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TEACHERS PERCEPTIONS OF IMPLEMENTING M-LEARNING USING PEDAGOGICAL APPROACHES

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TEACHERS' PERCEPTIONS OF IMPLEMENTING M-LEARNING USING PEDAGOGICAL APPROACHES

by

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Dedication

To Pop who always challenged me to be the best in everything.

To all my loved ones who did not get to see me achieve this goal.

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Abstract

Mobile learning (m-learning) has begun its transition from focusing on technology devices to pedagogical approaches that guide the design, development, and implementation of teaching and learning. The trends in the literature have identified pedagogical approaches, professional development and instructional practices that have improved academic achievement with teachers' abilities and perceptions as a contributing factor. However, a gap remains about the degree to which teachers effectively integrate and implement m-learning to make a significant impact on teaching and learning. To address this gap, this research was a causal comparative study examining two schools' perceptions of implementing m-learning after receiving differing types of professional development. A survey created from an extended Technology Acceptance Model (TAM) and Mobile Learning Readiness Survey (MLRS) was delivered to K-8 teachers from two schools within a large urban school district. The participants included K-8 teachers (n = 39) who responded to 42 survey items consisting of demographics (i.e. age, years of experience, content area, grade level, educational degree, and stage of adopting technology), mobile learning readiness, perceived usefulness, and perceived ease of use in relation to mobile learning and mobile technologies. The research performed a MANOVA comparing and determining that there was a non-statistical significant difference between the two schools and dependent variables. The results found that there was a non-statistical significant difference in teachers' perceptions of mobile learning readiness, usefulness, and ease of use when it comes to implementing m-learning and technologies. The participants tended to have higher perceptions of m-learning being able to provide new opportunities to deliver instruction, intentionally using mobile

technology more frequently, and willingness to learn how to effectively implement m-learning. Based on the findings, teachers from both schools were ready to implement m-learning regardless of the type of professional development and pedagogical approaches, blended learning or traditional learning, being used. The results of this study provide evidence to educational administrators and teachers that equitable investments into planning structured and organized professional development could transform pedagogical beliefs to effectively implement m-learning and improve student academic performance.

Keywords: mobile learning, m-learning, mobile learning readiness, pedagogical approaches, professional development, TAM, teachers' perceptions

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List of Abbreviations

Benefits (mBen)

Extended Technology Acceptance Model (extended TAM)

External Influences (mExt)

Mobile Learning (m-learning)

Mobile Learning Readiness Survey (MLRS)

Multivariate Analysis of Variance (MANOVA)

Perceived Ease of Use (PEU)

Perceived Usefulness (PU)

Possibilities (mPoss)

Statistical Package for the Social Sciences (SPSS)

Technology Acceptance Model (TAM)

CHAPTER ONE:

INTRODUCTION

Teaching learners with the tools of the 21st century has challenged many educational leaders and teachers. Many of these learners have been introduced to mobile technologies and features such as laptops, tablets, smartphones, eBooks, text-to-speech (or speech-to-text), interaction through touch and eye recognition, and connection to information anytime and anywhere through wireless Internet. For many of these learners, mobile technology is primarily used for gaming, watching videos, listening to music, and communicating with others through social media. Digital learners are interactive, accustomed to instant feedback and response times, interested in sharing and exchanging ideas socially, and more familiar with the mobile devices than many of the teachers providing instruction (Al Tameemy, 2017; Phillips & Garcia, 2013; Taleb, Ahmadi, & Musavi, 2014). It is the position of the researcher that the characteristics of digital learners and features of mobile technology can be combined to stimulate and motivate learning by providing an alternative method for delivering instruction and content.

Educational leaders and teachers have recognized that there is a need to strategically integrate mobile technologies to benefit the improvement of teaching and learning. The current educational needs of K-8 schools are to engage learners in interactive activities that stimulate and motivate learning, align mobile technology usage and curriculum to effectively improve overall academic performance, and employ a sustainable framework that can be modified as mobile technologies advance. The exploration of m-learning as an approach to teaching can facilitate the implementation of learning through a variety of mobile devices and networks without the constraints of time

and location (Chee, Yahaya, Ibrahim, & Hasan, 2017). While the influence of mobile technology on learning in schools and research has been received positively by many teachers, more research is needed to design appropriate guidelines for new curricula and pedagogy to support and assess the use of mobile technology in schools (Domingo & Garganté, 2016).

M-learning can be defined as the integration of mobile technology with appropriate pedagogy (Looi et al., 2014). M-learning occurs through social and content interactions that allow students to make connections while learning at anytime and anywhere (Domingo & Garganté, 2016; Males, Bate, & Macnish, 2017). Lindsay (2016) stated that combining mobile technologies and pedagogical approaches could provide new ways to teach and learn through the redefining and supporting learning activities; however, educational institutions need to identify strategies and approaches for effective implementation. It is important to note that the sustainability of m-learning requires significant time and financial investments into mobile technologies, initiative programs, and professional development of teachers made by educational institutions and its administrators (Ng & Nichols, 2013).

The integration of mobile technology to support teaching and learning has been the focus of educational institutions and teachers for nearly a decade. Reeves, Gunter, and Lacey's (2017) research showed an increase in research publications examining the effectiveness of mobile devices on classroom instruction and student achievement. Many administrators and teachers around the world are discussing and researching pedagogical sound best practices for the strategic use of mobile technologies to individualize instruction and improve standardized test scores— especially in reading, writing, and

mathematics. These professionals continually look to leverage mobile technologies to address the need for improved academic performance (Hosler, 2013). There is a need for greater understanding of m-learning as informed by teachers' perceptions and usage in relation to learning content, standardized testing, training, and pedagogical approaches towards teaching with mobile technology.

To better understand teachers' perceptions of implementing m-learning, a closer look need to occur examining their mobile learning readiness, perceived usefulness, and perceived ease of use with mobile technologies and instruction. As defined by Christensen and Knezek (2017), mobile learning readiness is a measure indicating teachers willingness to instruct with mobile technologies in their classrooms. Mobile learning readiness asks, "Do teachers view using mobile technology within the classroom as an opportunity to deliver instruction differently from their traditional instructional approaches?" Next, perceived usefulness is the degree to which teachers believe using mobile technologies could improve teaching and learning (Davis, 1989). Perceived usefulness relates to the likelihood that teachers intend to repeatedly use mobile technology as a learning tool to support instructional activities (Asiimwe and Gronlund, 2015; Camilleri and Camilleri, 2017; Christensen and Knezek, 2017; Marcial. 2015). Lastly, perceived ease of use examines the amount of effort teachers would consider placing into learning and implementing m-learning and technologies. If the teacher does not believe that m-learning requires an over abundant amount of time to learn, plan, setup, implement, and cleanup, the more possible they will continue to use the mobile technology.

In a systemic review of the outcomes of using mobile learning in PK-12 education, Crompton, Burke, and Gregory (2017) discovered that 62% of studies reported positive outcomes for teachers that resulted in increased student learning, 1% reported negative outcomes, 12% were neutral, and 34% measured outcomes unrelated to student learning. Males, Bates, and Macnish (2017) conducted a five-year mixed-methods study to gauge the implementation of an m-learning initiative for male students in a private school in Western Australia. Unfortunately, the researchers concluded that it was difficult to identify what effect the m-learning initiative had from the other influences on student learning as approaches to integrating m-learning varied from teacher to teacher. Taleb, Ahmadi, and Musavi (2015) examined the benefits and perceptions of teachers who were trained to employ a diverse range of methods to incorporate m-learning into academic content areas. The teachers in their study could make inappropriate and inflexible content into more attractive, motivating, and personalized instruction that resulted in increased student-centered engagement toward learning. Given the powerful role of educators in the effective integration and use of m-learning in the classroom, this dissertation research investigated teachers' perceptions of implementing m-learning in relation to pedagogical approaches.

Statement of the Problem

Many K-12 schools purchase mobile technology with the intent of having teachers and students use it for instruction. Unfortunately, teachers are left on their own to figure out how to appropriately integrate and implement mobile technologies into their classroom instruction (Baran, 2014). It is the position of the researcher that in many schools where teachers implement m-learning, they must attempt to incorporate what was

learned from a 30-60-minute session at a conference or researched information on the Internet into their classroom instruction. Teachers must often use trial and error when implementing m-learning which can be frustrating, demoralizing, and ineffective. These negative emotions and perceptions occur when teachers are unable to find meaningful ways to use devices, resolve technical issues, monitor web access, allocate adequate time for use of devices, or attempt to shift to learner-centered instructional activities using mobile technology (Cornelius and Shanks, 2017).

Accordingly, several problems impede the development and implementation of m-learning. These include pedagogical approaches, professional development, and integration as factors that hinder educational institutions and prevent teachers from implementing m-learning in a sustainable manner. Baran (2014) stated the need for organized and structured professional development for teachers and pre-service teachers on designing m-learning lesson and activities as well as proficiency in the operation and use of mobile technologies. Similarly, Mouza and Barrett-Greenly (2015) found limited research studies examining the design, implementation, and outcomes of professional development targeting teachers' integration of mobile devices in teaching and learning. This dissertation research attempts to close this gap within the research by focusing on teachers' mobile learning readiness, usefulness, and ease of use from two different schools implementing m-learning using pedagogical approaches and after being provided with professional development which may influence the sustainability and effectiveness of initiatives or programs.

Schools and school districts must have a clear vision to utilize and support mobile devices and educational applications (apps) within learning environments (Mouza &

Barrett-Greenly, 2015). For schools to make a significant impact on students' academic performance, investments must be made in providing effective professional development to encourage implementation of m-learning in a pedagogically sound manner. Teachers need to know how to strategically access information for learners to provide opportunities for more focused and personalized learning.

Purpose of the Study

There is a great need for educational administrators and teachers to effectively research m-learning programs or activities that assess the value of m-learning instruction, emphasize pedagogical approaches, evaluation of mobile apps, and have a positive impact on learning. Domingo and Garganté (2016) discovered that teachers who had high mobile readiness, usefulness, and ease of use impacted m-learning by providing new ways to learn and increasing engagement, increasing frequency of use through mobile apps, and enabling critical analysis on the quality of mobile apps used to support learning. When teachers are trained through professional development or through teacher education courses, they can implement grounded pedagogical approaches through m-learning that can impact teaching and learning (Baran, 2014). The intent of this research study was to confirm that teachers who effectively integrate and implement m-learning make a significant impact on teaching and learning. With an emphasis on teachers' abilities to implement m-learning after receiving professional development and preservice training, it was expected that teachers' perceptions, attitudes, motivation, and adequacies towards mobile technologies would have a direct impact on improving students' academic performance.

The purpose of this quantitative, causal comparative study was to compare mobile learning readiness, perceived usefulness, and perceived ease of use of K-8 teachers from a large urban school district, who were implementing m-learning after receiving two different types of professional development and being provided with curriculum and technical support. The independent variable was the implementation of m-learning aligned with pedagogical approaches. Teachers' content area, grade level taught, teacher certification, years of experience teaching, and age were examined to compare homogeneity between groups. These characteristics and other attributes show the similarity between the two groups participating in the research study (Creswell, 2015). The dependent variable—perceptions of m-learning—can be generally defined as the perceived usefulness, perceived ease of use, and mobile learning readiness of information technology toward implementing m-learning (Davis, 1989). These perceptions were concentrated on teachers' thoughts, abilities, attitudes, and motivation towards implementing m-learning for teaching and learning.

Research Questions

The research questions for this study are as follows:

- Research Question 1 (RQ1): Is there a difference in mobile learning readiness between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not?
- Research Question 2 (RQ2): Is there a difference in perceived usefulness between teachers in K-8 urban schools who systematically engage in professional

development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not?

- Research Question 3 (RQ3): Is there a difference in perceived ease of use between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not?

Null Hypotheses

The null hypotheses for this study are as follows:

- Null Hypotheses 1: There is no statistical significant difference in user mobile learning readiness between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not
- Null Hypotheses 2: There is no statistical significant difference in perceived usefulness between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not.
- Null Hypotheses 3: There is no statistical significant difference in perceived ease of use between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not.

Significance of the Study

This research study on teachers' perceptions of m-learning is significant to the field of education, distance education, and technology because teachers' beliefs and

attitudes toward mobile technologies' effectiveness a teaching tool impact classroom learning and learner engagement and achievement. The results of this study illustrated the ways in which teacher training and supported m-learning with pedagogical approaches can be effectively incorporated with teaching and learning practices inside and outside of the classroom. Understanding teachers' perceptions of mobile technology provides a means for promoting meaningful use of a technology (Domingo and Garganté, 2016) enriched curriculum. What may also impact the perceptions of teachers and students as perspectives shift from mobile technology usage as an inconvenience, problem, or waste of time to a valuable learning tool.

In many situations, the implementation of m-learning is conducted by individual teachers and within isolated lessons. Looi et al. (2014) demonstrated how teacher-designed curriculum affected educators' pedagogical orientation for both technology integration and relationships with students. Schoolwide integration will be more impactful on the overall student achievement—rather than individual classrooms where a small group of students benefit—if more classrooms build and demonstrate the connections between the subject matter and multiple content areas through the implementation of m-learning. It is the stance of the researcher that when teachers are properly trained in the use of m-learning, they have more confidence in their abilities to align mobile technologies with instruction. This position is supported by Taleb, Ahmadi, and Musavi (2015), who stated that teachers need to be educated on the benefits of incorporating technology in their classrooms and trained on how to integrate technology effectively. The appropriate alignment of mobile technologies with instruction enables the learner to effectively use the device and benefit from its features that support teaching

and learning. Teachers can support learning using the tools with which learners are familiar and learners can be provided with another use for the mobile device besides for leisure and pleasure.

Theoretical Framework

The theoretical framework of this study includes Davis' (1989) Technology Acceptance Model (TAM) and Sanchez-Prieto et al.'s (2016) Extended TAM. The TAM models of this study are used to measure, predict, and explain the adoption of m-learning initiatives that are influenced by the support of professional development and alignment of pedagogical approaches.

The Technology Acceptance Model. The Technology Acceptance Model (Davis, 1989) has been used or adapted many times in research to examine perceived usefulness, ease of use, and user acceptance of m-learning. This model was employed as the foundational structure for understanding teachers' perceptions of m-leaning. The TAM is considered the best measurement tool for predicting and explaining m-learning usage, assessing user demand, and evaluating school wide applications or programs for researchers, educational institutions, and educators (Aldunate & Nussbaum, 2013; Al-Hunaiyyan, Alhajri, & Al-Sharhan, 2016; Davis, 1989; Domingo and Garganté, 2016; Montrieux et al., 2013; O'Bannon & Thomas, 2014; Sanchez-Prieto et al., 2016; Young, 2016). The examination of teachers' perceived ease of use helps to identify their level of comfort and confidence when using m-learning and their abilities to enhance teaching and learning. The teachers' perceived usefulness helps to determine how professional development—along with curriculum and technology support—can increase frequency of use and confidence in employing m-learning. The acceptance of m-learning indicates

how teachers' perceptions have been transformed through the usage of m-learning to provide learners with individualized and alternative representations of learning content.

Extended TAM. The extended TAM created by Sanchez-Prieto et al. (2016) focused on the dependent variable of behavioral intention (BI). Referring the subjective norms and attitudes of an individual performing a given behavior, the BI relates to such factors as perceived enjoyment (PEN), self-efficacy (SE), facilitating conditions (FC), subjective norms (SN), resistance to change (RC), and anxiety (A). These construct variables are the factors which assist in identifying what influences user acceptance of m-learning. The understanding of teachers' perceptions of m-learning is a complex task which can be measured and analyzed by the extended TAM. The extended TAM addresses the actual usage of mobile technologies and the relationship between these construct variables can describe teachers' perceptions toward accepting or rejecting the implementation of m-learning. It is through these changes in beliefs about mobile technologies that m-learning has emerged as an alternative pedagogical approach to teaching and learning.

Definitions

- Anxiety to technology (AT): This term refers to the degree of an individual's apprehension, or even fear, when he or she is faced with the possibility of using mobile technologies (Sanchez-Prieto, Olmos-Miguelanez, & Garcia-Penalvo, 2016).
- Behavioral intentions (BI): An individual's BI refers to one's strength of intention to use m-learning. A key predictor of behaviors on the adoptions of information technology (Chen et al., 2013).

- Constructivism: Constructivism is a pedagogical approach that can ground m-learning because teaching and learning is centered around the learner. Richey and Tracey (2011) defined constructivism as a learning process grounded under the basic principles of learning resulting from personal interpretation, an action occurring in realistic and relevant situations, and an exploration of multiple perspectives. Instructional designers and instructors can apply this pedagogy to online instructional practices such as problem-based learning, situated learning, scaffolding, team collaboration, and social learning communities.
- Facilitating conditions (FC): The term FC denotes the measurement of the individual's perception of the resources at their disposal to support their behavior (Sanchez-Prieto et al., 2016).
- M-learning: This research situates m-learning as a distance learning process focused on teaching and learning. Setirek and Tanrikulu (2015) defined m-learning as four abilities: a) to address current educational needs, b) to have potential to be adopted by users, c) to maintain a certain condition or make progress, and d) to adapt to possibilities of change. M-learning can be considered a type of learning assisted by mobile devices wherein learning can occur anywhere and at any time (Rahimi & Miri, 2014). Teachers can employ mobile devices in connection to Internet resources to deliver and support instruction inside and outside of the classroom.
- Mobile learning readiness: Measures the extent to which teachers indicate willingness to introduce and teach with mobile technologies in their classrooms (Christensen & Knezek, 2017).

- Pedagogical approaches: Within the context of this study, pedagogical approaches can be understood as the individual or multiple instructional strategies implemented while using mobile devices as a tool to support teaching and learning. Lindsay (2016) identified pedagogical approaches as existing within three categories: a) the associative pedagogical approach, b) the individual constructive approach, and c) the collaborative constructive approach.
- Perceived ease of use (PEOU): The term PEOU is defined as the degree to which a person believes that using a system would be free of effort (Davis, 1989).
- Perceived enjoyment (PEN): The PEN refers to the degree to which the use of technology is perceived as enjoyable, regardless of the performance consequences that can be anticipated (Sanchez-Prieto et al., 2016).
- Perceived usefulness (PU): The concept of PU is defined as the degree to which a person believes that using a system would enhance his or her job performance (Davis, 1989).
- Resistance to change (RC): The term RC refers to the difficulty in breaking with routines and the emotional stress generated when facing the expectation of changes (Sanchez-Prieto et al., 2016).
- Self-efficacy (SE): One's SE denotes the assessment made by an individual on his or her ability to properly use mobile technologies (Sanchez-Prieto et al., 2016).
- Subjective norms (SN): The term SN refers to the social expectations placed on teachers to use a given technology (Sanchez-Prieto et al., 2016).

