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Understanding Student Experiences Using Smartphones as Learning Tools

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This is to certify that the doctoral dissertation by

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Walden University
2020

Abstract

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EdS, Walden University 2016

MS, Purdue University, 2014

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Dissertation Submitted in Partial Fulfillment

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Educational Technology and Design

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Abstract

While mobile technology is ubiquitous in higher education, facilitating student engagement and learning through educational technology remains minimally understood. The problem this study addressed is the gap in research about how online graduate students utilized smartphone technology for learning and what factors led to their adoption of this technology. The purpose of this basic qualitative study was to explore how mobile learning is being performed through smartphones by education graduate students in the online environment. The unified theory of acceptance and use of technology (UTAUT) was used as the conceptual framework for this study. The research question asked how online graduate students in Master of Education degree programs describe their learning experience related to the four dimensions of the UTAUT when utilizing smartphone technology. Ten online graduate students from various U.S. universities were interviewed. Data were recorded, transcribed, and coded using UTAUT preidentified categories to create themes related to the UTAUT constructs. Study findings showed that online graduate students expected to perform educational tasks on their smartphones by accessing course content and communicating with faculty and peers. Students also expected the effort involved in the use of smartphones to be minimal. Study findings further demonstrated online graduate students were mostly self-sufficient when exploring ideas for smartphone integration and when issues arose. Results of this study may provide positive social change by helping stakeholders teach students how to benefit from use of their mobile technology for learning.

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Dedication

This dissertation is dedicated to my mother Connie, who gave me so much, and through her love, guidance, and support made my life and this educational journey possible. Sadly, she passed before this journey was completed. Thank you, mom, I love and miss, you.

Acknowledgments

I would like to start by acknowledging the guidance I received from my committee members. Thank you Dr. Tyrell and Dr. Pann for your assistance and encouragement along the way. I would like to acknowledge my wife Melissa and my daughters Kadin and Kodi who have been with me and supported me throughout this journey. I would also like to thank my sister, Belinda, for all the assistance she has provided along the way. Finally, I would like to thank my father, Norman, who like my mother has always been there for me and truly has made my life possible.

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Chapter 1: Introduction to the Study

Introduction

The U.S. Department of Education (2017) recommended that U.S. educational

institutions take actions "that would enable everywhere, all-the-time learning and ensure

greater equity and accessibility to learning opportunities over the course of a learner's

lifetime" (p. 4). Students studying at online universities are well-positioned to meet these

recommendations, as they are untethered from higher education's traditional boundaries

of geography and timeline, allowing them to study from anywhere at any time. Research

shows that with proper support, smartphones can be a valuable tool for improving student

educational experiences (Cochrane, 2015; Tossell, Kortum, Shepard, Rahmati, & Zhong,

2015; Vorley & Williams, 2016). The purpose of this qualitative study was to explore the

experiences of graduate students enrolled in Master of Education programs at online

universities when using their smartphones for the purpose of learning. This study

explored the perceptions of online graduate students by using the four constructs of the

unified theory of acceptance and use of technology (UTAUT): performance expectancy,

effort expectancy, social influence, and facilitating conditions (Venkatesh, Morris, Davis,

& Davis, 2003) as the conceptual framework. The UTAUT is a combination of eight

previous theories (Appendix A) and as such several studies in Chapter 2 address how

these constructs help inform the current understanding in the field of the use of mobile

technology for K-12 (Kates, Wu, & Coryn, 2018; Pedro, Barbosa, & Santos, 2018),

undergraduate (Hamidi & Chavoshi, 2018; Iqbal & Bhatti, 2015; Kates et al., 2018;

Pedro et al., 2018; Raza, Umer, Qazi, & Makhdoom, 2018) and graduate (Alwraikat,

2017; Briz-Ponce, Pereira, Carvalho, Juanes-Mendez, & Garcia-Penalvo, 2016; Raza et al., 2018) students. Results from this study could improve mobile learning options for students via this ubiquitous device. Society may be positively impacted as mobile learning skills are created and enhanced, developing untethered lifelong learners and a more educated public.

In this chapter, I present background information related to the scope of the problem demonstrating the gap in knowledge that the study addresses. The sections found in this chapter provide background information for the study rationale, the theoretical framework, the problem, as well as research questions. The chapter further discusses the methodology of the study and defines key terms associated with the study's field of inquiry as well as any assumptions and limitations that exist. The chapter concludes with a brief discussion of the significance and social impact of the study.

