program developed by the Goodwill Community Foundation and Goodwill Industries of North Carolina, designed specifically for anyone wanting to extend their education in any of their 180 topics based on 21st Century Skills. For the purpose of this study, questions for the *Teacher Confidence and Preparedness Questionnaire* came from various modules including the following: (1) Computers, (2) Email, (3) Internet, (4) Digital skills, (5) Social media, (6) Using the cloud, and (7) Microsoft Office (2016).

Part three, the preparedness section of the questionnaire, asks 24 multiple-choice and true/false questions specifically targeted to measure basic computer hardware and software literacy, online competency, and communications skills.

Data Collection Procedures

Data were collected by the researcher via an online, Web-based questionnaire developed using Qualtrics provided through The University of Southern Mississippi, to all school districts within the State of Mississippi containing secondary institutions. Altogether, 133 districts containing 240 secondary schools were included in the email to district superintendents. This information was acquired online through the Mississippi Department of Education found at http://mdek12.org (see Appendix E). A request letter (see Appendix B) for all secondary teachers to complete the online questionnaire was sent to the district superintendent, who would then forward the questionnaire to all secondary teachers upon approval. The online questionnaire remained available for a period of approximately five weeks following the initial contact with the district superintendent, and teachers were given approximately one month to complete the questionnaire with a reminder email sent after two weeks. Participation was completely voluntary, and no repercussions were suffered if a teacher did not respond. According to Rea and Parker (2012), Web-based questionnaires provide a quick and efficient method for data collection. Web-based surveys are designed to load quickly in a Web browser and can be easily navigated to reduce the time required to complete the survey as well as increase return rates. Sue and Ritter (2012) describe the benefits of using Web-based survey hosts to include ease of use, expansion of distribution options, professional formatting ability, and accurate accounting of respondent lists. The commercial software Qualtrics was used to store the surveys and deliver the surveys to the participants. Many major universities and colleges us Qualtrics to conduct research. The company has an established privacy policy ensuring that all databases are protected by passwords and network firewalls, and the company guarantees a commitment to privacy and confidentiality.

As a commitment to privacy and confidentiality on the part of the researcher, the data collected from the respondents to the questionnaire collected electronically via Qualtrics will be retained electronically via computer for a period of five years at which time all files related to the study will be deleted. SPSS was used to analyze the collected data, which is also by electronic means. Moreover, other than the name of the school and school district, no identifying information was collected from the participants. No information will remain on file for any school districts or secondary teachers not responding to the questionnaire.

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Data Analysis

Descriptive statistics were calculated for age groups, length of service, subject area, name of school district and school, whether or not the school has a Website, Internet access, mobile technology accessibility, whether or not participants have had computer literacy training, and whether or not participants have had professional development opportunities relative to computer literacy. Frequencies, means and standard deviations were calculated for the questions measured on the Likert Scale as well as the multiplechoice and true/false questions.

Quantitative statistical analysis through bivariate correlational was utilized to identify any relationships between teachers' confidence and teachers' preparedness. According to Field (2013), a correlational study is one where research is observed in terms of natural occurrences without the manipulation of variables. In this case, data were collected over a specific period of time and without manipulation (Field, 2013). The bivariate correlation, which is a correlation between two variables, measured the extent of the differences in teachers' confidence and teachers' preparedness between teachers in schools employing mobile devices on a 1:1 basis and schools not employing mobile devices on a 1:1 basis. Pearson's correlation coefficient was conducted for bivariate correlation analysis (Field, 2013).

Logistic regression analysis was conducted to determine if there was a difference between teachers' confidence in teaching mobile learners in school employing mobile devices on a 1:1 student basis and schools not employing mobile devices on a 1:1 student basis. Logistic regression analysis was also used to determine if there was a difference between teachers' preparedness to teach mobile learners in schools employing mobile devices on a 1:1 student basis and schools not employing mobile devices on a 1:1 student basis. Logistic regression is an appropriate analysis to conduct when the dependent variable, in this case the employment of mobile devices in schools on a 1:1 student basis, is dichotomous or binary. According to Field (2013) logistic regression can be used to explain the relationship between a dependent dichotomous variable and one or more nominal, ordinal, or interval independent variables, which in this case refers to hardware and software applications knowledge, Internet skills, and online communications skills.

Summary

To summarize, chapter three of this study provided insight into the methodology used to explore five research questions relative to teachers' confidence and preparedness in teaching mobile learners. Additionally, chapter three described the pilot study conducted prior to the dissemination of the final research study, described the participants in the pilot study, and how the participants were selected for the study. Furthermore, the research design and instrumentation, data collection procedures, and the data analysis process were also a part of chapter three.

In the following chapter, the researcher presents findings from data gathered in the final questionnaire, statistical procedures used, and a factor analysis of the scales and subscales containing frequencies and percentages. Further, data analysis includes the alphas and correlations, and a summary of the findings and results.

CHAPTER IV – RESEARCH RESULTS

This chapter will provide information regarding the results from the research study including demographic information relative to the number and names of school districts, and the number of teachers participating in the study, age groups of participants, length of teaching service, and subjects taught by the participants. Demographics also includes information about school websites, Internet access, whether students are supplied mobile devices on a 1:1 basis, and computer literacy training and professional development. Finally, this chapter will reveal the levels of confidence and preparedness of public school secondary teachers for teaching mobile learners.

Demographics: Secondary Teachers

The *Teachers' Confidence and Preparedness for Teaching Mobile Learners* questionnaire (see Appendix A) was sent to a total of 133 school district superintendents. Superintendents from 12 of those districts agreed to forward the questionnaire via email to all secondary teachers employed by those districts. A total of 144 public school secondary teachers from 12 different school districts responded to the questionnaire resulting in approximately a 9% response rate. The 12 school districts were located in several regions throughout the State of Mississippi including the northeast, the Mississippi Delta (the northwest region), central Mississippi, and the Mississippi Gulf Coast. Northeast Mississippi was represented by Lee and Monroe counties along with Mississippi School for Math and Science. The Mississippi Delta included participants from Lee County. Laurel School District, Pear Public School District, Pearl River Central, Perry county, and Vicksburg represented Central Mississippi, and the Gulf Coast included participants from Moss Point, Ocean Springs and Pass Christian. As represented in Table 3 below, respondents in the study ranged in age from 25 to over 60 with 18.8% being within the age range of 20-29; 29.9% were ages 30-39; 25% were ages 40-49; 21.5% were ages 50-59; and 4.9% were age 60 or above. Of the total number of participants, 24.3% had 0-5 years teaching experience, 23.6% had 6-10 years teaching experience, 21.5% had 11-15 years teaching experience, 13.9% had 16-20 years teaching experience, and 16.7% had over 20 years teaching experience.