- User acceptance of technology (UAT): UAT serves to identify the determinant factors which cause people to accept or reject information technology (Davis, 1989).

Conclusion

In conclusion, administrators and teachers need to strategically integrate m-learning to differentiate and individualize instruction using alternative pedagogical approaches. Conversely, teachers should no longer be left alone using trial and error to appropriately integrate m-learning to best match instructional content. K-12 schools must make significant investments in providing professional development to teachers that increases frequency of use, confidence, knowledge, and motivation for implementing m-learning within classroom instruction. Overall, this causal comparative study seeks to understand if there are statistical differences in teachers' perceptions when using varying pedagogical approaches with m-learning. The next chapter will review the literature on the trends in m-learning, explore current educational and professional development practices, examination of teachers' perceptions on m-learning, and description of alternative pedagogical approaches using m-learning.

CHAPTER TWO:

REVIEW OF THE LITERATURE

The sustainability and effectiveness of m-learning is impacted by teachers' perceptions of its usefulness and its ease of use and acceptability within teaching and learning. M-learning provides many opportunities for teachers to design and develop effective meaningful lessons grounded in pedagogical approaches that can impact the learner wherever or whenever. When introducing m-learning into schools, the teachers' levels of knowledge and confidence in using technology is of concern (Osakwe, Dlodlo, & Jere, 2017). This dissertation research contributes to an understanding of teachers' attitudes and motivations in an effort to increase the frequency of use of m-learning to differentiate instruction through multiple representations of the content. Educational institutions and administrators can support this transformation by also investing in professional development that demonstrates to teachers how to align pedagogical approaches and m-learning activities for learners.

This review of the literature analyzes and synthesizes the trends in educational research on m-learning, teacher preparation, alignment of pedagogical approaches with mobile technology, perceptions of teachers' implementing m-learning and the effects of m-learning on teaching and learning. The investigation for teachers' perception of m-learning research targeted publications between 2012 and 2017. The information for this literature review was derived from journal articles, dissertations, and books related to m-learning, pedagogical approaches, professional development, teachers' perceptions, and sustainable implementation of mobile learning technologies.

Providing background information and supporting evidence for this dissertation research on teachers' perceptions of m-learning using pedagogical approaches, this literature review addresses the following areas: trends in m-learning research, current professional development practices in support of teachers' implementation of m-learning, the ways in which m-learning can transform pedagogical approaches, how teachers' beliefs influence their perceptions, and how m-learning has been implemented in different educational institutions around the world.

M-learning has evolved and transformed teaching and learning. Educators have progressed from seeing mobile devices as "toys" to using them as educational "tools" (Phillip & Garcia, 2013). The development and integration of resources and processes of informal educational uses of m-learning can provide educational solutions wherein educators adopt effective approaches in the classroom setting (Ifenthaler & Schweinbenz, 2013; Sanchez-Prieto et al., 2016). The success or failure of m-learning integration is based on the acceptance of technology as measured by teachers' positive perceptions and behavioral intentions for implementation (Aldunate & Nussbaum, 2013).

Emergent Research and Trends of M-Learning

As this dissertation research study examines teachers' perceptions of implementing m-learning and pedagogical approaches used in teaching and learning, it is important to understand the outcomes of past research. The amount of research on the implementation of m-learning has increased substantially over the last decade as evident in increases in the publication of peer-reviewed journal articles on subjects related to m-learning (Baran, 2014; Chee et al., 2017; Crompton, Burke, & Gregory, 2017). Until recently, there were few published studies examining teachers' perceptions and beliefs

about the use of mobile learning as most of the research focused on learner perceptions of m-learning (Rikala, Hiltunen, & Vesisenaho, 2014).

The successful integration of m-learning is influenced by the process through which it is adopted since it is within the classroom where m-learning initiatives are accepted or rejected by teachers (Ifenthaler & Schweinbenz, 2013). When conducting a meta-analysis approach to systematically review of approximately 260 studies on the effectiveness of m-learning, more than 52% of the reported results had positive outcomes with many demonstrating student learning had increased (Chee et al., 2017; Crompton et al., 2017; Sung et al., 2016; Wu et al., 2012). With less than 13% of the studies, from that same systematic review, results reported negative or neutral outcomes on student learning. Based on the meta-analysis of m-learning, the research indicates that when m-learning is implemented in a pedagogically sound manner, teachers and learners benefit and report positive learning outcomes.

The studies on m-learning has been categorized as formal, informal, or both formal and informal when implementing in an educational context. Formal use of m-learrning occurs when mobile technologies are strategically implemented within learning activities in an organized and structured location. The informal use of m-learning occurs when the learner independently seeks out information to gain knowledge or skill. Lastly, formal and informal use of m-learning occurs when learning is organized and structure but allows the learner to independently develop the final product. In an examination of the distribution of educational contexts in which this research occurs, informal learning was the most frequently used form of m-learning prior to 2012 (Chee et al., 2017). Since 2012, the increase in usage of m-learning in a formal educational context for learning has

provided for 50% of research studies being conducted (Chee et al., 2017; Crompton et al., 2017; Sung, Chang, & Liu, 2016). In the investigation for research on m-learning studies in formal settings, it was discovered that educators and researchers perceive m-learning to be more useful in structured complex, higher ordered thinking, and problem-solving activities.

Even though the trends in m-learning research have shown positive outcomes on student learning and increased usage in formal learning, a gap in the teachers' alignment of pedagogical approaches and m-learning persists in the literature. This gap in the research affects teachers' abilities to implement m-learning effectively and educational institutions' abilities to sustain programs or initiatives—which impacts learners' overall academic achievement. Baran (2014) asserted the need for pedagogical approaches that can guide teachers in designing mobile learning experiences and professional development supporting classroom strategies with integrated mobile tools. K-12 administrators and teachers need to be able to distinguish between m-learning and mobile usage and explore the pedagogical potentials of m-learning (Baran, 2014).

Current Professional Development Practices

This section of the literature review explores how structured professional development improves or changes the perceptions of teachers implementing m-learning. This section shows how the research supports including professional development into m-learning programs or initiatives, and the lasting effect this can have on sustaining m-learning's success and improving learners' academic performance.

Above all, the professional development of teachers is integral to improving the perceptions and increasing the implementation of effective m-learning. Many

educational institutions have purchased computers and mobile technologies for teachers and students to integrate into the classroom without providing effective and sufficient professional development. For many of the instructional technologies being provided for use in the classroom, teachers are not given time to learn how to use the devices, develop and align pedagogical approaches, or access support when the devices are not working as planned. Teachers attempting to integrate and implement m-learning often do so by trial-and-error, attending conferences with 30–60-minute sessions on related topics, searching the Internet for resources and professional learning groups, or, in some cases, having the students teach new technologies to them (Baran, 2014). These strategies are often ineffective for teachers as they impede on their time to teach the content.

Looi et al. (2014) stated that supported professional development sessions and regular meetings assisted teachers in developing more teaching strategies based on constructivist pedagogical approaches. M-learning can support and improve best teaching practices when implemented appropriately and in a pedagogically sound manner. For educational institutions to improve approaches to and usage of m-learning, they must provide adequate professional development before and throughout the initiative or program. Further educators need to be allowed sufficient time for collaboration, preparation, and development of new approaches along with digital curriculum content. Teachers should learn not only how to use m-technology gadgets but also how to monitor, coach, and motivate their students to use their m-learning gadgets as learning tools (Al Tameemy, 2017).

Rethinking Pedagogical Approaches for M-learning

Pedagogical approaches using m-learning can happen everywhere and at any time as these learners will have more flexibility and responsibility for their learning (Al Tameemy, 2017). Together with mobile technology and pedagogical approaches, teachers can design and develop activities and lessons that can stimulate and motivate learners. Teachers must leverage the versatility and adaptability of m-learning for teaching and learning to become more learner-centered. Without an alternative pedagogical model on good practices, mobile devices amount to no more than a sophisticated resource but often unused in the teaching and learning process—no more than a piece of" academic furniture" (Suarez, Lloret, & Mengual, 2016). Instructional designers must explore new methods that assist mobile learning situations to create effective learning solutions (Al-Hunaiyyan et al., 2016).

Accordingly, more research is needed to design appropriate guidelines for new curriculum and pedagogy to support and assess the use of m-learning (Domingo & Garganté, 2016). The existing curriculum and conventions of instruction must be reshaped for m-learning to systematically transform current pedagogical approaches from a content- and teacher-centered to a student-centered infrastructure (Ally, Grimus, & Ebner, 2014). Pedagogical approaches such as behavioral learning, constructivist learning, situated learning, and collaborative learning—separately or in combination—have been found to be useful and effective in supporting and aligning m-learning. The use of behavioral learning approaches has reportedly allowed teachers time to individualize learning for drill-and-practicing skills to close gaps within learning (Rahimi & Miri, 2014; Reeves et al., 2017). Constructivist learning has enabled teachers to

scaffold, differentiate learning, and allow learners to have more control of their learning to create meaningful end products (Yin et al., 2013). Situated learning has enabled teachers to create lessons that are relevant real-world situations which can go beyond the classroom and school environment (Alnuaim et al., 2012; Dekhane et al., 2013). Lastly, collaborative learning enables teachers to create lessons where they are not the sole source of information and learners must explore other resources through online learning communities to gain knowledge and new perspectives (Tseng et al., 2016).

Currently, behaviorist, constructivist, situated, and collaborative learning activities show promise in helping students prepare for learning and working in the digital age (Crompton, Burke, & Gregory, 2017). Integrating mobile applications and services into educators' pedagogy or instructional style is important for sustaining and improving students' attitudes toward the use of these mobile devices in the classroom (Al Tameemy, 2017). Research must focus on the use of new technologies through adopting pedagogical approaches by understanding mobile features and capabilities (Al-Hunaiyyan et al., 2016). Teachers have generally been positive in their response to the usefulness and effectiveness of these pedagogical approaches. Examples of integrated pedagogical approaches being implemented with m-learning are described later in this literature review.

Perceptions and Beliefs Influence Implementation

Teachers' perceptions of the effectiveness of m-learning are influenced by many factors, such as professional development, pedagogical approaches and beliefs, confidence with technology, and resistance to change. The perceptions of teachers regarding their implementation of m-learning have a significant impact on the

sustainability, teaching and learning, and academic performance of learners within this digital age. Aldunate and Nussbaum (2013) stated that there exists diversity not only in the attitude of teachers but also in performance expectancy and the facilitating conditions. There are several factors that support a positive educator response on the effectiveness of m-learning in the K-12 learning environment. In conducting research on the topic of teachers' perceptions, teachers' attitudes influence the usefulness and ease of use of technologies in the classroom, the type of professional development impact teachers will have on the implementation of m-learning with confidence, and b the alignment of pedagogical approaches and mobile technology that benefits student learner. When attempting to understand teachers' perceptions of m-learning, it is just as important to recognize how pedagogical approaches, professional development, technical and instructional support, and personal beliefs and abilities toward using mobile technology can be influential in the decisions teachers make in designing and implementing m-learning.

There has been a variety of research, both quantitative and qualitative, on teachers' perceptions of m-learning using sound pedagogical approaches. Teachers generally have positive perception levels about m-learning and want to use m-learning applications to support traditional education (Baran, 2014; Ozdamli & Uzunboylu, 2015). Teachers' positive attitudes, motivation, and increased frequency of use have consistently displayed the same results. However, despite the positive response towards m-learning, a significant number of teachers and educational leaders are reluctant to implement and support m-learning. These teachers are not in favor of putting into practice a learning-teaching process with only m-learning applications without the support of sustained

professional development and technical assistance (O'Bannon & Thomas, 2014; Ozdamli & Uzunboylu, 2015). Many teachers want to use m-learning in education, but their competence levels are not sufficient (Ozdamli & Uzunboylu 2015). These teachers are not realizing the advantages of technology because they are not familiar with the specific tools or not able to see the link between the tools and learning opportunities (Rikala et al., 2014).

The researcher sought to verify that teachers' attitudes are influenced by beliefs about perceived usefulness and perceived ease of use (Rikala et al., 2014). Teachers' confidence is affected by levels of adequate access, training, and the support available (Rikala et al., 2014). Teachers desire professional development and additional time to work with mobile technology, learn new pedagogical approaches, and collaborate to design creative lessons for teaching and learning (Baran, 2014; Mouza & Barrett-Greenly, 2015). Several researchers have identified that adequate professional development, allocation of time to prepare resources, opportunity to develop and practice new strategies, availability of digit curriculum content, and technology support and infrastructure supports the positive results when implementing m-learning (Royle, Stager, & Traxler, 2014; Young, 2016; Yusri, Goodwin, & Mooney, 2015).

Teachers' pedagogical beliefs influence their perceptions toward the implementation and effectiveness of m-learning. With the use of new technologies in the classroom comes the need to modify current pedagogical approaches (Greer et al., 2017). Teachers must make a shift in their pedagogy and associated risks of using digital tools (Royle et al., 2016) before learners can benefit from the versatility and adaptability of m-learning. In an examination of the expectations and challenges of implementing mobile

devices in a Scottish primary school, Cornelius and Shanks (2017) provided evidence that seemingly mundane uses of technology can have meaningful shifts in teachers' practice when pedagogical approaches are aligned with m-learning. Navarro, Molina, Redondo, and Ramirez (2016) applied a systematic mapping study aimed at understanding the tendencies and needs in the field of m-leaning. A significant part of this study was the identification of pedagogical usability as one factor to improve the quality of m-learning. Teachers can use pedagogical usability as a guideline for generating efficient learning content, using appropriate mobile device for multimedia learning, defining tasks or activities, promoting collaboration among learners, and personalizing lessons for learners to become more independent (Navarro, Molina, Redondo, & Ramirez, 2016).

Types of M-Learning Implementation Initiatives

Most teachers use m-learning to teach core curriculum areas such as mathematics, writing, social sciences, and reading. Instructional designers and instructors are using mobile technologies to improve learning through individualizing and differentiating instruction and curriculum, scaffolding content, and preparing new and veteran teachers to strategically implement m-learning into their teaching and learning practices. The following educational practices are examples of how m-learning is being implemented with the main purpose of improving students' academic achievement and supporting m-learning with pedagogical approaches, and the effect it has on teaching and learning.

Schoolwide implementation of m-learning. The sustainability and effectiveness of m-learning as a schoolwide initiative should be grounded in the professional development and alignment of pedagogical approaches. Looi et al. (2014) conducted a study which transformed the pedagogy, curriculum, technology integration, student

learning patterns, parents and teachers' attitudes, beliefs and capacities, and classroom culture using a classroom innovation model called Mobilized 5E (Engagement, Exploration, Explanation, Elaboration, and Evaluation) Science Curriculum (M5ESC). The implementation of constructivist pedagogical approaches enabled teachers to skillfully conduct experiments and discuss activities by extending ways for technology integration on evaluation and reflection of learning, asking questions on assessing learning and provide knowledge of procedures and seeking solutions. The continuous supported professional development sessions and meetings gave teachers opportunities to develop more teaching strategies, pose questions based on student responses, detect student understanding to guide knowledge construction and stimulate student self-directed learning using mobile devices.

Looi et al. (2014), also, conducted longitudinal studies on tracing learning effectiveness, surveys, experiments, or designs of mobile learning systems based on sustainable long-term interventions. This study was conducted over a five-year period in which all teachers participated in professional development workshops and meetings in the first year, and the adoption and implementation of the m-learning science curriculum began in the second year. The teachers integrated the scaled-up inquiry-based science curriculum supported by mobile technologies, changed classroom practices from using technology as a resource to a tool for reflection, evaluation, comparison, and collaboration, and evaluated the effects of the scaled-up curriculum on the students' performances. The teachers within this study were encouraged to use more constructivist pedagogical approaches which valued collaboration, learner autonomy, generativity, reflectivity, and active engagement (Looi et al., 2014). The authors of this study

highlighted that educators "need some time to adapt the inquiry-based curriculum supported by mobile technology and digest the relevant principles for integrating technology in an out of classroom" (Looi et al., 2014, p. 113). Schools or districts can research and analyze similar longitudinal studies to capture developments in innovations, to discover systematic school-based innovations, to advance theory, frameworks, design principles, resources, and strategies for effective and sustainable mobile learning.

M-Learning Integration in PK. Reeves, Gunter, and Lacey (2017) conducted a study to determine the ways in which integrating mobile technologies into a Pre-Kindergarten curriculum to enhance instruction using informal feedback that impacts students' academic achievement in emergent literacy and early math skills. As there are many Pre-Kindergarten classrooms or programs within large urban school districts, it would benefit educational leaders and developers of early childhood programs to view how m-learning is being implemented at introductory stages of development. At this early stage of development, children's engagement in learning tasks can be influenced by specific app features and content which adds educational value. However, teachers need to rely upon skills learned through professional development to evaluate m-learning apps before implementing them into classroom instruction. This study identified that there is a need for more research in K-12 schools for implementing m-learning, especially in the early childhood educational setting and identifying early predictors of reading success (Reeves et al, 2017).

Reeves, Gunter, and Lacey (2017) article mentioned several strategies for teachers to implement m-learning by making sure that students' access is limited to other non-educational applications and effectively planning to evaluate and set up mobile devices

for integrated lessons. The findings showed significant improvements in phonological awareness and mathematics skills using informal feedback from students to guide instruction with m-learning when compared to the control group that did not receive the instruction using mobile devices. Oral language, vocabulary skill, and print knowledge did not display significant changes because of the developmental level of the students or the limited availability of applications focused on expressive and receptive language, or parts of speech. More research is needed to examine the effects of informal feedback to inform practice in higher grades to see the impact on theory, research, and effectiveness using mobile learning.

Situated learning implementation. As mentioned earlier in this review of literature, situated learning refers to lessons that move beyond the classroom and school environment to relevant real-world situations. Situated learning approaches are commonly used at amusement parks, museums, and on different types of field trips. Chu (2014) explored the effect of online strategies on an m-learning environment that combined digital resources and the real-world learning context. This approach used situated learning while evaluating the effects of cognitive load to improve learning achievement. This research study took place at Chin-An Temple in Tainan County of Taiwan where students were expected to learn the five main parts of the temple, its architectural characteristics, and historical story. The m-learning system allowed students to have access to the Internet, repeat questions and answers, and provided hints and immediate feedback.

Chu (2014) also investigated the effect of applying web-based pedagogical approaches known to be effective during m-learning activities. The situated mobile

learning system allowed for the experimental group to respond to assessment questions, change responses by providing three chances to submit the correct answer, and supplying hints when incorrect answers are submitted. The control group only had one opportunity to submit the correct answer but could return to locations for exploring more clues. Unfortunately, the results showed that the control group performed significantly better than the experimental group on the posttest. The author posited that this result was due to the poor instructional design of the experimental group's program that inhibited their ability to concentrate on the content as opposed to just getting the task completed. The conclusion of this study stated that proper learning design and guidance procedures or tools can help improve students' learning achievements in m-learning environments (Chu, 2014).

Barriers and Challenges of M-Learning

Despite the numerous results showing the positive perceptions of teachers implementing m-learning effectively, there are still educational institutions and teachers who are reluctant to utilize this technology. In a study examining educator perceptions of m-learning (O'Bannon and Thomas, 2014), there was a significant difference between perceptions of teachers over 50 years of age and those in younger age groups—teachers over 50 were much more likely to describe m-learning as problematic. Teachers' age affects their perceptions of m-learning's usefulness and ease of use. Teachers in the study also identified the following classroom disruptions associated with m-learning: cheating, cyberbullying, sexting, and access to inappropriate content (O'Bannon & Thomas, 2014). There are internal (technological, pedagogical beliefs, and resistance to change) and external (resources and policies) barriers that limit the efforts of teachers to

implement new technologies (Rikala et al., 2014). It is in the experience of the researcher that teachers with low confidence using technology and who struggle with operating their own smartphones, personal computers, and mobile apps are more likely to be reluctant to use or avoid frequent use of technology. In the absence of appropriate pedagogy, mobile technology can detract or distract from learning as teachers are unable to effectively instruct the learner (Phillip & Garcia, 2013). This can lead to the loss of instruction needed to foster critical thinking, higher ordered thinking, and problem-solving activities. Resistance to change can be the result of a combination of factors, including when teachers do not perceive the benefits m-learning based on their personal beliefs or previous experiences. Additional resource and policy barriers which must be addressed by educational administrators include the lack of accessibility to the Internet or technology devices, issues around violations to security or classroom routines, limited or lack of on-staff technology support, and managing the effects m-learning on processes and activities involved with teaching and learning in the classroom (Al-Hunaiyyan et al., 2016; Phillips & Garcia, 2013).

Factors Informing Successful M-Learning Implementation

The positive perceptions of teachers and the ways in which they implement m-learning impact the adoption of m-learning as a part of the learning culture of educational institutions—and more specifically within K-12 classrooms. Educational institutions and teachers can begin this process by evaluating and selecting the best tools for m-learning activities, aligning mobile activities with pedagogical approaches, and actively using these tools both inside and outside of class activities for effective learning (Ozdamli & Uzunboylu, 2015). When incorporating new technologies, educators need to be able to

clearly articulate the rationale for how m-learning will allow students to meaningfully collect, represent, visualize, analyze, or communicate just text for a set of learning goals (Phillip & Garcia, 2013).

Several factors have been identified as influencing teachers' perceptions and enabling m-learning to become more frequently used in the classroom. These include professional development, pedagogical approaches, behavior intentions, acceptability, and sustainability of the transformation of teaching and learning. For example, Looi et al. (2014) research mentioned earlier in this chapter included all these factors in transforming teachers' perceptions and effective implementation of m-learning. The adequate training of teachers supports the integration, implementation, and effectiveness of m-learning. Educational institutions, instructional designers, and instructors should employ grounded pedagogical approaches—such as behaviorism, constructivism, situated learning, collaborative learning, and scaffolding—to use as a guideline to design and development m-learning. By understanding teachers' attitudes and motivation, learner-centered approaches can be used to individualize, differentiate, and support teaching and learning.

Conclusion

This review sought identify how teachers' perceptions of usefulness, frequency of use, and acceptance of mobile technology has influenced and impacted m-learning in the broader literature. Though this research of literature focuses on teachers' perceptions of implementing m-learning, the information addressing professional development and pedagogical approaches provides a foundation for understanding the ways in which knowledge and experiences influence teachers' response to m-learning. Educational

administrators, instructional designers, and instructors around the country are working with various existing pedagogical approaches to develop sustainable m-learning programs and to determine the long-term impact of m-learning on students' academic achievement. Teaching and learning are shifting toward a more student-centered approach wherein teachers cease to be the sole source of knowledge and students become more autonomous in their pursuit of learning (Al Tameemy, 2017).

CHAPTER THREE:

METHODOLOGY

One challenge of researching the use of m-learning was the need to understand how teachers' perceptions affect teaching and learning when they are trained and supported for effective implementation. The purpose of this dissertation research was to examine the statistical differences for the following research questions:

1. Is there a difference in mobile learning readiness between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not?
2. Is there a difference in perceived usefulness between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban who do not?
3. Is there a difference in perceived ease of use between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban who do not?

A quantitative, causal comparative study was conducted to compare the perceptions of K-8 teachers from a large urban school district who were implementing m-learning aligned with pedagogical approaches in their teaching and learning. A quantitative methodology was used to answer the research questions. The causal comparative design (Creswell, 2015) allowed this research to compare the two groups of

teachers on the same dependent variables (i.e. perceived usefulness, perceived ease of use, and mobile learning readiness). The two groups of teachers identified to participate in this group comparison study were intact and the setting was an authentic situation with no need to create artificial groups (Creswell, 2015). The purpose was to capture the significant difference between K-8 teachers' perceptions of implementing m-learning using pedagogical approaches.

This chapter describes and explains the methodology and design that guided this research. It identifies inclusion criteria, the study participants, and relevant demographic information. The setting and context of this study present the geographic locations and demographics of both schools and the overall school district. The procedures and data collection section provided an overview of how teachers were informed about the study and their rights within it, what their participation meant to the field of research on m-learning, and how they accessed the survey and entered responses. This section also includes the procedures followed when applying for IRB approval (see Appendix A), and participants consents forms for approval and removal from study. The analysis section of the chapter explained the process for organizing, calculating, and interpreting the statistical data from the surveys to answer the research questions and null hypotheses. Care was taken to ensure that the research study could be replicated for future researchers to compare the results in other learning environments and provide K-12 educational institutions with evidence to support schoolwide implementation of m-learning.

Method and Design

The quantitative research design was a causal comparative study of teachers and the differences in perceptions, attitudes, and motivation when integrating and

implementing m-learning into classroom instruction. The purpose of using a causal comparative study was to examine the possible factors informing the perceptions of teachers from two different schools towards implementing m-learning using pedagogical approaches. This design was chosen because the study examined teachers' perceptions after they received training or information on the implementation of m-learning. M-learning was being implemented in these two schools either in a schoolwide program or in individual classrooms.

For more than five years, the teachers in School A (pseudonym) were provided with structured professional development in the use of m-learning and for aligning pedagogical approaches to students' teaching and learning. The teachers in School B (pseudonym) were asked by the school's administrator to integrate mobile technology within their classroom instruction to expose learners to the technology and to initiate more differentiated learning within instructional practices. The results of this study can assist other K-12 educational administrators and teachers who are considering implementing m-learning schoolwide or within a specific grade level or content area in guiding and supporting the delivery of effective m-learning pedagogical approaches by addressing factors to improve teachers' perceptions and expectations.

Participants

The participants of the study were drawn from a large urban K-12 school district in southeastern Michigan with 2,749 teachers among 116 schools. Convenience sampling—that is a non-random sampling—was employed for the selection of participants. The teachers were readily available and able to provide useful information for answering the research questions and hypotheses. I formerly taught within this school

district for more than 20 years. For a duration of five years I taught at School A and another five years I was a teacher at School B. A request for permission to access to schools and teachers' participation for them to complete a survey was made to the school district's Office of Research, Evaluation, Assessment, and Accountability and the administrators from each school (see Appendix B). The acquisition of instructions and forms seeking permission to conduct research were obtained from the school district's website.

The teachers selected for this research came from two K-8 schools within the same school district and all were certified in their designated content areas—including special education. The teachers participating in this research were all over the age of 21 and certified to instruct in the State of Michigan. Based on the 2015-2016 MI School Data Educator Effectiveness snapshot, 61 out of 64 teachers were rated as effective or highly effective on evaluations observed by the school administration of each school. Thirty-two of 33 teachers at School A were given an effective teacher evaluation, while 29 of 31 teachers at School B received effective evaluations. The participating teachers for both K-8 schools were majority female and reported having a basic understanding of using technology—mainly for taking attendance, tracking grades, administering online testing, and general word processing. Many of the teachers possessed their own smartphones and/or tablets with Internet access for personal usage.

The administrators from each school provided the researcher access within the school to contact teachers in person with information about the research study, consent forms, and a link to the online survey. The teachers volunteered for the study by completing the consent form —in which additional information was provided about

withdrawal from the study, if necessary. A sample size formula provided the means for determining sampling error and power of analysis (Creswell, 2015). The sample population and sample size of 70 teachers was needed to ensure good power for the statistical analysis and design. For a causal comparative study, Gall, Gall, and Borg (2007) suggested a need for at least 15 participants in each group when estimating an adequate sample size. There were 18 teachers from School A and 21 teachers from School B who participated and completed the online survey in the research study.

Setting/Context

The targeted population for this research was K-8 educators from a low socioeconomic school district in a large urban city in southeastern Michigan. Many of the school buildings being used in this area were built in the early 1900s and earlier. Title I Part A of the Elementary and Secondary Education Act, Sec. 31A At-Risk and other grant funding was designated over the last decade toward schools' technology infrastructures and equipment purchases to setup wired and wireless networks to support and access for new technologies. Electrical service to both buildings built before 1965 had to be upgraded and multiple new electrical outlets were installed into classrooms to supply sufficient power to equipment. Prior to the electrical upgrade, many of the classrooms had one or two electrical outlets and limited wireless access points to handle all the devices that required electricity and connectivity to operate. School administrators and teachers were often frustrated with the unreliability of technology due to the insufficient infrastructure prior to the upgrades to the network. The installation of multiple wired and wireless access points, and increased bandwidth could support many devices connecting to the Internet. New schools were built in the area with multiple

network access points and electrical outlets to support equipment. This also helped to reduce teachers' frustrations with using the network.

School A was a K-8 school originally built in the 1890s. The school was located on the eastside of an urban school district and was the only school within at least a 5-mile radius. A large majority of the students attending the school are bussed in from neighborhoods within the 5-mile radius, while other students walk or were driven by parents, relatives, or neighbors. The classrooms have been updated over the years with electrical power, the installation of data network for both wired and wireless connection and outfitted with SMARTBoards. In recent years, computer labs and media centers were constructed for whole group instruction with desktops. Laptops, netbooks, and iPads were assigned to classroom teachers and stored within secured rooms on each floor in the building where they were being used. Prior to 2012, School A was classified as a "priority school"—has been identified as the lowest performing five percent of Title 1 in the state over a consecutive three-year duration—by the State of Michigan and the school administration and staff were changed several times. The school was classified as a "reward school"— has outstanding student achievement or growth over a consecutive three-year duration —because of the improvement in students' standardized test scores.

The school's principal adopted a schoolwide blended learning model using mobile devices and other technologies to provide an alternative method of delivering instruction to the students. After two years of implementing this schoolwide blended learning model, students' standardized test scores had improved significantly, and it became a model for other schools. Teachers were provided with professional development, an online curriculum, and on-staff technology support for integrating mobile technology and

aligning pedagogical approaches into classroom instruction. Initially, the school partnered with an educational consultant and an online educational program to train teachers how to implement the curriculum along with the technology available. Classroom teachers partnered with online instructors to identify student needs to differentiate instruction and effectively implement the program. Students used technology more frequently and in a structured manner that resulted in a significant impact on their learning. After several years of implementation, the teachers currently providing professional development to their colleagues with best practices and strategies to improve academic achievement.

School B in this study was also on the eastside of the urban school district, though it has a slightly different configuration. There are two buildings that make up this school—one was constructed in 1965 and the other was constructed in 2001. The building constructed in 1965 was where grades 6–8 and the self-contained special education classes are held. Inside the older building, there were computer labs with desktop workstations for whole classes to use for testing and instruction. Several laptop, netbook, and iPad carts are available to use in the classrooms by teachers and students. The building recently updated its electrical power, wired and wireless network connections. The building constructed in 2001 was where grades PK–5 are held. This building also contains a computer lab for whole group instruction and online testing. School B was considered a "priority school" by the State of Michigan. School administration and teachers have been changed several times. The school's status has remained unchanged since its priority school designation in 2012. The nearest school to School B was over four miles away. Most students attending this school were bussed in,

while a few students were still able to walk or receive rides to and from school. In the beginning and throughout the school year, teachers were asked by school administration to integrate technology into teaching and learning activities. Some of the teachers independently researched for best practices or activities that best fit the content being taught. Others continued with their traditional style to teaching with the integration of little or no technology.

Instrumentation

Instrument used to collect data. The online survey was used to appropriately provide data to assess the research questions and hypotheses identified for this research study. An online survey was developed and modified to address the targeted audience to assess teachers' perceptions of m-learning focusing on the categories of the Technology Acceptance Model (TAM) and the extended TAM. The two models are based on the research conducted by Davis (1989) and Sanchez-Prieto et al. (2016) who investigated the perceived usefulness, perceived ease of use, behavioral intentions, and user acceptance of information technology. The TAM model has been modified and used by many other researchers to investigate m-learning's impact on teachers' perceptions of the effectiveness of teaching and learning, the influence on instructional decisions to use or not, self-efficacy, and predictive factors for acceptance (Attis, 2014; Chen et al., 2013; Domingo & Garganté, 2016; Gao, Krogstie & Siau, 2011; Long, Liang, & Yu, 2013; Mac Callum, Jeffrey, & Kinshuk, 2014; Okyere-Kwakye, Nor, & Ologbo, 2016). Also, Mobile Learning Readiness Survey (MLRS) (Christensen and Knezek, 2017) was included in the development of the online survey. The MLRS measures teachers' acceptance and readiness for teaching and learning in a mobile learning environment

based on four factors, i.e. possibilities, benefits, preferences, and external influences (Christensen and Knezek, 2017).

A search of published journal articles was used to find instruments within similar areas of research. Surveys based on TAM and extended TAM were researched and studied to develop one instrument to measure and compare the data collected from the two groups of participants. The reliability and validity of the survey was compared to others used within similar research studies to determine if it yields the same results.

A web-based electronic survey was constructed to collect, measure, and compare data for all research questions and hypotheses. The survey was created and delivered through SurveyMonkey which was an online survey creation and collection tool. An investigation of two other online survey tools determined that SurveyMonkey was the most beneficial and easy for participants to use. SurveyMonkey supports over 100 questions, was transferrable to the software Statistical Package for the Social Sciences (SPSS) for statistical analysis, provides links for participants to access the survey, and is usable on multiple devices and operating systems. The online survey tool supported users when there was a problem. The purpose of the survey was to gather demographical data on the sample population, to determine the differences in teacher perceptions, attitudes, and motivation toward integrating m-learning, and to determine the differences between the two groups delivery of m-learning in K-8 classrooms. The results of the teachers' responses were calculated using SPSS—a statistical software used for entering data, performing calculations, and providing tables and graphs of statistical analysis.

Various types of data were used for measurement and comparison of the variables within this research study. The data collected provided demographic information about

the teachers from School A and School B—including age, highest earned degree, years of teaching experience, primary teaching content area, grade level(s) taught, and stage of adopting and implementing mobile learning. An attitudinal measure was used to measure the impact on classroom instruction, perceptions, attitudes, and motivation of teachers using m-learning (RQ1; RQ2; RQ3).

A 42-item Likert online survey (see Appendix F) was developed and modified based on the categories of TAM (Davis, 1989), extended TAM (Sanchez-Prieto et al., 2016), and Mobile Learning Readiness Survey (Christensen and Knezek, 2016). The first section asked for participant demographics: age range, highest earned degree, years of teaching experience, primary teaching content area, and grade level(s) taught. The second section consisted of 20 items on participants' readiness and acceptance to implement mobile learning in relation to its possibilities, benefits, and external influences on work productivity, effectiveness, and interest in mobile technologies. The third section has six items addressed the participants' perceived usefulness regarding mobile technology improving and enhancing learning. The fourth section (four items) addressed participants' perceived ease of use when interacting with mobile technologies. The last section on teachers' pedagogical approach consisted of six items which asked about the participants' stages of adoption where they perceived themselves in the implementation of mobile technology within teaching and learning.

Scales of measure. The online survey measured the attitudes and feelings of the participants toward implementing m-learning. A nominal scale was used to collect demographic information about the teachers (i.e., grade taught, years of experience, training received, etc.). The survey items were referenced using the initials in the

abbreviations section and a number connecting the item to its position being asked. Categories were given numerical values to input into data storage and SPSS to provide descriptive statistics on the teacher responses. An interval scale was used to measure teachers' responses to questions about perceptions, attitudes, motivation, and implementing m-learning into classroom instruction. Likert scale responses ranging from "strongly agree" to "strongly disagree," and "always" to "never" were familiar to teachers for evaluating items and provided equal intervals for scoring. The Likert scale range were converted to numbers (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree) so that the computer software could analyze the data collected. Table 1 provides a sample of the questions and format of the instrument designed for this research study.

Table 1

Sample Teacher Survey on M-Learning

Teacher Survey on M-Learning

Directions: Please answer the following question pertaining to the utility, usefulness, usability and general conceptions of m-learning. All respondents will remain anonymous.

Perceived Usefulness	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Mobile technology will make learning and teaching more interesting	5	4	3	2	1
M-learning is a way of encouraging more interaction by students and educators.	5	4	3	2	1

Table 1 (Continued)

Perceived Usefulness	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
M-learning is a way to improve student learning as it allows students to access learning content anytime and anywhere.	5	4	3	2	1
M-learning is a way to enhance/encourage my students' self-directed learning.	5	4	3	2	1
The use of mobile technologies in my teaching practice enhances my productivity.	5	4	3	2	1
The use of mobile technologies can make me more effective at work.	5	4	3	2	1

Procedures and Data Collection

The following chronological, step-by-step format describes the procedure used for conducting this research study.

IRB approval. The researcher obtained Institutional Review Board (IRB) training and a completion certificate through the University of Memphis. A description of this research study was submitted to the IRB for approval which included the purpose of the study, the data collection process, guarantees for protection of the participants, and a sample informed consent form. A review of IRB approval process for the university was conducted to understand the procedures and supply evidence for protecting participants. Also, an application to conduct research within the school district was

submitted and approved. This approval allows the researcher to have access to the teachers within designated school to complete the online research survey.

IRB approval was gained to guarantee to participants the research will cause minimal risk and consent for participation in research. The level of risk for this study was minimal to no known risk because teachers supplied information anonymously and online. Efforts were made for teachers to complete the survey within a 15-minute timeframe and outside of classroom so that it did not disrupt instruction. Informed consent forms were developed and delivered within the online survey to participants to select either "yes" or "no" before participating in the study. The informed consent forms outlined participants' rights, their right to withdraw at any time, the voluntary nature of participation in the study, and the purpose of the study (see Appendix D). The informed consent form was included at the beginning of the online survey. The participants were asked whether they agree to participate by selecting the appropriate option button after reading the online consent form. The participants were redirected to the survey if they agreed to the terms of the informed consent form. Conversely, they were redirected to the last page of the survey, if they chose not to participate in the study.