 Table 3 Demographics: Age Range

Age Range	Percentage
Language Arts (English and Foreign Languages)	23.1
Mathematics	17.5
Social Studies/Arts/Humanities (Includes Social Studies, Psychology, Sociology, Art, Band, Drama, Choir, and Dance	16.8
Science	11.2
Business/Computer/STEM	11.2

As part of the demographic information, participants reported teaching a variety of subjects in the schools in the following categories: Language Arts (23.1%), which included English and Foreign languages; Mathematics (17.5%); Social studies (16.8%), which included social studies psychology, sociology, art, band, drama, choir and dance; Science (11.2%); Business/Computer/Stem (11.2%); and Health/Nutrition/Physical Education (3.5%). Table 4 below represents the number of participants from each subject area within the schools and the percentage of the total each subject represented. Table 4 *Demographics: Subject Area*

Subject Area	Percentage
Language Arts (English and Foreign Languages)	23.1
Mathematics	17.5
Social Studies/Arts/Humanities (Includes Social Studies, Psychology, Sociology, Art, Band, Drama, Choir, and Dance	16.8
Science	11.2
Business/Computer/STEM	11.2
Health/Nutrition/Physical Education	3.5
Special Education	16.8

Of the 144 responses, 140 of the participants or 98.6% reported their school as having a website and 100% reported having access to the Internet. Although 100% of participants reported having access to the Internet, just 26.8% reported students having mobile devices on a 1:1 basis. The term 1:1 means there is one device for every student supplied by the school or school district. Additionally, of the 144 participants, 69.5% reported being offered computer literacy training through the school or school district, and 75.7% had computer literacy training as part of a professional development program.

Analysis of Teacher Questionnaire Data

Following demographic information, participants were asked to respond using a Likert scale to 24 statements categorized as hardware and software, Internet, and communications, and representative of their confidence levels in those three areas regarding teaching mobile learning/learners in the classroom. The Likert Scale used a 1 for Strongly Agree, a 2 for Agree, a 3 for Undecided, a 4 for Disagree, and a 5 for Strongly Disagree. During this analysis, a test of normality was completed in SPSS using descriptives and the variables relative to teachers' confidence. Producing a Stem-and-Leaf diagram, no outliers were identified that would have significantly impacted the study.

A Cronbach's Alpha reliability test was completed for the three confidence categories resulting in the following: Hardware and software was determined to have a value of .899 or a 90% reliability factor; Internet confidence reported a value of .771 meaning a 77% reliability factor; and communications revealed a value of .561 suggesting a 56% reliability factor. According to Field (2013), reliability factors above 70% are very reliable, while items with factors between 50% and 70% are worth reporting, but caution should be used referencing the reliability. The table below lists the means and standard deviations for each statement relative to the teachers' confidence level in the hardware and software category with 144 participants responding.

Table 5 Teachers'	Confidence I	Levels in Hara	ware and Software
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Confidence Statement	% Strongly Agree/Agree
I am confident allowing students to use mobile devices in the classroom.	73.7
I am confident when connecting wirelessly to the school network.	92.4
I am confident when connecting a laptop to a networked printer.	88.9
I am confident setting up a course using a learning management system.	50.0
I am confident when using a word processing software application.	95.8

I am confident when saving a word processing document with a new name.	99.3
I am confident in recognizing extensions and nomenclature of electronic files.	71.5
I am confident in making comments on documents in word processing software.	80.6
I am confident I can print a specific selection of text or a document.	96.5
I am confident in using presentation software applications.	91.0
I am confident using spreadsheet software applications.	75.0
I am confident creating a chart with a spreadsheet software application.	71.5
I am confident in creating If/Then statements in a spreadsheet.	47.9

Table 5 represents the analysis of the frequencies in the hardware and software category ranging from 47.9 percent to 99.3 percent of participants responding with strongly agree or agree. The results suggest teachers are confident in their ability to teach mobile learners relative to computer hardware and software skills with two notably lower percentages for confidence in using a learning management system and creating If/Then statement in a spreadsheet.

Table 6 represents the frequencies for teachers' confidence levels in the Internet category. An analysis of the frequencies in the Internet category range from 56.9 percent to 100 percent of participants responding with agree or strongly agree suggesting teachers are confident in their ability to teach mobile learners relative to Internet skills. The lowest

percentages were recorded for confidence in Web2.0 tools, open source document files,

and using the Cloud.

Table 6 Teachers' Confidence Levels in Internet Skills

Confidence Statement	% Strongly Agree/Agree
I am confident with the navigation of websites for research purposes.	95.1
I am confident using Web2.0 tools for educational purposes.	56.9
I am confident using web browsers and search engines.	100.0
I am confident with open source document files.	63.9
I am confident with saving pictures to use on the Web.	87.5
I am confident using the Cloud	60.4

Table 7 provides the frequencies for teachers' confidence levels relative to the items in the communications category. An analysis of the frequencies in the communications category range from 43.8 percent to 99.3 percent of participants responding with strongly agree or agree suggesting teachers are confident in their ability to teach mobile learners relative to communications skills. The lowest confidence score recorded was for the statement about using social media as an education tool.

Table 7 Teachers'	Confidence	Levels in	Communications
rubic / reachers	Conjuctice.		communications

Confidence Statement	% Strongly	
	Agree/Agree	
I am confident using SMS.	65.0	
I am confident when using social media as an educational tool.	43.8	

I am confident using email to send and receive correspondence.	99.3
I am confident using CC and BCC when sending an email.	95.1
I am confident in recognizing phishing and spam in email.	84.0

As the data suggests for *Research Question 1: Are teachers confident in their ability to teach mobile learners relative to computer hardware and software application knowledge, Internet skills, and online communications competence*, the evidence in this case supports that teachers are confident in their ability to teach mobile learners relative to computer hardware and software application knowledge, Internet skills, and online communications.

Following the confidence statements were 24 multiple-choice and true/false questions in the same three categories as the confidence levels (hardware and software, Internet, and communications) measuring the teachers' preparedness levels for teaching mobile learners. The 24 questions were developed in an effort to answer Research *Question 2: Are teachers prepared in their ability to teach mobile learners relative to computer hardware and software application knowledge, Internet skills, and online communications competence*? A Cronbach's Alpha reliability test was completed for these three categories as well and resulted in a value of .33 for the hardware and software category (a 33% reliability factor), a value of .21 or a 21% reliability factor for the Internet category, and a value of .53 in the communications category (almost a 53% reliability factor). The communication category is worth reporting, but has a low reliability factor and caution should be used when referencing the reliability. Because the

hardware and software category and the Internet category resulted in extremely low reliability factors these two categories will not be used in subsequent analysis.

Correlational analysis was performed to answer Research Question 3 relevant only to the communications category: *Is there a relationship between teachers' confidence and teachers' preparedness*? Pearson's Correlation (Pearson's r) is used to determine if two variables are related to one another. In this case it would determine if teachers' confidence is related to teachers' preparedness in the communications category. Using Pearson's r, if the result is close to 1, there is a strong relationship between the variable. The closer the number is to zero, the weaker the relationship (Field, 2013). This study revealed a Pearson's r result of -.319 negative correlation between teachers' confidence and teachers' preparedness in communications meaning as one variable goes up, the other will go down. The data suggests there is a moderately negative correlation between teachers' confidence and teachers' preparedness relative to the communications category.