Recruitment of participants. The target population for this study was K-12 teachers using mobile technologies within classroom instruction in a large urban school district educating students from low socioeconomic communities in southeastern Michigan. The sample population was teachers integrating mobile technologies into classroom instruction from two schools within the school district. A non-probability sampling approach using convenience sampling was used to select participants as the teachers were willing, available, and fit the criteria for answering the questions and

hypotheses of this study (Creswell, 2015). The sample size of the causal comparative study will contain at least 20 participants in each group. The researcher contacted the schools' administrators to briefly describe the purpose of this study and what was expected of teachers for their participation. All participants received a brief presentation from the researcher about the study and provided with a link to access the survey. The presentation was delivered at a regularly scheduled staff meeting and professional development when all teachers are required to attend.

Data collection. The web-based electronic survey allowed participants to access the information on the survey in privacy and at a time they chose. The participants used the schools' computer lab, laptops, tablets, or smartphones to complete the survey. They were asked to complete the survey alone and to answer honestly. There were 39 surveys completed and 39 respondents answered "yes" to the consent forms prior to answering the survey items.

The independent variable was the participating teachers within the two schools from the large urban school district. The dependent variables—perception of m-learning approaches—was defined as mobile learning readiness, perceived usefulness, and perceived ease of use for guiding m-learning integration and implementation in the classroom. The controlling variable was teachers who had attended structured professional development that could influence their perception on how to implement m-learning approaches compared to teachers who had not received structured professional development.

Data Analysis

Prior to performing an analysis of the data, all responses to the survey were organized and analyzed to make sure participants fully completed all sections in an accurate manner. The data collected was sorted by categories to make it easier to identify mistakes. A codebook was constructed to show a list of variables or questions that indicated the code or score responses from the instrument (Creswell, 2015). Participants' returned surveys were assigned identification reference numbers so that participants could remain anonymous in their responses. Nominal and interval scales were converted to numerical values and coded so that the computerized statistical software could calculate and organize the results accordingly. Scoring the data was calculated using SPSS for Windows. An Excel spreadsheet using the codebook for this research study was constructed to input all the data collected from the participants.

Demographic information and other categorical measures were summed individually or by group to determine the percentage in relation to the whole. The mean scores for the responses described the average score for teachers' perceptions, attitudes, and motivation towards m-learning. The mean score provided a quick glance at the differences between the two schools by the teachers' responses. The measures of variability examined each group's spread scores in range, variance, and standard deviation to indicate the amount of variability in the distribution of scores (Creswell, 2015). The distribution scores showed the grouping of teachers' responses and where majority of the responses appeared on a normal distribution curve.

Inferential statistics were used to interpret the null hypotheses and determine the significant differences between teachers who were integrating m-learning with or without

structured professional development. A level of significance (alpha level) was set at $p < 0.05$ for the reason to reject the null hypothesis which showed "there is a difference." This was a one-tailed test of significance—indicating the likelihood of rejecting the null hypothesis. A determination of the effect size identified the strength of the differences between the two groups using Partial Eta Squared.

A Pearson's correlation coefficient was conducted to measure the strength of linear association between the three dependent variables to determine multicollinearity. The assessment data from the teachers of the two schools were from equal populations so there was an assumption of homogeneity of variance to make sure that the groups are statistically the same. An assumption for the multivariate approach was conducted to determine the homogeneity of variance-covariances for Box's M test for the null hypothesis observed for the ratio between-subjects effect (Hinkle, Wiersma, & Jurs, 2003) and significant value ($p > 0.05$) to confirm their equal variance across groups. A test for the equality of the error variances, as defined by, across the combination of independent variables and each of the dependent variables. Matching of the groups by the schools reduced the internal threat of selection bias.

A one-way multivariate analysis of variance (MANOVA) was selected to understand whether there were differences in the perceptions of two schools who engaged in different professional development and their perceptions of implementing m-learning (i.e. the three dependent variables are mobile learning readiness, usefulness, and ease of use). A MANOVA analyzed the three research questions on the differences in means for perceived usefulness, perceived ease of use, and mobile learning readiness between the teachers at the two schools. A MANOVA tested the means of the two groups of teachers

on their related dependent variables. Assumption of linearity assumed that the relationship between the variables were linear. A scatterplot was created to examine this assumption. A straight line would indicate that it is linear. A curvilinear line would indicate that assumption is not tenable and other assumption tests, such univariate normality and equal variances, test for normal population distributions and test for same variances between populations (Rockinson-Szapkiw, n.d.).

Conclusion

Within this chapter, a description of the procedure for conducting this research is outlined in the method and design of the study, description of the participants, collection of data, and the type of data analysis used. This quantitative, causal comparative study will be used as ex post facto since the two groups are already involved in implementing m-learning and fit the criteria of the study. The online survey being used for the study has the ability store all assessment items, create a link connecting participants to the survey, and sort and transfer all data to SPSS for statistical calculation. Once the data has been transferred, and calculated in SPSS for analysis, the results of the findings will be written in the next chapter.

CHAPTER 4:

RESULTS

The purpose of this research study was to identify if there were differences in the perceptions of K-8 teachers in urban contexts who were implementing different pedagogical approaches using mobile technology and teachers who do not. Through understanding teachers' perceptions and assessing their perspectives of m-learning, educational institutions and administrators can provide the appropriate training and support emphasizing pedagogical approaches, evaluating mobile technology and apps, and having a positive impact on learning. To address the research gap, the participants' selection was based on two schools' approaches toward implementing mobile technology within their teaching and learning practices. The implementation of m-learning included schoolwide and/or individual teachers use of technology to deliver, guide, or support instruction.

As noted in Chapter 3, a quantitative methodology was used to examine the statistical differences for the following research questions:

1. Is there a difference in m-learning readiness between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not?
2. Is there a difference in perceived usefulness between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not?

3. Is there a difference in perceived ease of use between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not?

Data Collection

The data collected for this quantitative research used SurveyMonkey which is an online survey tool with the ability to convert survey responses to an Excel spreadsheet and prepare the data for uploading into SPSS. The survey was delivered to the teachers during the second semester of the school year after receiving professional development and allowing teachers a chance to implement what they learned into practice. The professional development administered to the teachers varied from structured to non-structured learning, which ranged from a few hours to a couple of days. School A had several organized and structured professional developments throughout the year that focused on technology integration within classroom instruction. School B did not attend any organized and structured professional developments that directly targeted technology integration within classroom instruction.

To begin the data collection, the teachers were provided with a brief introduction and overview of the research from the researcher after receiving professional development earlier in the school year. Each teacher was provided a link to access and complete the survey. The teachers used their smartphones, laptops, tablets, or desktop computers to complete the survey. There were 42-items (six on demographics, 20 on mobile learning readiness, six on perceived usefulness, four on perceived ease of use, and six on stages of adoption) in the survey which took each teacher approximately 7 minutes

and 22 seconds to complete. As noted in Chapter 3, the survey consisted of items from the extended TAM survey (Sanchez-Prieto, et al. 2016) and Mobile Learning Readiness Survey (Christensen and Knezek, 2016). The scoring for the survey used a 1 to 5 Likert scale where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree per item to for teachers to describe their perceptions on the dependent variables. The survey was available for three days to allow those participants who were absent or unable to take it due to prior commitments within the school. Majority of the teachers were able to complete the online survey on the first day it was made available. Once the survey was closed, the responses were downloaded into an Excel spreadsheet from Survey Monkey. Then, the spreadsheet was uploaded and coded in SPSS for data analysis.

Data Analysis

Participants Demographics

The teachers from two K-8 schools in a large urban school district provided their perceptions toward implementing m-learning. Of the 39 respondents, there were 18 teachers from School A (pseudonym) and 21 teachers from School B (pseudonym). The teachers from School A implemented a schoolwide blended learning model where pedagogical approaches and professional development integrated technology into teaching and learning. The teachers from School B used traditional teaching approaches but were asked by the administrator to integrate technology into their classroom instruction. Each school had desktop computer labs, mobile carts containing laptops and tablets, which were available for teachers and students to use for instruction and online testing.

All the teachers who participated in the study responded to seven items about themselves. The majority of the teachers who primarily taught English/Language Arts (*n*=17, 43.6%) and Mathematics (*n* = 9, 23.1%). The group categorized as Other (*n* = 8, 20.5%) were Special Education teachers and Instructional Specialist. At least 71.8% of the teachers had taught between 11 and 30 years. There was an equal representation of teachers across groups that taught students in grades K -2 (*n* = 12), 3 – 5 (*n* = 14), and 6 – 8 (*n* = 13). Majority of the teachers perceived their technology adoption as either Stage 4: Familiarity with confidence (*n* = 12, 30.8%) or Stage 5: Adoption to other contexts (*n* = 15, 38.5%) (See Table 2).

Table 2

Frequency for Stages of Adoption Between Schools

	School A	School B	Total	Percent
Stage 1		0	0	0
Stage 2		2	2	5.1
Stage 3		2	2	5.1
Stage 4	7	5	12	30.8
Stage 5	7	8	15	38.5
Stage 6	4	4	8	20.5
Total	18	21	39	100.0

Descriptive Statistics

According to Buehl and Beck (2015), it is important to explore factors or approaches that may better prepare teachers to enact beliefs, even though there may be challenges and obstacles. The descriptive statistics displayed and analyzed in this section

were the participants responses to the 30-scaled statements about m-learning readiness, perceived usefulness, and perceived ease of use (Christensen and Knezek, 2017; Sanchez-Prieto, et al., 2017). The descriptive statistics disaggregated by groups, teachers who attend structured and organized professional development (School A) and teacher who do not (School B) are outlined in Table 3

Table 3

Descriptive statistics for teacher's perceptions

	School A		School B	
	M	*SD*	*M*	*SD*
Mobile Learning Readiness	69.38	11.04	69.66	8.55
Usefulness	24.44	3.55	29.90	3.52
Ease of Use	16.16	2.59	16.52	2.48

The overall goal of this study was to determine if there were a difference in teachers' perceptions of m-learning after systematically receiving professional development on technology integration and those who do not. For this comparative analysis, the schools and stages of technology adoption were the independent variables. The dependent variables for this research study were Mobile Learning Readiness, Perceived Usefulness (PU), and Perceived Ease of Use (PEU). A series of Pearson's correlations were performed prior to conducting the MANOVA between all the dependent variables testing the assumption that dependent variables would be correlated with each other. Pearson correlation coefficient demonstrated that each pair of the dependent variables were positively significant associated (See Table 4). However, no

correlation coefficients exceeded the critical value of .9; there were no multicollinearity. The assumption of the homogeneity of variance-covariances were address using Box's M test of equality of covariance matrices and was found tenable, Box's M = 16.01, F = 2.43. p = .024 (See Table 5).

Table 4

Pearson's correlations of dependent variables (n = 39)

	Usefulness	Ease of Use	Mobile Learning Readiness
Usefulness	-	-	-
Ease of Use	.382*	-	-
Mobile Learning Readiness	.642**	.199	-

*. Correlation is significant at $p < 0.05$ level (2-tailed).
**. Correlation is significant at $p < 0.01$ level (2-tailed).

Table 5

Box's Test of Equality of Covariance Matrices

Box's M	F	df1	df2	Sig.
16.012	2.430	6	9259.220	.024

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups
a. Design: Intercept + School

To further explore the relationship, a multivariate analysis of variance (MANOVA) was conducted to determine if there were differences between the two schools (School A and School B) based on teachers' perceptions of mobile readiness, perceived usefulness, and perceived ease of use. There was non-statistically significant difference between faculty who participated in the structured and organized professional development (School A) versus teachers who have not (School B) on the combined (or

linear combination of) dependent variables, Pillai's Trace = .008, F (3, 35) = .095, p = .962, Partial η^2 = .008 (See Table 6). Since the MANOVA results were not significant, follow up ANOVA were not conducted. Assessed by Levene's Test of Homogeneity of Variance, the homogeneity of variances was tenable for all the dependent variables (Mobile Learning Readiness, p = .392; Usefulness, p = .965; Ease of Use, p = .928) (See Table 7).

Table 6

Multivariate tests using Pillai's Trace

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial η^2
School	Pillai's Trace	.008	.095	3	35	.962	.008
	Wilks' Lambda	.008	.095	3	35	.962	.008
	Hotelling's Trace	.008	.095	3	35	.962	.008
	Roy's Largest Root	.008	.095	3	35	.962	.008

Computed using $p < .05$

Table 7

Levene's tests of equality of error variances

	F	df1	df2	Sig.
Usefulness	.002	1	37	.965
Ease of Use	.008	1	37	.928
Mobile Learning Readiness	.750	1	37	.392

Tests the null hypothesis that the error variance of the dependent variable is equal across groups

a. Design: Intercept + School

Research Question 1

Is there a difference in m-learning readiness between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not?

The responses were adapted from the constructs outlined in Christensen and Knezek's (2017) M-learning Readiness Survey. The differences observed in how teachers used technology in their classrooms could be related to pedagogical orientations along with understanding the skills required for a 21st century education (Ertmer, et al., 2015). As this research began to examine the responses of the participants, the data served as indicators to how teachers approached using mobile technology in the classroom and deciding which instructional strategies could drive teaching and learning in and out of the classroom.

To answer Research Question 1 about teachers' m-learning readiness, an analysis of variance (ANOVA) was examined to determine if there were any statistical differences between two schools' engagement in professional development to implement m-learning (IV) and their perceived m-learning readiness (DV). The assumption of homogeneity was met as indicated in the Levene's Test of Homogeneity of Variances for mobile learning readiness (F (1, 37) = .750, p = .392) (Table 7). There was non-statistical significant difference between the schools and mobile learning readiness for providing new opportunities delivering instruction with mobile technology.

In examining the overall perceptions of mobile learning readiness, the results of the survey suggest that the participants tended to have similar positive perceptions, as defined by the constructs, on the possibilities of using mobile technology for teaching and

learning (See Table 8). In particular, the participants perceived that implementing m-learning would provide new opportunities for learning (mPoss2, *M* = 4.20), connect learners to people, content, and resources (mPoss3, *M* = 4.23), and improve skills needed for 21st century (mPoss6, *M* = 4.20) (Table 9) as three main possibilities. As it relates to theory and practice, constructivism states that knowledge is constructed from experience, learning results from personal interpretation and shared by a community of learners (Richey, Klein, & Tracey, 2011). In line with this assertion, the results suggest that new opportunities for learning could imply that the differentiation and individualization of knowledge construction would widen teachers' abilities to reach learners within the classroom. Specifically, the data indicates the participants could view mobile technology a way to access information and afford opportunities for students to become independent learners. In terms of constructivism, the results suggest mobile technology could be perceived as a way to improve learners' application of skills needed for the 21st century.

Table 8

Possibilities of Using M-Learning (*n* = 39)

Code	Item	Strongly Disagree/Disagree	Neutral	Strongly Agree/Agree	M
mPoss1	Mobile devices can play an important role in K-12 education.	7.7%	7.7%	84.6%	4.10
mPoss2	Mobile learning will bring new opportunities for learning.	2.6%	7.7%	89.7%	4.21

Table 8 (Continued)

Code	Item	Strongly Disagree/Disagree	Neutral	Strongly Agree/Agree	M
mPoss3	Mobile technology should be used to connect learners to people, content, and resources.	2.6%	10.3%	87.2%	4.23
mPoss4	Mobile learning will increase flexibility of learning.	5.2%	10.3%	84.6%	4.10
mPoss5	Mobile learning can be used to improve traditional literacy programs.	7.7%	10.3%	82.0%	3.97
mPoss6	Mobile technology can be used to improve 21st century skills.	0.0%	10.3%	89.8%	4.21
mPoss7	Technology can be used to level the playing field for special education students.	2.6%	28.2%	69.2%	4.21
mPoss8	Mobile devices can enhance learning if there is adequate support for teachers.	2.6%	2.6%	94.9%	3.95

Results are based on percentages.

The study explored the benefits of implementing mobile technologies in the classroom to increase learners' motivation, participation, engagement, and independent learning. The results suggest that teachers were struggling with perceiving the benefits of mobile technology in the classroom. There were on average at least 25% of the participants who responded neutral on the benefits of using mobile technology in the classroom (See Table 9). The survey item on whether mobile devices would introduce a significant distraction in the classroom (mBen1) showed that 51.3% of the participants

perceived mobile technology as a possible distraction (*M* = 2.79, See Table 9). As such, this could imply that the participants could require more training and/or support in managing mobile technology and keeping learners engaged in learning activities. Similarly, there were 53.5% of the participants who were skeptical or had a negative position toward how m-learning can improve communication between students (mBen7, see Table 9). One could argue, this could be a result of the participants not being aware of how to use collaborative tools and social media effectively for teaching and learning.

Table 9

Mobile Readiness for Benefits of Using Technology in Classroom (*n* = 39)

Code	Item	Strongly Disagree/Disagree	Neutral	Strongly Agree/Agree	M
mBen1	Mobile devices would introduce a significant distraction in my classroom.	48.7%	20.5%	30.8%	2.79
mBen2	The use of mobile technology in the classroom makes students more motivated to learn.	7.7%	28.2%	64.1%	3.82
mBen3	The use of mobile technology in the classroom increases student participation in classroom discussions.	5.2%	33.3%	61.5%	3.74
mBen4	The use of mobile technology in the classroom increases student engagement.	5.2%	15.4%	79.4%	3.97
mBen5	The use of mobile devices in the classroom allows students to own their learning.	7.7%	23.1%	69.2%	3.77

Table 9 (Continued)

Code	Item	Strongly Disagree/Disagree	Neutral	Strongly Agree/Agree	M
mBen6	The use of mobile technology in the classroom allows students to develop activities.	7.7%	25.6%	66.6%	3.69
mBen7	Mobile learning will improve communication between students.	20.5%	33.3%	46.1%	3.41

Results are based on percentages.

When analyzing the results on External Influences, there were on average at least 67.8% of the participants perceived outside forces that prevented them from implementing m-learning. The participants' responses displayed that the schools' infrastructure and wireless network (mExt3, $M = 2.77$), curriculum conducive to using mobile technology (mExt4, $M = 2.74$) and administration supportive of students having their own mobile devices in school (mExt5, $M = 2.72$) made it challenging to implement m-learning (See Table 10). The negative response to the school's infrastructure and wireless network could be a result of slow connectivity during peak usage times or interruptions in wireless service during learning activities. Even though many textbook and curriculum developers integrated technology into their instructions, the participants may have perceived that using mobile technology took too much time to setup before all learners were able to actively engage. Despite, many districts and schools instituting BYOD/BYOT (Bring Your Own Device or Bring Your Own Technology) there were still concerns with adequate access, safety, liability, and appropriate usage from learners, especially in grades K – 8, as evident by the descriptions of the communities which the school serviced mentioned in earlier in this research study.