Logistic regression is used for predicting the likelihood of an event occurring based on this association. In this study, the binary variable for Research Questions 4 and 5 was represented by the employment of mobile devices in schools on a 1:1 basis (each student has and uses a mobile device). The independent variables were represented by the confidence and preparedness questions in the *Teachers' Confidence and Preparedness Questionnaire* located in Appendix A. Logistic regression analysis was conducted to answer *Research Question 4: Is there a difference between teachers' confidence in teaching mobile learners in schools employing mobile devices on a 1:1 basis and schools not employing mobile devices on a 1:1 basis*, and for *Research Question 5: Is there a* difference between teachers' preparedness in teaching mobile learners in schools employing mobile devices on a 1:1 basis and schools not employing mobile devices on a 1:1 basis? Both questions contain independent variables comprised of the three categories mentioned earlier in the study of hardware and software knowledge, Internet skills, and communications skills.

Analysis of the data using employment of mobile devices on a 1:1 basis (yes or no) as the dependent variable and teacher confidence as the independent variable. Schools not employing mobile devices on a 1:1 basis showed no significant difference in teachers' confidence. In other words, teachers in schools employing mobile devices on a 1:1 basis do not necessarily feel more confident teaching mobile learners than those teachers who do not have mobile devices provided on a 1:1 basis.

Data analysis for teacher confidence in the Internet category and the data analysis for teacher confidence levels in the category of communication skills showed no significant difference in schools employing mobile devices on a 1:1 basis and those schools not employing the mobile devices on a 1:1 basis.

Data analysis regarding teacher preparedness also utilized the logistic regression method for only one of the three original categories. The sub scale analyzed was the communication category. As stated earlier, the extremely low reliability factor for the hardware and software and Internet categories prevented further analysis. In order to confirm a goodness of fit for the model used, a Hosmer Lemeshow test was performed in SPSS. The result was .87 which is greater than .05 suggesting that the model is not a good fit. The odds ratio of 1.36 indicates that for schools implementing mobile devices
on a 1:1 basis, teacher preparedness in communication skills will likely increase 1.3 times.

Although the logistic regression analysis of the data was not statistically significant, this researcher regards the results of the multiple-choice and true/false questions important enough to report. Therefore, frequencies were performed using SPSS to obtain the percentage of teachers answering these questions correctly or incorrectly. The following table (see Table 8) reveals those results.

 Table 8 Teachers' Preparedness Levels in Hardware and Software

Question	% Answered Correctly
Laptops, tablets and Smart phones are considered the leading mobile devices for education	95.8
To what does the acronym LAN refer?	80.6
In order to change or turn on/off Wi-Fi, I must go to:	29.9
An IP Address refers to a(n) that identifies a devices location	43.8
Canvas, Blackboard, Moodle, and Sakai are examples of	53.5
Which of the following file extensions represents a compressed file?	92.4
When saving a document with a new name, choose:	96.5
When making or receiving comments on documents in word processing software applications it is called:	81.7
To print a selection of text:	55.9
When keying an email address in a document, an underline may appear and the text may become a different color. This means the text is now:	87.4

What type of chart is best when trying to visually represent the contribution of each item as part of the total?	82.4
Which of the following If/Then statements would produce an answer equal to 200?	41.3

While teachers scored well on many of the questions in the hardware and software categories, there were several low scores, such as how to change or turn on/off Wi-Fi. Approximately only 30% of the teachers recognize the process for completing this task on a computer platform. Low scores were also recorded for recognizing the definition of an IP Address, recognizing learning management systems, printing a selection of text, and performing an If/Then statement in a spreadsheet. Approximately 44% answered the IP Address question correctly, 53.5% were able to correctly recognize learning management systems, 55.9% know how to print a selection of text, and 41.3% were able to perform an If/Then statement. It is important to point out that none of the questions were answered 100% correctly by the participants. The highest scores of 96.5% and 95.8% were recorded for a question about how to save a document with a new name, and laptops, tablets and Smart phones are the most popular mobile devices used for education.

The following table (see Table 9) reveals the results of the Internet category of the questionnaire. The scores in the Internet category do not reveal any percentages correct above 70%. The highest percentage scored was in recognizing the process of saving to the cloud, identifying web browsers, understanding the function of a Boolean search, and defining URL, yet the scores were all under 70% correct. Extremely low scores were

revealed for skills regarding Web2.0 tools, open source document sharing, and picture

formats for the Web.

Table 9 Teachers' Preparedness Levels in Internet Skills

Question	% Answered Correctly
Slideshare, Prezi, Google Docs, Animoto and Edmodo are examples of	11.8
A link that allows a user to access an open source document is a	11.2
Internet Explorer, Safari, Chrome, and Firefox are examples of	59.7
A Boolean search is one that expands search results.	48.6
URL stands for:	46.2
The best format to use for pictures to be use on the Web is	9.7
Saving to the Cloud requires an off-site server maintained by a third party.	69.7

Table 10 reveals the percentages scored based on skills in the communications category. The highest percentage correct in the communications category is 75.7% suggesting that teachers recognize social media. Other scores reveal 68.1% of teachers can identify spam and 54.9% of teachers can identify phishing in email. Only 61.8% of teachers know what BCC means when sending email, and 50.7% can define the acronym SMS.

Table 10 Teachers' Preparedness Levels in Communications Skills

Question	% Answered Correctly
SMS stands for:	50.7

Online communities offering individuals communication opportunities that are fast, frequent, and popular are referred to as	75.7
When using email, BCC means sending a	61.8
Phishing is electronic junk mail.	54.9
Spam is a type of fraud where a hacker tries to gain access to personal information.	68.1

Summary

Chapter four provided information regarding the results from the research study including demographic information relative to the number and names of school districts, and the number of teachers participating in the study, ages of participants, length of teaching service, and subjects taught by the participants. Additionally, this chapter provided information concerning the levels of confidence and preparedness of public school secondary teachers for teaching mobile learners, which resulted in a moderately high level of confidence for teachers in Mississippi. Furthermore, this chapter revealed the following:

1. A minor negative correlation between teachers' confidence and preparedness for teaching mobile learners;

2. There was no significant difference in confidence and preparedness levels of teachers in schools employing mobile devices on a 1:1 basis and those teachers in schools not employing mobile devices on a 1:1 basis; and

3. The percentages of questions answered correctly was under 70% for over half of all questions asked in the questionnaire.

The following chapter (Chapter five) will provide an overall summary of the findings and offer conclusions based from them. Implications of the findings in education, particularly to secondary school teachers in regards to knowledge and sureness in using mobile devices, will be discussed. Recommendations will be offered to help schools better prepare their teachers in this area. The chapter will conclude with ideas for further research to build upon this study.

CHAPTER V – DISCUSSION

The purpose of this chapter was to summarize and discuss the findings from chapter four, address the benefits of the study, acknowledge the limitations of the research, and provide possible recommendations for future practice and research. The discussions in this chapter were organized based on the five research questions included in this study.

- The first question investigated the confidence of teachers in their own ICT competencies in the areas of hardware and software applications knowledge, Internet skills, and communications skills relative to computer technology.
- The second question examined the preparedness levels of teachers regarding the above three categories.
- The third question investigated the relationship between the confidence levels and preparedness levels of those same teachers.
- The fourth question explored the possibility of a correlation between the employment of mobile devices on a 1:1 student basis and teacher confidence.
- The fifth question explored the possibility of a correlation between the employment of mobile devices on a 1:1 student basis and teacher preparedness.

This study produced detailed findings for these research questions using a quantitative method to extract data that could help answer the research questions. This chapter provides a general overview of teachers' confidence and preparedness relative to mobile devices in secondary education in Mississippi.

Summary of the Findings

Overall, this study was developed to collect, analyze, and report data collected to ascertain teachers' confidence and preparedness for teaching mobile learners in secondary schools in the State of Mississippi. To conduct this study, the researcher sent a questionnaire (see Appendix A) and a letter (see Appendix B) via email to 133 school district superintendents in Mississippi asking them to accept the invitation for teachers to participate. Superintendents from 12 of those districts agreed to forward the questionnaire via email to all secondary teachers employed by those districts. A total of 144 public school secondary teachers from 12 different school districts responded to the questionnaire resulting in approximately a 9% response rate. The 12 school districts were in several regions throughout the State of Mississippi including the northeast, the Mississippi Delta (the northwest region), central Mississippi, and the Mississippi Gulf Coast. Northeast Mississippi was represented by Lee County Schools and Monroe County School District along with Mississippi School for Math and Science. The Mississippi Delta included participants from Lee County Schools. Laurel School District, Pearl Public School District, Pearl River County Public Schools, Perry County Schools, and Vicksburg-Warren School District represented Central Mississippi. Finally, the Gulf Coast included participants from Moss Point School District, Ocean Springs School District and Pass Christian School District (Gonzales, 2018).

The participants taking part in this study ranged in age from 25 to over 60 with 18.8% being within the age range of 20-29; 29.9% were ages 30-39; 25% were ages 40-49; 21.5% were ages 50-59; and 4.9% were age 60 or above. Of the total number of participants, 24.3% had 0-5 years teaching experience, 23.6% had 6-10 years teaching

experience, 21.5% had 11-15 years teaching experience, 13.9% had 16-20 years teaching experience, and 16.7% had over 20 years teaching experience (Gonzales, 2018)

The demographic information revealed that participants were teaching many different subjects in the schools in the following categories: Language Arts (23.1%), which included English and Foreign languages; Mathematics (17.5%); Social studies (16.8%), which included social studies psychology, sociology, art, band, drama, choir and dance; Science (11.2%); Business/Computer/Stem (11.2%); and Health/Nutrition/Physical Education (3.5%) (Gonzales, 2018).

Of the 144 responses, 140 of the participants or 98.6% reported their school as having a website and 100% reported having access to the Internet. Although 100% of participants reported having access to the Internet, just 26.8% reported students having mobile devices on a 1:1 basis; 1:1 means there is one device for every student supplied by the school or school district. Additionally, of the 144 participants, 69.5% reported being offered computer literacy training through the school or school district, and 75.7% had computer literacy training as part of a professional development program (Gonzales, 2018).

Through the analysis of a range of questions, a quantitative approach using means and standard deviations, correlational analysis, and logistic regression were performed to extrapolate data that could answer the research questions. The results produced through statistical analysis enabled the researcher to discuss, ascertain certain conclusions relative to the data collected, and make recommendations for future practice and research.

Results relative to teachers' confidence were not surprising as the results were similar to previous studies (Raulston & Wright, 2010; Sad & Goktas, 2014; Yusri, et al.,

2015) that suggested teachers who use technology in the classroom view themselves as more capable of teaching with technology. Analysis of teachers' preparedness produced insignificant results and thus, was not enlightening. In addition, because of insignificant results, further analysis of correlation between confidence and preparedness revealed a minor negative correlation, which was surprising to the researcher. Based on the response from teachers regarding their levels of confidence, one would surmise the percentage of true/false and multiple-choice questions answered correctly would be higher. Moreover, the analysis of whether teachers' confidence and preparedness levels were influenced by the employment of 1:1 devices for students, produced numbers that were insignificant suggesting the employment of mobile devices does not have an effect on confidence or preparedness. Because of these findings, the researcher was bewildered, and will seek to pursue further detailed study into the effects of providing mobile devices on a 1:1 basis in the classroom on teachers' confidence and preparedness.

Conclusions

The prevalence of mobile devices in society and classrooms has changed the way students are learning and the way teachers are using these devices to instruct students. Research has been done relative to the way mobile devices are used by students and teachers (Chen & Denoyelles, 2013; Martin & Ertzberer, 2013), student and teacher perception of mobile devices (Gikas & Grant, 2013; Raulston & Wright, 2010; Sad & Goktas, 2014; and Yusri, et. al., 2015), and a small amount of research has been conducted regarding the usage frequency of mobile devices (Teo, 2015). There remain large gaps relative to teachers' confidence and preparedness in utilizing mobile devices in secondary classrooms, and how this confidence and preparedness may affect student performance.

This study was an effort to contribute to a larger body of knowledge serving as the foundation for research and statistical analysis in the areas of education, curriculum and instruction, and instructional technology and design. The quantitative results included two major scales, teachers' confidence and preparedness, while three subscales within the two major scales of confidence and preparedness existed and included hardware and software applications knowledge, Internet skills, and communications skills. The analysis of the results in these three categories enabled the researcher to triangulate data and discuss the results.

Conclusions are organized by each research question and are supported by the quantitative data analysis in the *Data Analysis* section of this dissertation.

Teachers' Confidence. Are teachers confident in their ability to teach mobile learners relative to computer hardware and software application knowledge, Internet skills, and online communications competence? According to the results of this study, the opinion of this researcher is that teachers in Mississippi, like teachers in other states and countries, rate their confidence levels moderate to high regarding their ability to teach mobile learners in their classrooms (Raulston & Wright, 2010; Sad & Goktas, 2014; Yusri, et al., 2015). This researchers surmises this is true because teachers who use technology as an educational tool view themselves as knowing more about how the technology works.

The highest confidence scores in the hardware and software applications category were reported for confidence in saving a word processing document with a new name, printing a selection of text, using word processing software, using presentation software, and connecting wirelessly to the school network. Other areas such as connecting a laptop to a networked printer and making comments in word processing software also scored in the high range of confidence. Using nomenclature, spreadsheet applications, and mobile devices in the classroom scored more moderately; while confidence in using a learning management system and creating if/then statements in a spreadsheet scored the lowest.

Internet skills confidence ranked high in the use of web browsers and search engine, navigating websites for research purposes, and saving pictures for the Web. More moderate scores were given for open source document files, and using Web2.0 tools for educational purposes. Teachers ranked using the Cloud the lowest.