Table 10

Mobile Readiness Based on External Influences for Teachers' Usage (n = 39)

Code	Item	Strongly Disagree/Disagree	Neutral	Strongly Agree/Agree	M
mExt1	Students are more knowledgeable than I am when it comes to using mobile technologies.	28.2%	15.4%	56.4%	3.41
mExt2	My school is doing a good job of using technology to enhance learning.	23.1%	20.5%	56.5%	3.30
mExt3	My campus technical infrastructure and wireless network can accommodate students bringing their own technology.	41.0%	33.3%	25.6%	2.77
mExt4	My curriculum is conducive to students having their own technology.	43.6%	30.8%	25.6%	2.74
mExt5	My administration is supportive of students having their own device.	41.0%	30.8%	28.2%	2.71

Results are based on percentages.

Research Question 2

Is there a difference in perceived usefulness between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not?

To answer Research Question 2, an analysis of variance was examined to determine if there were any statistical differences between two schools' engagement in professional development to implement m-learning (IV) and their perceived usefulness

(DV) of m-learning. The assumption of homogeneity was met as indicated in the Levene's Test of Homogeneity of Variances for the perceived usefulness of m-learning (F (1, 37) = .002, p = .965) (See Table 7). As mentioned earlier, there was a non-statistical significant difference reported between the two schools and their perceived usefulness of m-learning.

This research study employed an instrument based on extended TAM (Sanchez-Prieto, et al., 2016) which measured perceived usefulness. The results suggest that the participants had positive perceptions on the usefulness of mobile technology and m-learning within the schools. The participants perceived mobile technologies could enhance their job performance (PU1, M = 4.18) and make teaching and learning more interesting (PU4, M = 4.18) (See Table 11). Results suggest teachers perceived m-learning as a way to improve student learning by accessing learning content anytime and anywhere (PU5, M = 4.28) and useful in their area of instruction (PU6, M = 4.10) (See Table 11).

A further examination of each survey item revealed that more than 20% of participants were neutral in how mobile technologies could make them more effective at work and enhance their productivity in teaching practices. Even though teachers may have high perceptions that integrating mobile technologies into the field would be good, they were seemingly unsure of their personal abilities to effectively perform tasks related to m-learning in the classroom (See Table 11). The results suggest that there is a small group of participants who may need more information or support into implementing best practices relevant to their content area inside and outside of the classrooms.

Table 11

Perceived Usefulness of M-Learning on Teaching Performance (n = 39)

Code	Item	Strongly Disagree/Disagree	Neutral	Strongly Agree/Agree	M
PU1	The use of mobile technologies can enhance my job performance.	00.0%	15.4%	84.6%	4.18
PU2	The use of mobile technologies can make me more effective at work.	2.6%	25.6%	71.8%	4.00
PU3	The use of mobile devices in teaching practice enhances my productivity.	5.1%	20.5%	74.3%	3.95
PU4	The use of mobile technology will make teaching and learning more interesting.	00.0%	5.1%	94.9%	4.18
PU5	The use of m-learning is a way to improve student learning as it allows students to access learning content anytime and anywhere.	00.0%	2.6%	97.5%	4.28
PU6	Generally, I consider that mobile devices can be useful in my area of instruction.	5.1%	10.3%	84.6%	4.10

Results are based on percentages.

Research Question 3

Is there a difference in perceived ease of use between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not?

To answer Research Question 3, an analysis of variance was examined to determine if there were any statistical differences between two schools' engagement in

professional development to implement m-learning (IV) and their perceived ease of use (DV) for implementing m-learning. Once again, the instrument was used based on extended TAM survey (Sanchez-Prieto, et al., 2016), which measured perceived ease of use. The assumption of homogeneity was met as indicated in the Levene's Test of Homogeneity of Variances for the perceive ease of use for implementing m-learning (F (1, 37) = .008, p = .928) (See Table 7). Once again, there was a non-statistical significant difference between the two schools in relation to the perceived ease of use.

The results found that the participants tended to be on the positive side of the scale on their abilities to learn how to use mobile technologies. The participants perceived that it would be easy learning how to use mobile devices in the classroom (PEU1, M = 4.13) (See Table 12). In examining the number of responses for each survey item on perceived ease of use, the number of participants from each school, and the number of participants for each stage of adoption, the differences in perceptions were result of the participants' stage of adopting technology. There were participants (n = 18) from School A which rated themselves from stage 4 to stage 6 in adopting technology (See Table 2). This implies that some of the participants from School B (See Table 2) who perceived stages of adoption as Stage 3: Understanding and application of the process and Stage 2: Learning the process did not believe with confidence that mobile technology would be easy to use in relation to instruction.

Table 12

Perceived Ease of Use of M-Learning (*n* = 39)

Code	Item	Strongly Disagree/Disagree	Neutral	Strongly Agree/Agree	M
PEU1	Learning to use mobile devices in the classroom would be easy for me.	2.6%	15.4%	82.0%	4.13
PEU2	I find it easy to interact with mobile devices.	00.0%	15.4%	84.6%	4.13
PEU3	Interaction with mobile devices is clear and easy to understand for me.	2.6%	25.6%	71.8%	3.92
PEU4	Generally, I consider that mobile devices are easy to use	00.0%	10.3%	89.7%	4.18

Results are based on percentages.

Summary

While most of the research on m-learning focused on learners' perceptions of m-learning, it was not until recently where studies began to explore teachers' perceptions and beliefs about m-learning and technologies (Rikala, et al., 2014). Teachers perceptions are influenced by many factors, which may have a significant impact on the teaching, learning, and academic performance of learners within the digital age. This makes it difficult to ascertain the true impact of new technologies and the perceived impact on teaching. One way to explore this is by attempting to differentiate how pedagogical approaches, professional development, technical and instructional support, and personal beliefs and abilities can influences teachers' decisions in implementing m-learning (Aldunate and Nussbaum, 2013; Royle, et al., 2014; Young, 2016; Yusri, et al.,

2015). Previous studies have suggested that teachers' attitudes and confidence were influenced positively or negatively by their perceived usefulness and perceived ease of use (Rikala, et al., 2014) of mobile technologies. However, this suggests that educators lack clarity about the exact benefits of implementing mobile technologies is education. Further empirical research is needed so that educational institutions and administrators could focus on professional development which provides instructional methods which implements schoolwide, content area, or grade level m-learning initiatives (Looi, et al., 2014; Reeves, et al., 2017).

Given that technology adoption is multifaceted, this chapter presented data analysis investigating teachers' perceptions of implementing m-learning within the K-8 classroom on a variety of factors. The study examined teachers' perceptions about m-learning and mobile technology through m-learning readiness, perceived usefulness, and perceived ease of use. The results revealed non-statistical significant differences between the two schools and the three dependent variables mobile learning readiness, perceived usefulness, and perceived ease of use. The two schools shared an overall higher perception of m-learning and mobile technologies implementation to enhance their work and improve teaching and learning in the classroom. The next chapter concludes the discussion on teachers' perceptions of m-learning by exploring other research which supports or contradicts the results of this study, and its implications and recommendations to the field of study.

CHAPTER 5:

DISCUSSION AND CONCLUSION

Previous research suggests that pedagogical approaches, professional development, integration and support as the recurring gap as it relates to identifying the impediments in the development and implementation of mobile leaning and technologies in the classroom (Baran, 2014; Chu, 2014; Looi, et al., 2014; Mouza and Barrett-Greenly, 2015; Reeves, et al., 2017). Research finds that teachers were often left on their own to learn and determine the best practices for integrating and implementing mobile technologies into instruction (Baran, 2014). This is especially problematic as teachers are constantly pressured to adopt the latest technology. As such, studies find negative emotions and perceptions result from not knowing how to effectively use mobile technologies, resolve technical issues, allocate adequate time for planning and usage, or attempting to shift traditional instructional practices to learner-centered activities integrated with mobile technologies (Aldunate and Nussbaum, 2013; Baran, 2014; Ifenthaler & Schweinbenz, 2013; O'Bannon & Thomas, 2014; Ozadamli & Uzunboylu 2015; Rikala, et al., 2014).

To further explore the benefits of mobile learning, a quantitative study was conducted to determine if there were differences between the perceptions of teachers from two different K-8 schools about m-learning who may or may not have received professional development and provided with curriculum and technical support. Specifically, the intent of this research study was to discover how teachers' perceptions, attitudes, motivation, and adequacies could make a significant impact on teaching, learning, and academic performance when m-learning is effectively implemented. To

address the research gap, this research measured m-learning readiness (i.e., possibilities, benefits, external influences) (Christensen and Knezek, 2017) perceived usefulness, and perceived ease of use (Sanchez-Prieto, et al., 2016). Majority of the participants in this study considered themselves as adopters of technology in relation to their confidence of using technology, applying technology as an instructional tool, and integrating technology into the curriculum. Based on the participants' responses to Research Question 1 (See Table 8, Table 9, Table 10), Research Question 2 (Table 11) and Research Question 3 (See Table 12), this study indicates that more teachers have higher perceptions on the new opportunities, increased productivity, and ability to learn to integrate mobile technologies within the K-8 classroom. Interestingly, there were non-statistical significant differences found considering the two schools had different approaches toward implementing and providing training of m-learning. As discussed below, this study may assist educational administrations in making decisions to invest in mobile technologies, schoolwide professional development, technical support staff, and curriculum programs that integrate mobile technologies into daily classroom instruction.

This chapter will begin with an interpretation of the findings organized by the research questions. Then, it will discuss the implications, limitations, and recommendations for future research studies and practices. Finally, this chapter will close with an overall conclusion.

Summary of Findings

Research Question 1

Is there a difference in m-learning readiness between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not?

The first research question was designed to acquire information on teachers' perceptions of m-learning readiness from two K-8 schools. Once again, the M-learning Readiness Survey (Christensen and Knezek, 2016) was used to determine the degree to which teachers perceived implementing m-learning and mobile technologies. The participants responded to several survey items that focused on the possibilities, benefits, and external influences related to implementing m-learning on a scale of strongly disagree to strongly agree. The results of the MANOVA revealed a non-significant difference between the two schools in teachers' perceptions of their mobile learning readiness to implementing m-learning. Considering that School A was implementing a schoolwide integrated technology-based curriculum and School B was not, it was reasonable to conclude that difference would be significant. The statistically significant differences provide additional evidence that professional development plays a crucial factor in successful technology adoption (Al Tameemy, 2017; Baran, 2014; Looi, et al., 2014). However, it was noteworthy that including other variables could have, revealed a significant difference in any other areas with respect to m-learning readiness. This may be explained by more teachers are familiar and using mobile devices within their personal lives. Teachers were aware of other schools integrating mobile technology with

instruction either by personal experience with own child's school experiences or hearing about BYOD/BYOT from colleagues, news, or social media.

Despite the differing levels of professional development, the participants tended to have higher perceptions of the future possibilities that mobile technologies and m-learning could provide to teaching and learning. The data suggests participants realized that m-learning could provide new opportunities for learning where learners were able to connect with other people, content, and resources for information. This is important given that m-learning is often approached from the purview of constructivism. From a constructivist perspective, teachers can use technology to assist more learners in acquiring the knowledge and skills needed for improving academically and pursuing future careers. In many ways, these findings reinforce other studies based on constructivist paradigms which suggest that m-learning can provide teachers with the flexibility to individualize and differentiate learning for difficult content and concepts (Al Hunaiyyan, et al., 2016; Chu, 2014; Reeves, et al., 2017; Yin, et al., 2017). This data adds to the theory in that as teachers continue to utilize constructivism, they seek technologies that support differentiated learning strategies.

Despite the general higher perceptions, there were some participants who appeared to still be reluctant to consider m-learning approaches over tradition learning approaches in relation to traditional literacy and special education programs (see Table 8). As noted by Reeves, et al. (2017), m-learning could offer opportunities for increasing the interaction between the learner and the content in lower elementary and special education where the teacher could provide the appropriate feedback to the learner. This research adds to the body of literature since the data suggests that administrators should

target the flexibility, connectivity, and opportunities of integrating mobile technology through adequately supporting teachers to shift paradigms with the intent to reach all learners.

Based on the participants' responses to Research Question 1 (Table 8), there were at least 94.9% of the participants agreed with mobile technology enhancing learning with adequate support to teachers (mPoss8). This could mean that teachers need continuous support throughout the year after receiving the initial professional development or training. In terms of theory, Mouza and Barrett-Greenly (2015) suggested that the importance of professional development adheres to five key principles: a) focus on content learning, b) implemented in an extended duration, c) involves teachers active in learning, d) collaborating, and e) coherent with local standards. Moreover, educational administrators should plan, budget, and put staff in place to provide teachers with support needed to effectively implement m-learning and improve pedagogical approaches to teaching and learning. As it relates to previous research, this study coincides with other examinations of teachers attending effective professional development that assist low socioeconomic schools coordinating mobile devices to support academic growth and learning (Mouza and Barrett-Greenly, 2015).

The participants were neutral on the benefits of implementing m-learning in relation to the practices for improving classroom instruction. The survey items of this research study that addressed the benefits of m-learning examined teachers' perceptions of learner behaviors when implementing mobile technology for instruction in the classroom. Motivation, participation, engagement, learning ownership, and communications were the subconstructs being examined in this section. This data

coincides with other research that consistently shows that motivating and engaging more learners to participate within instruction and learning has been a challenge (Crompton, et al., 2017; Dekhane, et al., 2013; Domingo and Gargante', 2016; Ifenthaler and Schweinbenz, 2013; Looi. Et al., 2014; Osakwe, et al., 2017). Similarly, this study adds to the growing body of literature in that many participants of this study were not convinced that m-learning would improve motivation (mBen2, n = 11) and participation (mBen3, n = 13) when it comes to learning and discussions (See Table 9). While the previous research was about m-learning in particular, this study suggests that new form of technology is not immune to these perceptions. As noted before, this provides additional evidence that administrators should proceed with caution when attempting to implement m-learning before understanding what motivates or discourages learners and teachers to use them (Karimi, 2016).

More than half of the respondents did not perceive how m-learning could improve communications between learners in an academic structure (mBen7) (see Table 9). One interpretation of the data is that these participants may not know how to use online collaborative tools or social media for allowing learners to share and communicate ideas, thoughts, or solutions. Moreover, the participants were split on their perception that mobile technology would not be a distraction within their classrooms (See Table 10). As will be discussed in the future studies section, this would be interpreted as there were a subset of teachers who were able to manage the usage of mobile technology for their learners. This subset of teachers would be able to keep the learners motivated and engaged within the learner activity and when mobile technology is prohibited from being used at a designated time. As it relates to previous literature, this study coincides with

teachers' perception of how external factors influence their use of mobile technology as evident by the data where age, lack of support, lack of training, lack of time, and lack of adequate access are factors (O'Bannon and Thomas, 2014; Rikala, et al. 2014)

According to Buehl, et al. (2015), there are internal and external factors that support or hinder teachers' beliefs, such as self-awareness and self-reflection, classroom content factors, school context, national, state, and district level factors. This study is noteworthy in that the results of the external influences were the lowest scored in relation to environment or context in which m-learning and mobile technology implementation. The survey items of this research study addressing external influences examined the perceptions of the actual practices of m-learning based on students versus teachers' knowledge of mobile technologies, administration and staff support of mobile technologies, infrastructure and wireless network, and integration within the curriculum. At least 56.4% of the participants felt that the learners knew more than them about mobile technology (mExt1) (See Table 10). This could be result of the adults viewing mobile technology as tool for the youth and the amount of time they spend on using the mobile technology. Once again, one way to address this is by professional development using mobile technologies for school-related work for successful integration of mobile technology that requires teachers to know how to use and support technology with student learning.

The participants viewed that infrastructure and wireless network (M = 2.76) (See Table 10) could not support the learners bringing their own devices for use within the classroom. Many teachers have experienced slow or loss of connectivity at the most inopportune times during the school day due to large of number of users trying to access

the Internet through the school's wireless network. The participants perceived that the curriculum was not conducive to supporting learners with their own mobile technology (*M* = 2.74) (See Table 10). This result suggests that the curriculum does not have lessons or activities where learners can continue lessons on their own, teachers are not aware or do not know how to use the technology integration components which are a part of many textbook adoptions, or the textbooks, materials, and resources need to be updated to support m-learning and mobile technologies.

The results about external influences tie into the broader discussion of Pietrzyk (2013), whose research identified administrative-based and district-based restrictions as main impediments to the implementation of mobile technology in the classroom. The results of this study revealed that administrative support of learners having their own mobile devices (mExt5, M = 2.71) (See Table 10) had an overall low perception from the participants. It is conceivable that administrators and teachers have other concerns surrounding mobile technology usage during instructional and non-instructional time. As Christensen and Knezek (2017) argues: "Teachers must have supportive training on the pedagogy of integrating these devices as well as useful strategies for classroom management that will enable teachers to feel confident in their classroom instruction environment" (p. 113). This also suggests that without administrative support teachers are reluctant to fully implement and integrate mobile technologies into teaching and learning practices.

Research Question 2

Is there a difference in perceived usefulness between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not?

There was non-statistical significant difference between the schools' perceptions of implementing m-learning with perceived usefulness. This is important as there is a growing body of literature about the factors that impact teachers' alignment with pedagogical approaches and implement of m-learning. According to Sanchez-Prieto, et al., (2017), it is important to design educational actions which stress the usefulness of mobile technologies with the teaching practice and reducing the anxiety they might produce. As mentioned by Asiimwe and Gronlund (2015), mobile technology, as a new technology, requires revisiting the interaction between the user and technology, and "the integration of mobile technologies in teaching and learning environments and processes" (p. 103). The second research question was designed to acquire information on teachers' perceptions of the usefulness of mobile technology in relation to their job performance, views of teaching and learning, and usage within their area of instruction. There are "growing indications that teachers primarily use" mobile technologies "for functions that fit their pre-existing pedagogical approaches" (Petko, 2012, p. 1353). Although there was non-statistically significant difference between schools, the participants had an overall positive perception of the usefulness mobile technology within teaching and learning. These results suggest that participants believe that using mobile technology could enhance their job performance (PU1, M = 4.17) and effectiveness (PU2, M = 4.00) (See Table 11) at work. In line with previous studies, this

research affirms the notion that improved job performance and effectiveness can impact teachers' approaches toward using mobile technology in their area of instruction and making lessons more interesting for the learner (Christensen and Knezek, 2017; Yusri, et al., 2015).

In a study examining the attitudes of teachers toward using table computers, the results of this study coincided with the growing body of research suggest that teachers have adopted and accepted the usefulness of mobile technologies as a learning tool and expressed positive expectation for using it in class and beyond (Ifenthaler & Schweinbenz, 2013; Montrieux, et al., 2013; Young, 2016). Teachers attitudes toward technology means were weighted on a five-point Likert scale. The teachers had similar positive perceptions towards using mobile technology in relation to help to organize work, saving time and effort, being more productive, providing as an effective learning tool, making subject matter more interesting, and enhancing learning (Young, 2016). When considering the effectiveness of mobile technology as a teaching tool, teachers have supported that usability and versatility made it more effective (Long, et al., 2013; Young, 2016).

As revealed in a study by Mama and Hennessy (2013), overall, teachers believed that the value of technology in teaching and learning encouraged constructivist teaching, shifting "teacher as lecturer" to "teacher as facilitators", and could increase student interest and motivation to engage in lessons. "Teachers could develop a disposition towards creating new technology-enhanced pedagogies, and the skills to achieve that aim" (Young, 2016, p. 189). Despite the overall positive perceptions in technology usefulness, teachers have different reasons for believing in technology

usefulness. In terms of the TAM theory, one might argue that irrespective of professional development teachers believed that mobile technologies would enhance their job performance and shift their pedagogical approach towards teaching and learning.

Research Question 3

Is there a difference in perceived ease of use between teachers in K-8 urban schools who systematically engage in professional development implementing pedagogical approaches using mobile technology and teachers in K-8 urban schools who do not?

The third research question was designed to acquire information on teachers' perceptions of the ease of use for learning, understanding, and interacting with mobile technologies in the classroom. The results revealed that there was a non-significant difference in the perceived ease of use between the two schools. Considering that School A have offered several professional developments and trainings targeting technology integration within the curriculum throughout the year and two technology experts on staff, this difference could be reasonably understood. School B does not offer the same type of professional development or trainings nor have a designated staff member to support technology implementation after in-services are completed. But teachers are more familiar with mobile technology being used in classroom from attending conferences and their personal use of smartphones and tablets for communication and researching information on the Internet. This finding is also not entirely surprising given the body of research on the perceived ease of use construct. For example, this research coincides with a similar study where 83% to 90% teachers' perceptions of m-learning agreed or strongly agree that m-learning could save their learning time, and good for working adults for self-development (Yusri, et al, 2015). This research adds to the

growing body of literature about the importance of professional development being a determinant factor toward building and improving teachers' technical abilities, confidence, and creativity when implementing mobile technologies within instructional practices (Looi, et al., 2014; Mouza and Barrett-Greenly, 2015; Rikala, et al., 2014; Sanchez-Prieto, et al., 2017; Yusri, et al., 2017).

The results suggest that the participants had an overall positive perception of how easy the use of mobile technology could be for implementing into teaching and learning. The results about perceived ease of use relates back to a broader discussion from Osakwe, et al. (2017) about teachers being in favor of using mobile technologies and finding them easy to use. It was revealed that training, in particular, helped gain confidence and motivation to operate mobile devices which impacts perceived ease of use (Osakwe, et al., 2017; Rikala, et al., 2014). This also aligns with Looi, et al., (2014) assertion that "teachers…need some time to adapt…curriculum supported by mobile technology and digest relevant principles for integrating technology in and out of the classroom" (p. 113).

A further exploration of the specific question reveals interesting interests. For example, there were 83% of the total teachers surveyed that agreed or strongly agreed with finding mobile devices easy to use. However, when it came to teachers' perceptions on learning how to operate m-learning technology, there were 15.4% of the respondents were neutral toward it being easy for them to learn. More than 82% of the participants perceived that m-learning and mobile technologies would be easy to use for learning and interaction within the classroom activities (See Table 12). Despite the overall positive perceptions of mobile technologies being easy to use, there were a significant number of

participants who did not understand how mobile technologies could make teaching and learning more clearer and easier for learners. This could suggest that teachers may have the knowledge of how others are implementing mobile technologies to improve instruction and learning but struggling with their ability to easily implement mobile technologies into their instructional practice and classroom with little or no support.

Discussion

As mentioned earlier in the literature review, there are several factors that support a positive educator's response on the perceptions of implementing m-learning in the K-12 learning environment. It is thus "important to know the key elements that lead to technology acceptance, so we can diagnose, predict, and intervene in the appropriate situations." (Sanchez-Prieto, 2016, p. 522). Data suggest that adoption of m-learning is rising; therefore, studies are needed to ascertain its effectiveness (Al-Hunaiyyan, et al., 2016; Badia, et al, 2014; Mouza and Barrett-Greenly, 2015; O'Bannon and Thomas, 2014; Petko, 2012). To date, research studies have been conducted examining teachers' perceptions on adopting, implementing, and evaluating m-learning in specific grade levels, content areas, schoolwide or district wide programs. In many ways, the results of this research coincide with several other research studies focusing on teachers' perceptions of m-learning, especially in the K-12 learning environment (Al-Awidi and Aldhafeeri, 2017; Hiltunen and Vesisenaho, 2014; Montrieux, et al., 2013; Tayan, 2017; Yusri, et al., 2015). The implications for administrators suggest that more effort should target providing hands-on professional development which addresses applying pedagogical approaches aligned with curriculum and mobile technology, mobile applications to improve academic performance. Also, providing technical and

instructional support for sustaining effectiveness and benefits of m-learning's impact on teaching and learning. The implications for teachers suggest that building upon their motivation and readiness to implement m-learning by improving their technological literacy, linking education applications with pedagogy to create lessons develop collaborative groups to support each other. This section will discuss how other studies reinforce or contradict the findings of this research study.

The theoretical framework of this research study used Davis' (1989) Technology Acceptance Model (TAM) to describe how teachers' beliefs and attitudes were related to perceived usefulness, and perceived ease of use. Even though TAM was constructed in the 1980s when computer use was different, it has been modified several times to identify the perceived intentions to use and being potentially useful within a system (Asiimwe and Gronlund, 2015). As mentioned earlier, the TAM models of this study were used to measure, predict, and explain the adoption of m-learning initiatives that are influenced by the support of professional development and alignment of pedagogical approaches.

This study extends the application of TAM by applying it within an m-learning and underserved context. In an investigation into m-learning readiness, Yusri, et al. (2015) reported on research study in Indonesia of teachers' perceptions toward m-learning to evaluate their readiness to engage in m-learning training. A similar survey was used identifying teacher demographic (gender, age range, educational background, years of service, type of school, and subject of teaching) and perceptions on m-learning (knowledge on m-learning, learning method issues, device issues, financial issues, and readiness on m-learning). M-learning readiness was cross-tabulated with the

demographic profiles showing that a high percentage of teachers were ready than those who were not ready to engage in m-learning. Once again, the data found that more teachers are understanding the benefits and possibilities which m-learning can offer them inside and outside the classroom to engage and motivate learners. This could be interpreted as these teachers having a willingness to learn more about m-learning that could influence its implementation and impact. This evidence suggests that teachers tend to have an overall higher perception towards m-learning even though their knowledge of m-learning was considered average.

The results are also important for those outside the classroom (e.g. – external influence). School administrators or districts need to adjust or reevaluate policies and practices that restrict the implementation of m-learning, since the data suggest that teachers are less likely to implement m-learning external influence restricts its use. According to a case study conducted by Rikala, et al. (2014), teachers' attitudes and competencies influence their willingness to adopt m-learning approaches. This study explored the internal and external barriers which prevented teachers from implementing and sustaining m-learning within their learning environments. Once again, this coincides with the results of the External Influences examined within this study where teachers require the support of the administrator with the technological infrastructure, budget, and supply of equipment. To mitigate the negative effects of external influence, teachers require both technical and pedagogical support because m-learning approaches were new for the teachers and a need to utilize m-learning to its full potential (Rikala, et al., 2015). The findings of that study revealed that teachers have a desire to obtain technological and

pedagogical knowledge to be able to integrate digital technology effectively in the curriculum.

Regarding teachers' perceptions on m-learning improving traditional literacy programs, motivation, and m-learning approaches to teaching and learning, it was found that despite the affordances to learners and teachers in language education there are still some challenges to m-learning adoption and implementation. This finding is important because it implies that teachers are reluctant to use mobile technology. According to Tayan (2017), it was pointed out that being aware, understanding, and accepting the immense transition required for successful m-learning implementation in pedagogy was paramount. When teachers can apply mobile devices to learning activities, they can increase learners' extrinsic levels of motivation to participate in learning activities which would result in positive learning outcomes or goals (Tayan, 2017). Montrieux, et al. (2013) reinforces this by stating that a vast opportunity of motivating pupils, introducing more joy into the learning experience if conditions live up to beliefs of having and implementing mobile technologies create a nicer learning experience.

Based on the results from this research study, administrators and educational institutions could offer professional development and the appropriate support which will sustain the effective implementation of m-learning. The professional development should be structured and organized to address alternative pedagogical and instructional practices, provide hands-on activities to use in the classroom, and multiple levels of using mobile technology for teaching and learning. In accordance with Al-Awidi and Aldhafeeri (2017), professional development should equip teachers with the technical and pedagogical knowledge to implement the curriculum aligned with mobile technologies.

The following paragraphs suggests specific examples of how professional development can be structured and organized based the constructs of this research study using mobile learning readiness, usefulness, and ease of use.

From the results on mobile learning readiness, the teachers could begin learning alternative teaching methods toward implementing m-learning. As mentioned earlier, teachers would need to shift their paradigm from traditional instructional approaches to alternative approaches which aligns the use of mobile technology and instruction. For example, constructivist and situated learning are pedagogical approaches which allows teachers to design and develop multiple representations of content, provide material to perform real-world learning situations, and enable learners to take on more ownership of their learning process. Through professional development and high mobile learning readiness, teachers can engage in activities that use different teaching methods to individualize and meet learners' needs; tailor interactive content and technology for increasing learner engagement; and incorporating strategies for completing lessons within designated instructional timeframes.

As this study examines professional development and usefulness, teachers should be allowed to share how they have implemented and applied different instructional strategies using mobile technologies in the classroom. By observing how other teachers within the same school, teachers can hear and view the ways m-learning have improved productivity to make teaching and learning more effective to reach all learners. Teachers could use this opportunity to ask questions about instructional strategies, barriers to overcome, or application into other content areas. Perceived usefulness is a determining indicator of teachers' behavioral intention to use m-learning

as it relates to their willingness to frequently implement. Administrators and educational institutions could perceive this as a way for sustaining and verifying if the teachers are finding the m-learning initiative or program as effective and beneficial to the learners in the school.

When developing professional development with perceived ease of use, this is where teachers should be engaged in hands-on learning activities, allowed time to practice, and have access to technical and instructional support. The plan for preparing professional development is to help teachers gain confidence in their abilities to implement m-learning through ongoing in-service on how to integrate mobile technologies into the curriculum (Al-Awidi & Aldhafeeri, 2017; Royle, et al., 2014; Suarez-Guerrero, et al., 2016; Sung, et al., 2016; Yusof, et al., 2017). The data suggests that majority of the teachers are comfortable and consider mobile technology easy to use. Administrators and educational institutions should be careful with these data results. Since teachers may not have considered their initial introduction to learning how use mobile technology and its terminology, they may have responded based on their current knowledge and abilities. It will be important to remember when implementing any technological program that teachers will need time to learn the features and technology associated with the program, and how to access the commands to troubleshoot problems.

Implications

The implications of this research study suggested that teachers were ready to implement m-learning and provide alternative pedagogical approaches for teaching and learning. The promise of implementing m-learning will not come without the teachers' full support and a positive perspective of readiness (Al-Awidi & Aldhafeeri, 2017). The

results of Research Question 1 indicated that teachers' perceptions toward the (a) benefits and (b) external influences were two variables which inhibit the implementation of m-learning into the classroom. Based on the findings of this study, the skepticism and negative perceptions of teachers affected their pedagogical approaches and effectiveness of incorporating mobile technology into the classroom. Based on the data, one could argue it will be imperative for educational institutions and administrators to provide the required support for mobile technologies, pedagogical approaches, infrastructure, and wireless networking for effective implementation of m-learning to occur schoolwide.

The results of Research Question 2 indicated that teachers from both schools agreed on the perceived usefulness of m-learning and mobile technology. Based on the results, one might argue that there was a large percentage of teaches who were still unsure (neutral) of how using mobile technologies could make them more effective (PU2) and enhance their teaching practice (PU3) (See Table 11). This could imply that administration need to supply additional educational resources and tools designed and developed specifically for m-learning to support teaching and learning (Looi, et al. 2013). Alternatively, one might postulate that teachers use mobile technology in their daily lives, so they equally prepared to foresee its usefulness in the classroom, irrespective of professional development.

Lastly, the results of Research Question 3 of this study shows that more teachers were familiar with mobile technologies and its operation than reported in past studies and years (Al-Hunaiyyan, et al., 2016; Badia, Meneses, Sigales, & Fabregues, 2014; O'Bannon & Thomas, 2014; Osakwe, et al., 2017). As mentioned by Osakwe, et al. (2017), one of the main concerns surrounding the introduction of mobile technology

into schools had been teachers' level of knowledge and self-confidence. When given proper professional development, this claim was not supported by this research study as the teachers' responses revealed mobile technology was easy to use. The results of this study suggested that focus should be on teachers' interactions with mobile technologies inside the classroom in relation to lesson planning, time management, and use of mobile technologies as a learning tool. This suggest that the usability be considered prior to implementation. That is, educators make a concerted effort to only integrate mobile technologies that are perceived high in usability. If the potential teachers deem the product as user-friendly, they will wore likely implement m-learning more frequently in the classroom.

This study also adds to the growing body of research which explores how urban low socioeconomic schools were struggling to implement m-learning. Based on research of the literature, teachers and administrators have recognized disruption, texting, cheating, sexting, cyberbullying, and accessing inappropriate content as barriers to using mobile technology in the classroom (Mouza and Barret-Greenly, 2015; O'Bannon and Thomas, 2014). Even though there are several other concerns about mobile devices with the same capabilities, safety and liability for learners bringing their own devices to school, the results of this study suggest that mobile technology integration is a multifaceted issue and not binary. Unlike other school districts in the surrounding suburban and rural communities, the schools participating in this research study have concerns with students bringing mobile devices to school. Also, "teachers expressed concerns about growing disparities across affluent and disadvantage schools as a result of mobile learning" (Mouza and Barrett-Greenly, 2015, p. 3). Many of these students come

from low socioeconomic households where they may or may not can afford the mobile technologies with the system requirements and capabilities of an instituted m-learning program. Safety and liability concerns are in relation to some of the unsafe areas students travel through back and forth to school.

This study also has implications for teacher training. Based on the results of this study, the data indicated a statistical significant difference between the two schools as it relates to professional development. The results could imply that for more teachers to see the benefits of implementing m-learning, they may need to observe how other teachers and students from other schools. The educators will need to observe the genuine engagement and motivation of teachers and students implementing alternative pedagogical approaches with mobile technology. It is important to remember that "the ultimate goal is not teachers embracing technology, per se, but that they embrace the type of pedagogical approaches that benefit from meaningful and authentic technology use" (Ertmer, et al, 2015, p. 413).

Limitations

While the results of this study contribute to the emerging literature about m-learning, there are limitations that others should build upon. The weaknesses of this study that could not be controlled were the sample size of the population identified to participate. As convenience sampling was used there was a lack of randomization. The experimental group was the only school at the time of this study that has provided structured professional development for teachers to integrate m-learning instructional strategies into the classroom. Other schools offering professional development to teachers using m-learning instructional strategies would strengthen the field of research

and provide evidence in determining whether there are significant differences between schools and teachers using m-learning. Participants could be placed in subgroups based on their years of teaching experience, content area, grade level, and participation in m-learning program.

Another limitation relates to selection. Selection potentially threatens the internal validity of the research since the two groups were identified based on the specific characteristics. The participants from both schools were teachers selected by the researcher due to their interest in teaching and comfort with using technology prior to completing the survey. The teachers in both groups demonstrated other potential qualities and characteristics such as highly effective evaluative teaching scores, excellent classroom management, and creativity in delivering instruction. As mentioned earlier, there were large number of English teachers participating in this research study which could have skewed the data and should be a limitation. Matching teachers based on content area, grade level, or years of experience could reduce the internal threat of validity. Gender could not be used for matching because both schools are predominantly female.

As mentioned earlier, there should be some caution with the interpretation of the data results within this research study due to the limited number of participants and its low power. Even though the number of participants satisfied the number to conduct this study. The results may not coincide with all the teachers within the school district or K-8 teachers in general. To strengthen this research, more than half, if not all, within the school district should complete this survey to better understand or determine teachers' perceptions of mobile readiness, usefulness, and ease of use to implement m-learning.

In addition to the aforementioned limitation, the threats to external validity are the interaction of history and treatment. This research study occurred during the second semester of the school year. Teachers who had been recently hired into the school during the year after the professional development training had been delivered would not have had a chance to effectively implement the information learned to teach using m-learning instructional strategies. The responses to the survey could be different once new teachers had a chance to integrate and implement those approaches over the course of a school year. The teachers from School B may have previous knowledge of m-learning from attending conferences with information or demonstrations of using mobile technology within the classroom, experiencing or talking with colleagues who have children attending schools in other surrounding school districts implementing m-learning, or personally researching alternative teaching methods with the use of technology. This could influence teachers' perceptions of m-learning because they are already familiar with the impact or effectiveness of implementing mobile technology for teaching and learning.

Recommendation for Future Research

Examining the acceptance of m-learning by teachers can contribute to explaining and improving usage patterns and hence assist the full integration of m-learning in the educational system (Ifenthaler, 2013). There are several recommendations to consider for future research studies. Schools and researchers are increasing exploration into other models, such as Technological Pedagogical and Content Knowledge (TPACK) framework (Koh, et al., 2014; Koh, et. al. 2014; Lux, et al., 2011) which focused on the interaction between technology, pedagogical approaches, and

content. The researcher can examine how demographics, teachers' perceptions, and pedagogical approaches impact m-learning, lesson designs, and designs during implementation.

It is noteworthy that in the table above (Table 9, mPoss7). The contributions toward special education were the lowest rated. This suggest more research is need in the area of Universal Design for Learning (UDL) and Universal Design for Instruction on strategies to integrate mobile technologies to teach various groups of learners (Burke, Clapper, & McRae, 2016; Izzo, 2012; Tobin, 2014). According to Yusof, et al. (2014), teachers perceptions of m-learning for special education is still in its infant stage within research. The findings of that research suggest teachers engaging students with special needs implemented different teaching methods to meet individual needs and matched suitable m-learning elements to the individual student needs (Yusof, et al., 2014). When incorporating new technologies and alternative pedagogical approaches, educators need to be able to clearly articulate the rationale for how m-learning will allow students to meaningfully collect, represent, visualize, analyze, or communicate texts for a set of learning goals (Phillip & Garcia, 2013).