In the communications category, using email to send and receive correspondence, using CC and BCC when sending an email, and recognizing phishing and spam ranked high on the confidence scale. Using SMS scaled moderately, while using social media as an educational tool scored the lowest.

Teachers' confidence levels were measured, and data analyzed using means and standard deviations. The scoring range included a Likert scale from 1-5 with 1 being the highest (strongly agree). The reliability factors for the confidence section of the questionnaire scored high at 90% and 77% for the hardware and software and Internet respectively. The reliability factor for communications was 56%, but still at a level worth reporting with a suggestion to use caution in the interpretation. The data collected in the hardware and software category resulted in teacher confidence percentages ranging from 47.9 to 99.3, the Internet skills category percentages ranging from 56.9 to 100 (Gonzales,

71

2018, p. 56), and in the communications category percentages ranging from 43.8 to 99.3 (Gonzales, 2018, p. 57).

These findings support the learning theory (Bandura, 1986) that actions of individuals are representative of their belief in their ability to perform tasks. The results of this research study show teachers are confident in their ability to teach mobile learners relative to computer hardware and software application knowledge, Internet skills, and online communications. This information is consistent with studies conducted by Umar and Yusoff (2014) who found Malaysian teachers reported a high skill level for basic ICT skills, Duncan-Howell (2012) who report 71 percent of Australian pre-service teachers were confident in their ICT skills, and Nadelson, et al. (2013) who reported a high level of confidence as well. However, this study showed inconsistencies with the results of a study conducted by Oluwatayo (2012) who studied secondary teachers in Nigeria and found only 44 percent of teachers ranked their level of confidence on a moderate to high level. These inconsistencies may be a result of the limited research area of Mississippi and suggested is to have more research conducted in other states with secondary teachers to be truly representative of the population.

Teachers' preparedness. Are teachers prepared to teach mobile learners relative to computer hardware and software applications knowledge, Internet skills, and online communications competence? This research study did not produce a clear answer for this question due to the reliability of the questionnaire. However, ISTE and NETS (2008) standards require teachers to demonstrate digital competencies and understanding of the necessary skills needed in a digital world. Based on the percentage of incorrectly answered questions in the true/false and multiple-choice section of the questionnaire, this researcher suggests secondary teachers in Mississippi are not familiar with the ICT competencies needed to be successful in implementing mobile devices in the classroom outlined by the EdTech Team (2015); Johnson (2010); Johnson (2013); Nadelson, et al. (2014); Poole (2015); and Thompson (2014); Turner (2005). Therefore, it would behoove the Federal Department of Education in conjunction with ISTE, NETS, UNESCO and other global entities to produce an aptitude test for computer literacy incorporating basic ICT competencies for teachers. Based on outcomes of a computer literacy aptitude test, school districts would be able to identify teachers who need assistance, professional development opportunities, and additional training. Universities could benefit by discovering computer literacy needs of students entering the education profession, as well as develop specific course and curriculum offerings during the undergraduate and pre-service teaching experience that address mobile learning.

The purpose of introducing and promoting a standard computer literacy test is not to further burden education students or teachers, but to make their transition to 1:1 mobile devices and mobile learners easier and contribute to the opportunities available for learning. Teachers who are prepared to implement mobile devices and mobile learning in the classroom will emerge as innovators and valued educators. Higher levels of preparedness would also reduce the indifference to using technology in the classroom as a viable and respected learning tool.

Relationship between teachers' confidence and teachers' preparedness. Is there a relationship between teachers' confidence and teachers' preparedness? As a result of this

study, data showed a moderate negative correlation between teachers' confidence and teachers' preparedness in only one of the categories, which was communications. However, this was a very weak association and suggest there was a weak relationship between teachers' confidence and their preparedness. This researcher proposes better tests be developed and vetted for measuring preparedness levels so correlational analysis is more accurate and relevant. There is no previous literature in the area, and thus, measuring any consistencies or inconsistencies between this study and others is difficult.

Teachers' confidence and 1:1 mobile devices. Is there a difference between teachers' confidence in teaching mobile learners in schools employing mobile devices on a 1:1 basis and schools not employing mobile devices on a 1:1 basis? The data analysis produced no significant difference in teachers' confidence levels in schools employing mobile devices and schools not employing mobile devices. The evidence suggests that there is no difference in whether mobile devices are available for each student, nor does the availability have an impact on how teachers rank their confidence.

Such inconsistencies may be caused by teachers not understanding what 1:1 truly means, and some teachers may have more computer literacy training than other teachers where mobile devices are 1:1. The number of teachers with computer literacy training was not evenly distributed throughout the schools or school districts surveyed. The 1:1 component has had little to no research produced and needs to be studied in detail in the future.

Teachers' preparedness and 1:1 mobile devices. Is there a difference between teachers' preparedness to teach mobile learners in schools employing mobile devices on a 1:1 basis and schools not employing mobile devices on a 1:1 basis? This research

question did not produce any significant difference. One inference is that better computer literacy tests and assessments should be created and developed to measure preparedness.

A total of 24 multiple-choice and true/false questions were developed by the researcher to measure teachers' preparedness in the same three categories as the confidence levels (hardware and software, Internet, and communications). Reliability factors for hardware and software, Internet and communications categories were 33%, 21%, and 53% respectively. According to Field (2013), when analyzing the reliability factor for multiple-choice and true/false questions, a high reliability factor for multiple-choice and true/false questions, a high reliability factor for multiple-choice and true/false questions. Although a pilot study was conducted using the questionnaire and an overall alpha was run, the scale score was problematic. Also important to note, no previous studies were found to support validation of a measuring instrument for the sole purpose of measuring teachers' preparedness.

While a clear statistical picture did not emerge from this study, this researcher deemed it important to report the results of the multiple-choice and true/false questions in an effort to help other researchers become aware of questions where the percentage of teachers answering correctly fell below 70 percent. The tables below (see Tables 11, 12, and 13) provide the questions, the percentage of teachers who answered correctly, and the category in which the questions belong (Gonzales, 2018, pp. 64-66).

Table 11	Harc	lware	and	Softwa	re Ç	Juestions
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Question		% Answered Correctly
In order to change or turn on/off Wi-Fi, I	must go to:	29.9
An IP Address refers to a(n) devices location	_ that identifies a	43.8

Canvas, Blackboard, Moodle, and Sakai are examples of	53.5
To print a selection of text:	55.9
Which of the following If/Then statements would produce an answer equal to 200?	41.3
Which of the following IF/THEN statements would produce an answer equal to 200?	41.3

Table 12 Internet Skills Questions

Question	% Answered Correctly
Slideshare, Prezi, Google Docs, Animoto and Edmodo are examples of	11.8
A link that allows a user to access an open source document is a	11.2
Internet Explorer, Safari, Chrome, and Firefox are examples of	59.7
A Boolean search is one that expands search results.	48.6
URL stands for:	46.2
The best format to use for pictures to be use on the Web is	9.7
Saving to the Cloud requires an off-site server maintained by a third party.	69.7

Table 13 Communications Skills Questions

Question	% Answered Correctly
SMS stands for:	50.7
When using email, BCC means sending a	61.8

Phishing is electronic junk mail.	54.9
Spam is a type of fraud where a hacker tries to gain access to personal information.	68.1

While there is not sufficient evidence to support a significant difference in the levels of teachers' preparedness, as a result of questions answered correctly versus incorrectly reiterate the need to strengthen the development of teachers' knowledge and competence for using mobile devices in classroom education by connecting prior knowledge (Connectivism) to new information and technological tools (Siemens, 2004). This researcher suggests including lifelong learning in professional development to weave the social interaction and collaboration together with the cognitive development of teachers (Reese, 2014).