Future studies could build upon this by exploring its application in other areas, such as Pre-Kindergarten and Special Education. This study mostly focused on K-8 general education teachers with urban publics. As there are many Pre-Kindergarten classrooms or Special Education programs within large urban school districts, it would benefit educational leaders and developers of these programs to consider how m-learning is being implemented at different stages of cognitive development. In particular, educational institutions and teachers can begin this process by evaluating and selecting

the best tools for m-learning activities, aligning mobile activities with pedagogical approaches, and actively using these tools both inside and outside of class activities for effective learning (Ozdamli & Uzunboylu, 2015).

Future research should also consider replicating this past research in other demographic or geographical locations to extend the verification of the theoretical framework or models on other m-learning settings (Hsu & Ching, 2015). Schools or districts can research and analyze similar longitudinal studies to capture the developments in innovations, to discover systematic school-based innovations, to advance theory, frameworks, design principles, resources, and strategies for effective and sustainable m-learning. To further this research, an examination of other independent variables should be considered. This study could be expanded by investigating the differences between age groups, content area taught, grade level, and years of experience to determine whether these variables were indicators for influencing m-learning implementation.

Conclusion

In conclusion, it has been shown through this research study that teachers are ready to leverage the versatility and capability of m-learning approaches to make learning more learner-centered. The literature review and data analysis reinforce that teacher training and continuous support with incorporating m-learning can effectively sustain and impact teaching and learning practices. Regardless of teaching model, traditional or blended learning, being used in schools, many teachers are ready to implement m-learning to teach, motivate, and engage the different types of learners in their classroom with the use of mobile technologies. Existing curriculum and conventions must be

reshaped for m-learning to systematically transform the traditional teacher-centered pedagogical approaches to student-centered learning approaches. The data results confirm that teachers' high perceptions regarding implementation of m-learning have an impact on the sustainability of m-learning programs, teaching and learning, and the academic performance of learners. This research revealed that teachers desire professional development and additional time to work with mobile technology and to learn new approaches. Administrators can concentrate more time on providing hands-on instructional strategies through professional development, allocating adequate time for planning, and collaborating with peers, technical, and instructional support long after training have been completed.

References

Abachi, H. R., and Muhammad, G. (2014). The impact of m-learning technology on students and educators. *Computers in Human Behavior, 30*, 491-496. doi: http://dx.doi.org/10.1016/j.chb.2013.06.018.

Aldunate, R. and Nussbaum, M. (2103). Teacher adoption of technology. *Computers in Human Behavior, 29*, 519-524. Doi: http://dx.doi.org/10.1016/j.chb.2012.10.017.

Al Tameemy, F. (2017). Mobile phones for teaching and learning: implementation and students' and teachers' attitudes. *Journal of Educational Technology Systems, 45(3),* 436-451. doi: 10.1177/0047239516659754.

Al-Hunaiyyan, A., Alhajri, R. A., and Al-Sharhan, S. (2016). Perceptions and challenges of mobile learning in Kuwait. *Journal of King Saud University - Computer and Information Sciences.* Doi: 10.1016/j.jksuci.2016.12.001.

Ally, M., Grimus, M., and Ebner, M. (2014). Preparing teachers for a mobile world, to improve access to education. *Prospects, 44,* 43-59. doi: 10.1007/s11125-014-9293-2.

Alnuaim, A., Caleb-Solly, P., and Perry, C. (2012). A mobile location-based situated learning framework for supporting critical thinking – a requirements analysis study. *IADIS International Conference on Cognition and Exploratory Learning in Digital Age,* 163-170.

Angkananon, K., Wald, M., & Gilbert, L. (2014). Applying technology enhanced interaction framework to accessible mobile learning. *Procedia Computer Science. 27,* 261-270. doi: 10.1016/j.procs.2014.02.029.

Attis, J. (2014). *An investigation of the variables that predict teacher e-learning acceptance*. (Doctoral dissertation, Liberty University). Retrieved from http://digitalcommons.liberty.edu/cgi/viewcontent.cgi?article=1945&context=doctoral

Badia, A., Meneses, J., Sigales, C., & Fabregues. (2014). Factors affecting school teachers' perceptions of the instructional benefits of digital technology. Procedia – Social and Behavioral Sciences, 14, 357-362. Doi: 10.1016/j.sbspro.2014.05.063.

Baran, E. (2014). A review of research on mobile learning in teacher education. *Educational Technology & Society. 17(4),* 17-32.

Buehl, M. M. and Beck, J. S. (2015). The relationship between teachers' beliefs and teachers' practices. In H. Fives & M. G. Gill (Eds.*), International handbook of research on teachers' beliefs* (pp. 66-84). New York, NY: Routledge.

Burke, D. D., Clapper, D., & McRae, D. (2016). Accessible online instruction for students with disabilities: federal imperatives and the challenge of compliance. *Journal of Law & Education, 44(2),* 135-180.

Camilleri, M. A. and Camilleri, A. C. (2017). The technology acceptance of mobile applications in education. *13th International Conference Mobile Learning,* 41-48.

Chee, K. N., Yahaya, N., Ibrahim, N. H., & Hasan, M. N. (2107). Review of mobile learning trends 2010-2015: meta-analysis. *Educational Technology & Society, 20(2),* 113-126.

Chen, B., Sivo, S., Seilhamer, R., Sugar., A & Mao, J. (2013). User acceptance of mobile technology: a campus-wide implementation of blackboard's mobile learn application. *Journal of Educational Computing Research, 49(3),* 327-343. Doi: http://dx/doi/org/10.2190/EC.49.3.c,

Christensen, R. & Knezek, G, (2017). Contrasts in openness toward mobile learning in the classroom: a study of elementary, middle, and high school teachers. 14th International Conference on Cognition and Exploratory Learning in Digital Age, 141-148.

Christensen, R. & Knezek, G. (2017). Readiness for integrating mobile leaning in the classroom: challenges, preferences, and possibilities. *Computers in Human Behavior, 76,* 112-121. doi:10.1016/j.chb.2017.07.014

Chu, H.-C. (2014). Potential negative effects of mobile learning on students' learning achievement and cognitive load- a formative assessment perspective. *Educational Technology & Society, 17(1),* 332-344.

Cooper, V. (2015). An instructional development framework supportive of learning styles in mobile learning to enhance students' metacognition. *Dissertation Abstracts International Section A: Humanities and Social Sciences, 75(12-A) (E).*

Cornelius, S and Shanks, R. (2017). Expectations and challenges: the implementation of mobile devices in a Scottish primary school. *Technology, Pedagogy, and Education, 26(1),* 19-31. doi: 10.1050/1475939X.2016.1153513.

Creswell, J. (2015). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research.* Fifth Edition. Pearson Education. New Jersey.

Crompton, H., Burke, D., & Gregory, K. H. (2017). The use of mobile learning in PK-12 education: a systematic review. *Computers & Education, 110,* 51-63. Doi: http://dx.doi.org/10.1016/j.compedu.2017.03.013.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13(3),* 319-340.

Dekhane, S., Xu, X., and Tsoi, M. Y. (2013). Mobile app development to increase student engagement and problem solving skills. *Journal of Information Systems Education, 24(4),* 299-308.

Domingo, M. G. & Garganté, A. B. (2016). Exploring the use of educational technology in primary education: Teachers' perception of mobile technology learning impacts and applications' use in the classroom. *Computers in Human Behavior, 56,* 21-28.

Driscoll, M. P. (2005). *Psychology of Learning for Instruction.* Third Edition. Boston: Pearson Education.

Ekandayake, S and Wishart, J. (2015). Integrating mobile phones into teaching and learning: a case study of teacher training through professional development workshops. *British Journal of Educational Technology, 46(1),* 173-189. doi: 10.1111/bjet.12131.

Er, M. and Er, N. F. (2013). Instructional technology as a tool in creating constructivist classrooms. Procedia – Social and Behavioral Sciences, 93, 1441-1445. Doi: 10.1016/j.sbspro.2013.10.1060.

Ertmer, P. A., Ottenbreit-Leftwich, A. T., and Tondeur, J. (2015). Teachers' beliefs and uses of technology to support 21st-century teaching and learning. In H. Fives & M. G. Gill (Eds.), *International handbook of research on teachers' beliefs* (pp. 403-418). New York, NY: Routledge.

Fuegen, S. (2012). The impact of mobile learning technologies on distance education. *TechTrends: Linking Research and Practice to Improve Learning, 56(6),* 49-63.

Fulantelli, G., Taibi, D., & Arrigo, M. (2015). A framework to support educational decision making in mobile learning. *Computers in Human Behavior, 47,* 57-59. doi: 10.1016/j.chb.2014.05.045

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). Selecting a sample. *Educational Research: Introduction, Eighth Edition,* 163-187. Pearson

Gao, S., Krogstie, J., & Siau, K. (2011). Developing an instrument to measure the adoption of mobile services. *Mobile Information Systems, 7,* 45-67. Doi: 10.3233/MIS-2011-0110.

Greer, R., White, B., Zeegers, Y., Au, W., and Barnes, A. (2017). Emerging pedagogies for the use of ipads in schools. British Journal of Educational Technology, 48(2), 490-498. Doi: 10/1111/bjet.12381.

Hamann, D. (2016). The construction and validation of an m-learning framework for online and blended learning. *Dissertation Abstracts International Section A: Humanities and Social Sciences, 76(9-A) (E).*

Han, I. and Shin, W. S. (2016). The use of a mobile learning management system and academic achievement of online students. *Computers & Education, 102,* 79-89. doi: 10.1016/j.compedu.2016.07.003.

Hinkle, D., Wiersma, W., & Jurs, S. G. (2003). *Applied Statistics for the Behavioral Sciences.* Fifth Edition. California: Wadsworth, Cengage Learning.

Hosler, K. (2014). Pedagogies, perspectives, and practices: mobile learning through the experiences of faculty developers and instructional designers in centers for teaching and learning. *Dissertation Abstracts International Section A: Humanities and Social Sciences, 74(11-A) (E).*

Hsu, Y-C. and Ching, Y-H. (2015). A review of models and frameworks for designing mobile learning experiences and environments. *Canadian Journal of Learning and Technology, 41(3),* 1-22.

Ifenthaler, D. and Schweinbenz, V. (2013). The acceptance of tablet-pcs in classroom instruction: the teachers' perspectives. *Computers in Human Behavior, 29,* 525-534. Doi: http://dx.doi.org/10.1016/j.chb.2012.10.017.

Izzo, M. V. (2012). Universal design for learning: enhancing achievement of students with disabilities. Procedia Computer Science, 14, 343-350. Doi: 10.1016/j.procs.2012.10.039.

Karimi, S. (2016). Do learners' characteristics matter? An exploration of mobile-learning adoption in self-directed learning. *Computers in Human Behavior, 63,* 769-776. doi: 10.1016/j.chb.2016.06.014.

Ko, E. H. T., Chiu, D. K. W., Lo, P. & Ho, K. K. W. (2015). Comparative study on m-learning usage among lis students from Hong Kong, Japan, and Taiwan. *The Journal of Academic Librarianship, 41,* 567-577. doi: http://dx.doi.org/10.1016/j.acalib.2015.07.005.

Koh, J. H. and Chai, C. S. (2014). Teacher clusters and their perceptions of technological pedagogical content knowledge (TPACK) development through ICT lesson design. Computer & Education, 70, 222-232. Doi: http://dx.doi.org/j.compedu.2013.08.017.

Koh, J. H., Chai, C. S., & Tsai, C-C. (2014). Demographic factors, TPACK constructs, and teachers' perceptions of constructivist-oriented TPACK. Educational Technology & Society, 17(1), 185-196.

Lee, J-H. and Kim, H. (2016). Implementation of smart teaching 3.0: mobile-based self-directed efl teacher professional development. *The Journal of Asia TEGL, 13(4).* Doi: 10.18823/asiatefl.2016.13.4.6.331.

Lindsay, L. (2016). Transformation of teacher practice using mobile technology with one-to-one classes: m-learning pedagogical approaches. *British Journal of Educational Technology, 47(5),* 883-892. Doi: 10.1111/bjet.12265.

Long, T., Liang, W., and Yu, S. (2013). A study of the tablet computer's application in k-12 school in china. *International Journal of Education and Development using Information and Communication Technology, 9(3)*, 61-70.

Looi, C-K., Sun, D., Wu, L., Seow, P., Chia, G., Wong, L-H., Soloway, E., & Norris, C. (2014). Implementing mobile learning curricula in a grade level: empirical study of learning effectiveness at scale. *Computers & Education. 77*, 101-115. doi: 10.1016/j.compedu.2014.04.011.

Lux, N., Bangert, A. W., & Whittier, D. B. (2011). The development of an instrument to assess preservice teacher's technological pedagogical content knowledge. *Journal of Educational Computing Research, 45(4)*, 415-431. doi: http://dx.doi.org/10.2190/EC.45.4.c.

Mac Callum, K., Jeffrey, L., & Kinshuk. (2014). Factors impacting teachers' adoption of mobile learning. *Journal of Information Technology Education: Research, 13*, 141-162. Retrieved from http://www.jite.org/documents/Vol13/JITEv13ResearchP141-162MacCallum0455.pdf

Males, S., Bate, F., & Macnish, J. (2017). The impact of mobile learning on student performances as gauged by standardized test (NAPLAN) scores. *Issues in Educational Research, 27(1)*, 99- 114. http://www.iier.org.au/iier27/males.pdf.

Marcial, D. E. (2015). Teacher education perceptions of a proposed mobile classroom manager. *IAFOR Journal of Education*, 13-29.

Montrieux, H., Courtois, C., De Grove, F., Raes. A., Schellens, T., & De Marez, L. (2013). Mobile learning in secondary education: perceptions and acceptance of tablets of teachers and pupils. *International Conference Mobile Learning.*

Mouza, C., and Barrett-Greenly, T. (2015). Bridging the app gap: an examination of a professional development initiative on mobile learning in urban schools. *Computers & Education, 88,* 1-14. Doi: http://dx.doi.org/10.1016/j.compedu.2015.04.009.

Navarro, C. X., Molina, A. I., Redondo, M. A., and Juarez-Ramirez, R. (2016). Framework to evaluate m-learning systems: a technological and pedagogical approach. IEEE Revista Iberoamericana De Tecnologias Del Aprendizaje, 11(1), 33-40. Doi: 10.1109/RITA.2016.2518459.

Ng, W. and Nicholas, H. (2013). A framework for sustainable mobile learning in schools. *British Journal of Educational Technology, 44(5),* 675-715. doi:10/1111/j.1467-8535.2012.03159.x

O'Bannon, B., and Thomas, K. (2014). Teacher perceptions of using mobile phones: age matters! *Computers & Education, 74,* 15-25. doi: 10.1016/j.compedu.2014.01.006.

Okyere-Kwake, E., Nor, K. M., & Ologbo, A.C. (2016). Technology acceptance: examining the intentions of Ghanaian teachers to use computer for teaching. *African Journal of Library, Archives & Information Science, 26(2),* 117-130.

Osakwe, J., Dlodlo, N., and Jere, N. (2017). Where learners' and teachers' perceptions on mobile learning meet: a case of Namibian secondary schools in the Khomas region. *Technology in Society, 49,* 16-30. doi: 10.1016/j.techsoc.2016.12.004.

Oz, H. (2014). Prospective english teachers' ownership and usage of mobile devices as m-learning tools. Procedia – Social and Behavioral Sciences, 141, 1031-1041. Doi: 10.1016/j.sbspro.2014.05.173.

Ozadamli, F & Uzunboylu, H. (2015). M-learning adequacy and perceptions of students and teachers in secondary schools. *British Journal of Educational Technology, 46(10),* 159-172. doi: 10.1111/bjet.1236.

Ozan, O. (2013). Scaffolding in connectivist mobile learning environment. *Turkish Online Journal of Distance Education, 14(2),* 44-55.

Park, S, Y. (2009). An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning. *Educational Technology & Society, 12(3),* 150-162.

Park, N., Kim, Y.-C., Shon, H. Y., & Shim, H. (2013). Factors influencing smartphone use and dependency in South Korea. Computers in Human Behavior, 29, 1763-1770. doi: http://dx.doi.org/10.1016/j.chb.2013.02.008.

Pereira, O. R. E. and Rodrigues, J. J. P. C. (2013). Survey and analysis of current mobile learning applications and technologies. *ACM Computer Surveys, 46(2),* 1-35. 10.1145/2543581.2543594.

Petko, D. (2012). Teachers' pedagogical beliefs and their use of digital media in classrooms: sharpening the focus of the 'will, skill, tool' model and integrating teachers' constructivist orientations. Computers & Education 58, 1351-1359. doi: 10.1016/j.compedu.2011.12.013.

Pietrzyk, C. A. (2013). The perceptions of k-12 educators towards mobile technologies in the classroom: a phenomenological multiple-case study of six Pennsylvania school districts (Dissertation). ProQuest Dissertations and Theses database. (UMI Number: 3577605)

Rahimi, M. and Miri, S. S. (2014). The impact of mobile dictionary use on language learning. *Procedia – Social and Behavioral Sciences, 98*, 1469-1474. Doi: 10.1016/j.sbspro.2014.03.567.

Reeves, J.L., Gunter, G.A., & Lacey, C. (2017). Mobile learning in pre-kindergarten: using student feedback to inform practice. *Education Technology & Society, 20(1)*, 37-44.

Richey, R. Klein, J. and Tracey, M. (2011). *The Instructional Design Knowledge Base: Theory, Research, and Practice.* New York: Routledge.

Rikala, J., Hiltunen, L., and Vesisenaho, M. (2014). Teachers' attitudes, competencies, and readiness to adopt mobile learning approaches. *Frontiers in Education Conference*, 1-8. Doi:10.1109/fir.2014.7044408.

Rockinson-Szapkiw, A. J. (n.d.). *Statistics Guide.* Retrieved from https://www.dropbox.com/s/9a7v7afn89wslyk/Statistics_Guide.pdf?dl=0

Royle, K., Stager, S, and Traxler, J. (2014). Teacher development with mobiles: comparative critical factors. *Prospects, 44*, 29-42. doi: 10.1007/s11125-013-9292-8.

Sanchez-Prieto, J. C., Olmos-Miguelanez, S., & Garcia-Penalvo, F. J. (2016). Informal tools in formal context: development of a model to assess the acceptance of mobile technologies among teachers. *Computers in Human Behavior, 55,* 519-528. Doi: http://dx.doi.org/10.1016/j.chb.2015.07.002.

Sanchez-Prieto, J. C., Olmos-Miguelanez, S. and Garcia-Penalvo, J. (2017). M-learning and preservice teachers: an assessment of the behavioral intention using an expanded TAM model. *Computers in Human Behavior, 72*, 644-654. doi: http://dx.doi.org/10.1016/j.chb.2016.09.061.

Seneca, E. (2014). Analyzing the effects of context-aware mobile design principles on student learning. *International Journal of Mobile and Blended Learning, 6(1),* 56-70. doi: 10.4018/ijmbl.2014010104.

Setirek, A. C., and Tanrikulu, Z. (2015). Significant developmental factors that can affect the sustainability of mobile learning. *Procedia - Social and Behavioral Sciences, 191*, 2089-2096. doi: 10.1016/j.sbspro.2015.04.336

Stephan, L. (2016). Participative teaching with mobile devices and social networks for k-12 children. *Broad Research in Artificial Intelligence and Neuroscience, 7(3),* 94-114.

Suarez-Guerrero, C., Lloret-Catala, C., and Mengual-Andres, S. (2016). Teachers' perceptions of the digital transformation of the classroom through the use of tablets: a study in Spain. *Comunicar, 24(4*9), 81-89. doi: 10.3916/C49-2016-08.

Sung, Y-T., Chang, K-E., and Liu, T-C. (2016). The effects of integrating mobile devices with teaching and learning on students' learning performance: a meta-analysis and research synthesis. *Computers & Education, 94,* 252-275. doi: 10.1016/j.compedu.2015.11.008.

Taleb, Z., Ahmadi, A., & Musavi, M. (2015). The effect of m-learning on mathematics learning. *Procedia - Social and Behavioral Sciences, 171,* 83-89. doi: 10.1016/j.sbspro.2015.01.092.

Tayan, B. M. (2017). Students and teachers' perceptions into the viability of mobile technology implementation to support language learning for first year business students in a middle eastern university. *International Journal of Education & Literacy Studies, 5(2),* 74-83. doi: 10.7575.aiac.ijels.v.5n.2p.74.

Tobin, T. (2014). Increase online student retention with universal design for learning. *The Quarterly Review of Distance Education, 15(3),* 13-24.

Tseng, H. W., Tang, Y., and Morris, B. (2016). Evaluation of iTunes university courses through instructional design strategies and m-learning framework. *Educational Technology & Society, 19(1),* 199-210.

Unknown. (2010). Publication Manual of the American Psychological Association. Sixth Edition. Washington, DC: American Psychological Association.

Wu, W-H., Wu, Y-C. J., Chen, C-Y., Kao, H-Y., Lin, C-H., & Huang, S-H. (2012). Review of trends from mobile learning studies: a meta-analysis. *Computers & Education, 59,* 817-827. doi: 10.1016/j.compedu.2012.03.016.

Yin, C., Song, Y., Tabata, Y., Ogata, H. & Hwang, G.-L. (2013). Developing and implementing a framework of participatory simulation form mobile learning using scaffolding. *Educational Technology & Society, 16(3),* 137-150.

Young, K. (2016). Teachers' attitudes to using ipads or tablet computers; implications for developing new skill, pedagogies, and school-provided support. *TechTrends: Linking Research & Practice to Improve Learning. 60(2),* 183-189.

Yusof, A. M., Daniel, E. G. S., Low, W. L. & Aziz, K. A. (2014). Teachers' perception of mobile edutainment for special needs learners: the Malaysian case. International Journal of Inclusive Education, 18(12), 1237-1246. Doi: 10.1080/13603116.2014.885595

Yusri, I. K., Goodwin, R., and Mooney, C. (2015). Teachers and mobile learning perception: towards a conceptual model of mobile learning for training. *Procedia - Social and Behavioral Sciences, 176,* 45-430.

Appendix A: Letter of IRB Approval

PRO-FY2018-233 - Initial: Approval - Exempt

irb@memphis.edu

Fri 2/16/2018 11:56 AM

To: Andrew Atef Tawfik (aatawfik) <aatawfik@memphis.edu>; James Albert Barnes Jr (jbrnes10) <jbrnes10@memphis.edu>;

THE UNIVERSITY OF MEMPHIS

Institutional Review Board
Office of Sponsored Programs
University of Memphis
315 Admin Bldg
Memphis, TN 38152-3370

Feb 16, 2018

PI Name: James Barnes
Co-Investigators:
Advisor and/or Co-PI: Andrew Tawfik
Submission Type: Initial
Title: Teachers' Perceptions of Implementing M-Learning Using Pedagogical Approaches
IRB ID : #PRO-FY2018-233
Exempt Approval: Feb 15, 2018

Approval of this project is given with the following obligations:

1. When the project is finished or terminated, a completion form must be submitted.

2. No change may be made in the approved protocol without prior board approval.

3. Exempt approval are considered to have no expiration date and no further review is necessary unless the protocol needs modification.

Thank you,
James P. Whelan, Ph.D.
Institutional Review Board Chair
The University of Memphis.

Appendix B: Letters from School Administrators

DETROIT PUBLIC SCHOOLS COMMUNITY DISTRICT

A.L. Holmes Academy of Blended Learning

8950 Crane
Detroit, Michigan 48213
313-866-5644 313-866-2299 (FAX)
Tammy Mitchell, Principal

IRB Administrator

Office of Sponsored Programs

University of Memphis

315 Admin Bldg.

Memphis, TN 38152-3370

Subject: Site Approval Letter

To whom it may concern:

This letter acknowledges that I have received and reviewed a request by James A. Barnes, Jr. to conduct a research project entitled "*TEACHERS PERCEPTIONS OF IMPLEMENTING M-LEARNING USING PEDAGOGICAL APPROACHES*" at *The University of Memphis* and I approve of this research to be conducted at our facility.

When the researcher receives approval for his research project from the University of Memphis's Institutional Review Board, I agree to provide access for the approved research project. If we have any concerns or need additional information, we will contact the Institutional Review Board staff at the University of Memphis at (901) 678-2705 or irb@memphis.edu

Sincerely,

Tammy Mitchell, Principal

tammy.mitchell@detroitk12.org

IRB Administrator
Office of Sponsored Programs
University of Memphis
315 Admin Bldg.
Memphis, TN 38152-3370

Subject: Site Approval Letter

To whom it may concern:

This letter acknowledges that I have received and reviewed a request by James A. Barnes, Jr. to conduct a research project entitled "*TEACHERS PERCEPTIONS OF IMPLEMENTING M-LEARNING USING PEDAGOGICAL APPROACHES*" at *The University of Memphis* and I approve of this research to be conducted at our facility.

When the researcher receives approval for his research project from the University of Memphis's Institutional Review Board, I agree to provide access for the approved research project. If we have any concerns or need additional information, we will contact the Institutional Review Board staff at the University of Memphis at (901) 678-2705 or irb@memphis.edu

Sincerely,

Deborah Sinclair, Principal
Marquette Elementary-Middle School
(313) 417-9360
deborah.sinclair@detroitk12.org

Appendix C: Letter of Informed Consent to Participants

Consent to Participate in a Research Study (Copy)
TEACHERS' PERCEPTIONS OF IMPLEMENTING M-LEARNING USING PEDAGOGICAL APPROACHES

WHY ARE YOU BEING INVITED TO TAKE PART IN THIS RESEARCH?

You are being invited to take part in a research study about perceptions of implementing m-learning. You are being invited to take part in this research study because your school have access and using mobile technology for teaching and learning. If you volunteer to take part in this study, you will be one of about 70 teachers to do so.

WHO IS DOING THE STUDY?

The person in charge of this study is James A. Barnes, Jr. (*Lead Investigator, LI*) of University of Memphis Department of Instructional Design and Technology. He is being guided in this research by Dr. Amanda Rockinson-Szapkiw. There may be other people on the research team assisting at different times during the study.

WHAT IS THE PURPOSE OF THIS STUDY?

By doing this study, we hope to learn what are teachers' perceptions of implementing m-learning in the classroom. We are interested in teachers' abilities, attitudes, and motivation towards using mobile technologies for teaching and learning.

ARE THERE REASONS WHY YOU SHOULD NOT TAKE PART IN THIS STUDY?

If you are under the age of 18 and not an employee of Detroit Public Schools Community District, you should not take part in this study.

WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST?

The research procedures will be conducted at your school. You will need to complete the online survey one time during the study. The survey will take about 30-40 minutes to complete. The total amount of time you will be asked to volunteer for this study is twice over the next month.

WHAT WILL YOU BE ASKED TO DO?

You will be asked to respond to a series of statements or questions in an online survey developed by the lead investigator. The statements and questions have been designed prior to your participation in the study related to your perceptions and experiences in using mobile technologies for teaching and learning.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?

To the best of our knowledge, the things you will be doing have no more risk of harm than you would experience in everyday life.

WILL YOU BENEFIT FROM TAKING PART IN THIS STUDY?

You will not get any personal benefit from taking part in this study. Your willingness to take part, however, may, in the future, help educators as a whole to better understand this research topic.

DO YOU HAVE TO TAKE PART IN THE STUDY?

If you decide to take part in the study, it should be because you really want to volunteer. You will not lose any benefits or rights you would normally have if you choose not to volunteer. You can stop at any time during the study and still keep the benefits and rights you had before volunteering.

IF YOU DON'T WANT TO TAKE PART IN THE STUDY, ARE THERE OTHER CHOICES?

If you do not want to be in the study, there are no other choices except not to take part in the study.

WHAT WILL IT COST YOU TO PARTICIPATE?

There are no costs associated with taking part in the study.

WILL YOU RECEIVE ANY REWARDS FOR TAKING PART IN THIS STUDY?

You will not receive any rewards or payment for taking part in the study.

WHO WILL SEE THE INFORMATION THAT YOU GIVE?

We will make every effort to keep private all research records that identify you to the extent allowed by law.

Your information will be combined with information from other people taking part in the study. When we write about the study to share it with other researchers, we will write about the combined information we have gathered. You will not be personally identified in these written materials. We may publish the results of this study; however, we will keep your name and other identifying information private.

This study is anonymous. That means that no one, not even members of the research team, will know that the information you give came from you.

CAN YOUR TAKING PART IN THE STUDY END EARLY?

If you decide to take part in the study, you still have the right to decide at any time that you no longer want to continue. You will not be treated differently if you decide to stop taking part in the study.

The individuals conducting the study may need to withdraw you from the study. This may occur if you are not able to follow the directions they give you, if they find that your being in the study is more risk than benefit to you, or if the agency funding the study decides to stop the study early for a variety of scientific reasons.

To withdraw, simply inform the lead investigator at any time that you do not wish to continue.

WHAT IF YOU HAVE QUESTIONS, SUGGESTIONS, CONCERNS, OR COMPLAINTS?

Before you decide whether to accept this invitation to take part in the study, please ask any questions that might come to mind now. Later, if you have questions, suggestions, concerns, or complaints about the study, you can contact the investigator, James A. Barnes, Jr. at 313.408.0390. If you have any questions about your rights as a volunteer in this research, contact the Institutional Review Board staff at the University of Memphis at 901-678-2705. We will give you a signed copy of this consent form to take with you.

WHAT ELSE DO YOU NEED TO KNOW?

There are no organizations involved in this study, financially or otherwise, other than the University of Memphis.

_____ _____

Signature of person agreeing to take part in the study Date

_____

Printed name of person agreeing to take part in the study

_____ _____

Name of [authorized] person obtaining informed consent Date

Appendix D: Recruitment of Participants About Survey

The University of Memphis

Volunteers Wanted for a Research Study

Teachers' Perceptions of Implementing M-Learning

Using Pedagogical Approaches

The purpose of this research study is to compare K-8 teachers, from a large urban school district, who implementing m-learning after receiving professional development on integrating pedagogical approaches and being provided with curriculum and technical support. Is there a difference in perceived usefulness and perceived ease of use in a m-learning model and teachers who do not?

All teachers are eligible to participate in this study who are 21 years and older with a teaching certificate.

To learn more information about this research, contact James Barnes by email at jbrnes10@memphis.edu, or by phone at 313.408.0390.

Appendix E: Survey Questions Administered to Participants

Teachers' Perception Survey on M-Learning

Directions: Please answer the following question pertaining to the utility, usefulness, usability and general conceptions of m-learning. All respondents will remain anonymous.

Demographics

Name of School	A. L. Holmes Academy of Blended Learning			Marquette Elementary-Middle School	
Age Range	21-30	31-40		41-50	Over 50
Highest Degree Earned	Bachelors	Masters	Educational Specialist	Doctorate	Other
Primary Grade Level Assignment	PreK – 2	3 – 5		6 – 8	
Years as a Classroom Teacher	0 – 10	11 – 20		21 -30	More than 30
Content Area Primarily Taught	English/ Language Arts	Mathematics	Science	Social Studies	Art/Music Gym/Computers

Instructions: Select one level of agreement for each statement to indicate how you feel.

Mobile Learning Readiness Survey	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Mobile devices can play an important role in K-12 education.	1	2	3	4	5
Mobile learning will bring new opportunities for learning.	1	2	3	4	5
Mobile technology should be used to connect learners to people, content, and resources.	1	2	3	4	5
Mobile learning will increase flexibility of learning.	1	2	3	4	5
Mobile learning can be used to improve traditional literacy programs.	1	2	3	4	5
Mobile technology can be used to improve 21st century skills.	1	2	3	4	5

Technology can be used to level the playing field for special education students.	1	2	3	4	5
Mobile devices can enhance learning if there is adequate support for teachers.	1	2	3	4	5
Mobile devices would introduce a significant distraction in my classroom.	1	2	3	4	5
The use of mobile technology in the classroom makes students more motivated to learn.	1	2	3	4	5
The use of mobile technology in the classroom increases student participation in classroom discussions.	1	2	3	4	5
The use of mobile technology in the classroom increases student engagement.	1	2	3	4	5
The use of mobile devices in the classroom allows students to own their learning.	1	2	3	4	5
The use of mobile technology in the classroom allows students to develop activities.	1	2	3	4	5
Mobile learning will improve communication between students.	1	2	3	4	5
Students are more knowledgeable than I am when it comes to using mobile technologies.	1	2	3	4	5
My school is doing a good job of using technology to enhance learning.	1	2	3	4	5
My campus technical infrastructure and wireless network can accommodate students bringing their own technology.	1	2	3	4	5
My curriculum is conducive to students having their own technology.	1	2	3	4	5
My administration is supportive of students having their own device.	1	2	3	4	5

Christensen, R. and Knezek, G. (2017).

Perceived Usefulness	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The use of mobile technologies can enhance my job performance.	5	4	3	2	1
The use of mobile technologies can make me more effective at work.	5	4	3	2	1
The use of mobile devices in teaching practice enhances my productivity.	5	4	3	2	1
The use of mobile technology will make teaching and learning more interesting.	5	4	3	2	1
The use of mobile learning is a way to improve student learning as it allows students to access learning content anytime and anywhere.	5	4	3	2	1
Generally, I consider that mobile devices can be useful in my area of instruction.	5	4	3	2	1

Perceived Ease of Use	**5**	**4**	**3**	**2**	**1**
Learning to use mobile devices in the classroom would be easy for me.	5	4	3	2	1
I find it easy to interact with mobile devices.	5	4	3	2	1
Interaction with mobile devices is clear and easy to understand for me.	5	4	3	2	1
Generally, I consider that mobile devices are easy to use	5	4	3	2	1

Sanchez-Prieto, J. C., Olmos-Miguelanez, S. and Garcia-Penalvo, J. (2017).

Stages of Adoption

Instructions: Please read the descriptions of each of the six related to adoption of technology. Choose the stage that best describes where you are in the adoption of technology.

Score	Adoption
	Stage 1: Awareness
1	I am aware that technology exists but have not used it – perhaps I'm even avoiding it. I am anxious about the prospect of using computers.
	Stage 2: Learning the process
2	I am currently trying to learn the basics. I am sometimes frustrated using computers. I lack confidence when using computers.
	Stage 3: Understanding and application of the process
3	I am beginning to understand the process of using technology and can think of specific tasks in which it might be useful.
	Stage 4: Familiarity with confidence
4	I am gaining a sense of confidence in using the computer for specific tasks. I am starting to feel comfortable using the computer.
	Stage 5: Adaption to other contexts
5	I think about the computer as a tool to help me and am no longer concerned about it as technology. I can use it in many applications and as an instructional aid.
	Stage 6: Creative application to new contexts
6	I can apply what I know about technology in the classroom. I am able to use it as an instructional tool and integrate it into the curriculum.

Christensen, R. and Knezek, G. (2017).

Appendix F. Survey Permission to Use

Re: [EXT] Permission to Use Mobile Learning Readiness Survey (MLRS)

Christensen, Rhonda <Rhonda.Christensen@unt.edu>

Fri 3/16/2018 10:47 AM

To: James Albert Barnes Jr (jbrnes10) <jbrnes10@memphis.edu>; rhonda.christensen@gmail.com <rhonda.christensen@gmail.com>; Knezek, Gerald <Gerald.Knezek@unt.edu>;

Hello James,
I have been out of the country but don't think I replied to this email message.
You have permission to use the survey under the conditions you listed in your request. We have added more scoring information at iittl.unt.edu under Instruments that may be useful to you.
Good luck in your study.
Kind regards,
Rhonda Christensen

****
Rhonda W. Christensen, Ph.D.
Research Professor

NSF Going Green! MSOSW Project Co-PI
Co-Director, Institute for the Integration of Technology into Teaching and Learning (IITTL)
University of North Texas
Information Technology Council Chair, Society for Information Technology in Teacher Education (SITE)
Email: rhonda.christensen@gmail.com
Project Web: www.iittl.unt.edu

From: James Albert Barnes Jr (jbrnes10) <jbrnes10@memphis.edu>
Sent: Thursday, March 8, 2018 6:38:48 PM
To: Christensen, Rhonda; rhonda.christensen@gmail.com
Subject: [EXT] Permission to Use Mobile Learning Readiness Survey (MLRS)

Greetings Ms. Rhonda Christensen:

I am doctoral student from University of Memphis writing my dissertation titled TEACHERS' PERCEPTIONS OF IMPLEMENTING M-LEARNING USING PEDAGOGICAL APPROACHES, under the direction of my dissertation committee chaired by Dr. Andrew Tawfik, Ph. D., who can be reached at aatawfik@memphis.edu. The University of Memphis IRB staff can be contacted at 901-978-2705 or by mail at 315 Administration Bldg., Memphis, TN 38152.

I would like permission to use the MOBILE LEARNING READINESS SURVEY instrument in my research study. I would like to use your survey under the following conditions:

- I will use the survey only for my research and will not sell or use it with any compensated or curriculum development activities.
- I will include the copyright statement on all copies of the instrument.
- I will send a copy of my completed research study to your attention upon completion of the study.

If these are acceptable terms and conditions, please indicate so by responding through email: jbrnes10@memphis.edu

Sincerely,

James A. Barnes, Jr.
Doctoral Candidate - University of Memphis