Overall, this research study was successful in contributing to a larger body of knowledge in the area of instructional technology as well as the study was revealing relative to gaps in available research. Additionally, this study laid a foundation for more research relative to teachers' confidence and preparedness for teaching mobile learners, and how the research may benefit future and veteran educators. Moreover, this study is valuable because it affords future researchers an opportunity to explore and examine the effects of providing mobile devices to students on a 1:1 basis as well as how access to mobile devices may or may not contribute to student achievement.

Limitations

This study did encounter several limitations. First, the study was limited because only secondary teachers in 12 of the 133 available school districts in the State of Mississippi (a 9% response rate) responded to the questionnaire. This meant there were a small number of participants (144), and the results would not necessarily be generalizable across larger areas, regions, the nation, or the world. Further investigation needs to be conducted to broaden the scope of schools included.

Other limitations included a lack of control over the number of school district superintendents who would approve the study, and then forward it to the secondary teachers within the district. Future research in this area may require additional contact with superintendents through email, phone calls, or personal visits.

Although a pilot study was conducted to test the instrument that was developed by the researcher using other instruments as a foundation, the Cronbach's Alpha test of reliability was higher for the pilot study than in the final study. Modifications to the questionnaire to include rewording, additions, and deletions may prove necessary in future research. A focus on testing the reliability of the assessment should be a priority as well. While statistical analysis included acceptable distributions of the dependent and independent variable data and helps identify existing correlations, the power of the results was limited.

Additionally, the study did not measure access to mobile devices during class time, and the amount of training or level of experience teachers had acquired to date. Measuring the amount of time teachers spend on using mobile devices along with the amount of training received may have produced a better picture of correlational data between teachers' confidence and preparedness.

Recommendations for Practice

Based on the outcomes of this data analysis, this researcher suggests the following to support the effective use of mobile devices and the instruction of mobile learners.

- Before mobile devices are provided to students on a 1:1 basis, more training for secondary teachers should be made available during professional development. It is suggested that school districts utilize more instructional technologists to train teachers in the classroom, and use MOOCs and badges to encourage teachers to learn more computer literacy skills as well as increase their confidence levels for teaching mobile learners.
- 2. A standards-based computer literacy test should be developed for education majors, pre-service teachers, and current teachers to determine knowledge and skill levels. The questions should be created based on industry standards and vetted to increase the effectiveness of measuring preparedness, which in essence would more accurately measure a teacher's level of preparedness. ISTE, NETS and UNESCO standards are very broad and vague, and do not target specific skills or knowledge needed for computer literacy and teaching mobile learners. Also recommended is to evaluate and consider the A+ certification test from the computer science industry to be the standard for ICT knowledge and skills. The A+ certification test is quite technically detailed, but could be adapted to address current and available technologies widely used in the classrooms.
- 3. Once the content of the computer literacy test has been developed, the test should be evaluated with a focus on the reliability of the questions. Higher reliability

factors for the questions will provide for an improved correlational analysis of the participant data relative to confidence and preparedness.

- 4. State Departments of Education, Institutions of Higher Learning, Federal education agencies, and industry professionals should come together to develop specific computer literacy skills for teachers and build a tool for measuring those computer literacy skills. Standardization of skills would be beneficial in establishing baseline expectations for all teachers. Armed with this information, teachers would be able to perform a self-assessment relative to their preparedness to teach mobile learners and incorporate mobile devices in their classrooms.
- 5. More collaboration between State Departments of Education, Institutions of Higher Learning and the Federal Department of Education to write and implement curriculums focused on necessary ICT skills needs to be done. This collaboration can help successfully prepare education majors and teachers for the incorporation of mobile devices in their individual classrooms.
- 6. Provide availability of educational software platforms for teachers to increase the amount of time mobile devices are used in the classroom making certain the time used increases student learning. Teachers are being asked to deliver meaningful instruction using mobile devices and educational software as one way to increase student exposure to educational materials and opportunities for learning.
- 7. A push to increase dialogue among students and teachers, teachers and teachers, and teachers and administrators regarding learning opportunities for ICT skills should be made. This open dialogue can produce more opportunities for

collaboration resulting in a myriad of available resources and learning opportunities.

8. Track pre-service and new teachers in the field to formulate best practices for learning ICT skills and teaching mobile learners can be performed. Best practices should continually be updated to reflect new technologies, as well as new competencies needed for successful teaching of mobile learners.

Recommendations for Future Research

This research study helped identify current confidence and preparedness levels of secondary public-school teachers in Mississippi relative to mobile learners and mobile devices in classrooms. Additionally, this research study determined if those teachers felt confident in teaching mobile learners, and if those same teachers are prepared to teach mobile learners. Moreover, this research study explored any relationship between confidence and preparedness. Finally, this study examined whether the employment of mobile devices on a 1:1 basis had an impact on confidence and preparedness.

The study was limited as it only investigated secondary teachers in twelve districts within the State of Mississippi. Thus, future research should include more schools in additional school districts and conduct studies in other states and regions within the United States. By broadening the schools included, further studies can help obtain a clearer picture of teacher confidence and preparedness across the nation. Asking university students majoring in education and pre-service teachers to participate in the study would give another dimension to the data providing a wider range of data analysis. Additional research should also include administrators to investigate their confidence levels in providing training and professional development to increase use of mobile devices in the classroom.

Whereas it was necessary to examine the confidence and preparedness levels of secondary teachers, the preparedness questions did not produce significant numbers in the data analysis. The recommendation would be that future researchers clarify true/false and multiple-choice questions and better vet those questions with varied audiences to measure teacher preparedness with more accuracy.

Future studies should focus on more specific capabilities of teachers using mobile devices in the classroom and how this impacts learners' comprehension and understanding of specific information. Although some research has been conducted with regard to utilizing mobile devices on a 1:1 basis for students, future research should also be focus on generalizing course knowledge and benefits of using mobile devices to learn specific subject matter. Defining 1:1 mobile devices more clearly for participants could help clarify information and questions on the survey instrument.

Another recommendation includes incorporating qualitative analysis to allow for the examination of remarks from teachers regarding their confidence and preparedness levels. Asking questions as to why teachers rated their confidence on a specific level can be very beneficial. A qualitative analysis could enable the researcher to better formulate a correlation between teachers' confidence and preparedness. For example, if a teacher ranked their level of confidence as high in Web2.0 tools, but incorrectly responded to the question asking them to identify those tools, a researcher may be able to ascertain why they missed the questions through an interview process. In this study, a correlational analysis was performed with very weak significance. Thus, trying to discover the reasons behind these findings can develop a more well-designed research study.

Finally, this researcher recommends future studies to include analyses of variance (ANOVA) as a way to explore relationships between demographic information and confidence levels, and between demographic information and preparedness levels. For instance, does age and years of service influence how teachers rank their confidence, or does age and years of service have an impact on true/false and multiple-choice questions being answered correctly or incorrectly? Exploring these relationships in the data can allow focused training and education be developed for pre-service and in-service classroom teachers regarding technology integration.

APPENDIX A - Placeholder Appendix Title

Teachers' confidence and preparedness for teaching mobile learners-Questionnaire

Start of Block: Default Question Block

Teachers' Confidence and Preparedness for Teaching Mobile Learners

PURPOSE: The purpose of this study is to determine the degree to which teachers feel confident and prepared in using mobile devices in the classroom to augment student performance.

BENEFITS: An opportunity to be part of a research study that may impact future professional development and computer literacy training.

RISKS: Minor eve strain due to the use of a computer monitor.

CONFIDENTIALITY: No personal identifying information will be collected.

1. CONSENT TO PARTICIPATE IN RESEARCH: This questionnaire was created by Kelley. Gonzales for a Ph.D. dissertation research study under the leadership of Dr. Jonathan Beedle. My contact information is 601-503-5405 (cell) and my email is kkirkgonzales@gmail.com. By clicking the box below, consent is hereby given to participate in this research project. All procedures and/or investigations to be followed and their purposes, including any experimental procedures, were explained to me. Information was given about all benefits, risks, inconveniences, or discomforts that might be expected.

Click here if you consent to the study, and then click "Next." If you do not wish to consent to this study, please close your browser at this time. (1)

PART ONE: Part one consists of demographic information. Please select the answer that best fits you and/or your situation.

2. I verify that I am a secondary public school teacher.

I am a secondary public school teacher. (1)

I am NOT a secondary public school teacher. (2)

If you are NOT a secondary teacher, please close your browser at this time.

- 3. What is your age group?
 - 0 20-29
 - 0 30-39
 - 0 40-49
 - 0 50-59
 - 60 or above
- 4. What is your length of service as a teacher?
 - 0-5 years
 - 6-10 years
 - 11-15 years
 - 16-20 years
 - Over 20 years
- 5. What subject area do you teach?
 - C Language Arts (Includes English and Foreign Languages)
 - Mathematics

 Social Studies/Arts/Humanities (Includes Social Studies, Psychology, Geography, Sociology, Art, Band, Drama, Choir, Dance)

- O Science
- O Business/Computer/STEM
- O Health/Nutrition/Physical Education
- O Special Education
- 6. What is the name of your school district?
- 7. What is the name of your school?

- 8. My school has a website
 - ⊖ Yes
 - \bigcirc No
 - O Unsure

9. My school has access to the Internet.

🔾 Yes

- No
- O Unsure

10. Does your school or school district provide students with mobile devices on a 1:1 basis?

- Yes
- No
- O Unsure

11. Have you been offered computer literacy training?

- ⊖ Yes
- No
- O Unsure

12. Have you participated in professional development relative to computer literacy?

- O Yes
- \bigcirc No
- O Unsure

PART TWO: Part two is composed of questions pertaining to your level of confidence in using mobile devices to enhance student learning. Please answer the confidence questions based on an ordinal scale of 1-5 using the following legend: 1 = Strongly agree 2 = Agree 3 = Undecided 4 = Disagree 5 = Strongly disagree

- 1. I am confident allowing students to use mobile devices in the classroom.
 - O Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 2. I am confident with the navigation of websites for research purposes.
 - O Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - Strongly disagree
- 3. I am confident using SMS.
 - Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 4. I am confident when using Web2.0 tools for educational purposes.
 - Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - \bigcirc Strongly disagree

- 5. I am confident when using social media as an educational tool.
 - O Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 6. I am confident when connecting wirelessly to the school network.
 - Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 7. I am confident using web browsers and search engines.
 - Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 8. I am confident when connecting a laptop to a networked printer.
 - O Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree

- 9. I am confident setting up a course using a learning management system.
 - O Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 10. I am confident with open source document files.
 - O Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 11. I am confident with saving pictures for use on the Web?
 - Strongly agree
 - O Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 12. I am confident in using email to send and receive correspondence.
 - Strongly agree
 - O Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree

- 13. I am confident in using CC and BCC when sending an email.
 - O Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 14. I am confident in recognizing phishing and spam in email.
 - O Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 15. I am confident when using a word processing software application.
 - O Strongly agree
 - O Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 16. I am confident when saving a word processing document with a new name.
 - O Strongly agree
 - O Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree

- 17. I am confident in recognizing extensions and nomenclature of electronic files.
 - O Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 18. I am confident in making comments on documents in word processing software.
 - O Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 19. I am confident I can print a specific selection of text or a document.
 - O Strongly agree
 - O Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 20. I am confident in using presentation software applications.
 - O Strongly agree
 - O Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree

- 21. I am confident in using spreadsheet software applications.
 - O Strongly agree
 - O Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 22. I am confident when creating a chart with a spreadsheet software application.
 - Strongly agree
 - O Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 23. I am confident in creating If/Then statements in a spreadsheet.
 - O Strongly agree
 - Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree
- 24. I am confident in using the Cloud.
 - O Strongly agree
 - O Agree
 - O Undecided
 - O Disagree
 - O Strongly disagree

PART THREE: Part three asks questions that will measure your basic computer knowledge and skills. For the following questions, please select the best answer without the assistance of any outside materials or resources, and as quickly as possible. You will, not be penalized for any incorrect answers.

1. Laptops, tablets and Smart phones are considered the leading mobile devices for education.

- 🔿 True
- O False

2. SMS stands for

- O Smart Message Service
- Smart Mobile System
- Short Message Service
- O Small Message Service
- 3. Slideshare, Prezi, Google Docs, Animoto and Edmodo are examples of
 - O Presentation tools
 - Learning management systems
 - Online collaboration tools
 - Web2.0 tools

Online communities offering individuals communication opportunities that are fast, frequent, and popular are referred to as

- Web2.0 tools
- O Social media
- O Mobile hot spots
- O Messaging systems

- 5. To what does the acronym LAN refer?
 - A type of screen standard
 - A type of programming language
 - A type of computer network
 - A type of computer memory

6. In order to change or turn on/off Wi-Fi I must go to:

- Settings for Windows and Mac
- O System Preferences for Windows and Mac
- Settings for Windows and System Preferences for MAC
- O System Preferences for Windows and Settings for MAC
- 7. An IP Address refers to a(n) ______ that identifies a device's location.
 - O Network Information Protocol
 - O Numerical Information Proxy
 - Internet Proxy Address
 - Internet Protocol Address
- 8. A link that allows a user to access an open source document is a
 - O Hyperlink
 - O Shareable link
 - Text link
 - O File link
- 9. Internet Explorer, Safari, Chrome, and Firefox are examples of
 - O Network browsers
 - O Search engines
 - O Web browsers
 - O Surfing engines

- 10. A Boolean search is one that expands search results.
 - 🔿 True
 - O False
- 11. URL stands for
 - O Universal Research Listing
 - Uniform Resource Locator
 - O Universal Research Locator
 - O Uniform Resource Listing
- 12. Canvas, Blackboard, Moodle, and Sakai are examples of
 - O MOOCs
 - Online learning systems
 - Learning management systems
 - O Mobile learning devices
- 13. The best format to use for pictures to be used on the Web is
 - O psd
 - ⊖ jpg
 - O png
 - ⊖ gif
- 14. When using email, BCC means sending a
 - Basic carbon copy
 - O Blind carbon copy
 - Blind correspondence copy
 - Basic communication copy
- 15. Phishing is electronic junk mail
 - O True
 - O False

16. Spam is a type of fraud where a hacker tries to gain access to personal information.

- O True
- O False

17. Which of the following file extensions represents a compressed file?

- 🔿 .txt
- O .doc
- 🔿 .zip
- 🔾 .tmp

18. When saving a document with a new name, choose

- O File, and then Save
- O File, and then Save As
- O Home, and then Save
- O Home, and then Save As

19. When making or receiving comments on documents in word processing software, applications it is called

- O Adding comments
- Comparing documents
- Highlighting changes
- O Track changes
- 20. To print a selection of text
 - Choose Select All/File/Print
 - Choose the Selection Tool/ File/Print

O Use the mouse to select the portion of text to print/File/Print/Print Range

O Use the mouse to select the portion of text to print/Edit/Copy, and then Paste to a New. Document/File/Print.
21. When keying an email address is a document an underline may appear and the text may become a different color. This means the text is now

- A hyperbutton
- Hypertext
- A hyperlink
- Hypercode

22. What type of chart is best when trying to visually represent the contribution of each item as part of the total?

- O Column
- O Pie
- 🔿 Area
- Line

1	А	В	С
1	Total	Amount Spent	Within Budget
2	150		
3			
4		25	
5		175	

- 23. Which of the following IF/THEN statements would produce an answer equal to 200?
 - =IF(A2
 - IF(A2>100, SUM(B4:B5), "Within Budget")
 - IF (A2="Within Budget", SUM(B4:B5))
 - =IF(B4:B5
- 24. Saving to the Cloud requires an off-site server maintained by a third-party.
 - O True
 - O False

APPENDIX B -Letter to Superintendents

August 18, 2017

Dear Superintendent:

Thank you for agreeing to allow me to conduct a research study involving the secondary educators in your district. I am currently enrolled as a Ph.D. candidate in the Instructional Technology and Design program at The University of Southern Mississippi located in Hattiesburg, Mississippi under the supervision of Dr. Jonathan Beedle. The study is entitled *Teachers' Confidence and Preparedness in Teaching Mobile Learners*, and as the researcher, I have developed the questionnaire/instrument for the study.

It is my request that you disseminate the questionnaire to all public school secondary educators via group email. The questionnaire should take approximately 15-20 minutes to complete, and there are no potential risks involved. Participation is <u>completely voluntary</u> and will provide an opportunity for teachers to be part of a research study involving technology and mobile learning.

The link to access the questionnaire is as follows: *Teachers' confidence and preparedness* for teaching mobile learners. Data gathered from your schools is confidential and will only be used for this research study and reported as such.

Your approval to conduct this research study is greatly appreciated, and I am happy to answer any questions you may have via email at kkirkgonzales@gmail.com or you may call me on my cell phone at 601-503-5405.

Sincerely

Kelley Gonzales

Ph.D. Candidate/Researcher

Attachment: IRB Approval

APPENDIX C - IRB Approval Letter

THE UNIVERSITY OF SOUTHERN MISSISSIPPI.

INSTITUTIONAL REVIEW BOARD

118 College Drive #5147 | Hattiesburg, MS 39406-0001 Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to
 maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
 Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 17073102

PROJECT TITLE: Teachers' Confidence and Preparedness for Teaching Mobile Learners PROJECT TYPE: Graduate Project RESEARCHER(S): Kelley Gonzales COLLEGE/DIVISION: College of Education and Psychology DEPARTMENT: Curriculum, Instruction and Special Education FUNDING AGENCY/SPONSOR: N/A IRB COMMITTEE ACTION: Exempt Review Approval PERIOD OF APPROVAL: 08/15/2017 to 08/14/2018 Lawrence A. Hosman, Ph.D. Institutional Review Board

APPENDIX D – Email Letter to Mississippi Department of Education

From: Kelley Kirk Gonzales [mailto:kkirkgonzales@gmail.com] Sent: Thursday, August 10, 2017 2:40 PM To: Deborah Donovan <DDonovan@mdek12.org> Subject: Request for Information

Dear Ms. Donovan,

Currently I am preparing my dissertation and would like to conduct a study that involves secondary teachers in the State of Mississippi, and I must send an email to all Superintendents in order for the survey to be <u>approved</u> and disseminated. I work for Dr. Robertson in OSI and would like to request a list of the Superintendents along with their district and email address.

Thank you in advance for your assistance.

Sincerely,

Kelley Gonzales

APPENDIX E – Email Letter from Mississippi Department of Education

Access to List of Superintendents of Mississippi School Districts

Received Thursday, August 10, 2017

Hi Kelley,

Superintendent contact information is available on our website at http://mdereports.mdek12.org/

Thanks,

Deborah Donovan Director of Office of Data Analysis and Reporting Office of Technology and Strategic Services MISSISSIPPI DEPARTMENT OF EDUCATION P.O. Box 771 | Jackson, MS | 39205-0771 Tel 601-359-3487 | Fax 601-359-2027 www.mde.k12.ms.us Twitter: @MissDeptEd

APPENDIX F – Permission Letter: Patsy Lanclos

Permission to use the Technology Applications Inventory

November 11, 2016

To whom it may concern:

Kelly Kirk Gonzales has my permission to use the Technology Assessment that I wrote and she found at

http://web.archive.org/web/20100107161830/http://www.tcet.unt.edu/START/assess/teks urv.pdf

Patsy Lanclos

Patsy Lanclos Instructional Tech Professional Development Educator, Author, Knowledge Architect Apple Distinguished Educator Smithsonian Laureate Book Creator Ambassador Woman of Distinction, Nat'l Assn. Women of Distinction APPENDIX G – Permission Statement: Northstar Digital Literacy Project

Permission to use the Basic Computer Skills Certificate modules developed by Northstar. Digital Literacy Project

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APPENDIX H – Permission Statement: GCFLearnFree.org

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