Background

The introduction and rapid development of mobile technology and online learning have created new ways information can be delivered to students. The new evolving nature of these phenomena has made it difficult for researchers to understand the nuances associated with this form of learning or how to best support this new learning environment. Tossell et al. (2015) found that when specific applications are incorporated to demonstrate a fundamental principle, or the internet is used to find information as part of a class activity, the benefits of smartphone use can add substantial value to the classroom. Mills, Knezek, and Khaddage (2014) studied information seeking and sharing behaviors of students and found evidence that using mobile web 2.0 tools to collaborate

with peers and experts can improve informal learning situations. Zvjezdana, Dickson, and Patrick (2015) found taking notes, interacting with peers, and accessing content are ways in which graduate students use their smartphones to learn. While Alwraikat (2017) found a number of obstacles hindering student smartphone use, including university regulations, faculty support, access to affordable networks, as well as battery life and charging availability. Lo et al. (2016) found smartphone ownership amongst all participants in their study; however, they also found that students infrequently used the device for formal learning, preferring to use it for tasks such as online searches and social communications. Further, Shroff and Keyes (2017) found that perceived competence, perceived challenge, perceived choice, and perceived interest all had a significant effect on behavioral intention to use mobile applications. Iqbal and Bhatti (2015) found that possessing the skills to properly use mobile devices make students more likely to adopt this technology. Several studies have investigated the four constructs associated with the UTAUT for educational purposes at all levels of higher education and provide justification and comparative data for the use of this approach (Briz-Ponce et al., 2016; Feng, Worrachananun, & Ka-Wailai, 2015; Milosevic, Manasijevic, & Nikolic, 2015; Sabah, 2016; Yeap, Ramayah, and Soto-Acosta, 2106). However, there are no studies that have investigated the four UTAUT constructs using a qualitative approach to understand the perceptions of online graduate students. There has also been a number of studies examining differing student populations and how mobile devices effect learning outcomes as well as the factors that influence successful adoption of mobile devices.

What is lacking, and what this study addressed, is the gap in the research regarding the experiences of online graduate students when using smartphones for learning.

Problem Statement

Significant evidence exists to support smartphones as useful learning tools to meet the goal of anytime anywhere learning (Barchilon Ben-Av & Ben-Av, 2016). However, though researchers have found that smartphones can support learning goals, the problem is that students are not taking advantage of this device for learning (Alwraikat, 2017). Zvjezdana et al. (2015) concluded that there exists a need for further research to understand how undergraduate and graduate students are learning through the use of smartphones and how this information can be used to "deliver the best learning experience" (p. 559). Hamidi and Chavoshi (2018) found that college students are more likely to adopt mobile technology when device performance is easy to use. Both Sabah (2016) and Raza et al. (2018) found the effort associated with mobile learning to be factors influencing mobile adoption in college students. Feng et al. (2015) identified the role social influence plays in promoting mobile education app adoption and Alwraikat (2017) found the important role that institutions play in facilitating and supporting m-learning in higher education. These studies show how the four constructs associated with the UTAUT have been used to understand how students use mobile technology to support m-learning (Alwraikat, 2017; Feng et al., 2015; Hamidi & Chavoshi, 2018; Raza et al., 2018; Sabah, 2016). By applying the four constructs of the UTAUT to smartphone adoption of online graduate students for the purpose of learning, which has yet to be studied, this research addressed this identified research gap. In order to better support

online graduate student use of this ubiquitous tool for learning, further information was needed about the experiences online graduate students are having with their smartphone in regards to effort involved in the use and the performance expectations of the device as well as the social and organizational experiences that influence their decisions to use or not use smartphones for learning.

Purpose of the Study

The purpose of this qualitative study was to explore the experiences of graduate students enrolled in Master of Education programs at online universities when using their smartphones for the purpose of learning. How online graduate students use their smartphones for learning has been under studied, and better understanding of how online graduate students are applying this technology for personal learning provides insight into how to better support these students in their academic journey. This research could also provide insight in how these students might approach smartphone integration in their professional positions. Further, the UTAUT-identified criteria explains why technology is being adapted by asking questions that explore the constructs of the UTAUT. Using the UTAUT as a framework, I explored online graduate student perspectives, as they relate to smartphone performance, user effort, social factors affecting use, and the conditions and ways in which smartphones are currently being used. This information provides a practical understanding of how smartphones are being used as well as added to the current research by providing new information for a previously unexplored group of learners. In this study I aimed to better understand how individual online graduate students use this technology for learning.

Research Question

The following research question was developed to guide the research study:

Research Question 1: How do online graduate students in Master of Education degree programs describe their learning experience related to the four dimensions of the UTAUT when utilizing smartphone technology?

Conceptual Framework

The conceptual framework for this study was the UTAUT (Venkatesh et al., 2003). The intent of this model is to understand users' intent to use technology. Venkatesh et al. combined the critical factors of eight older models to create the UTAUT (Appendix A). The UTAUT contains four constructs: (a) performance expectancy, (b) effort expectancy, (c) social influence, and (d) facilitating conditions (Venkatesh et al., 2003). The UTAUT provided a framework for this study to examine smartphone use in online graduate students. The constructs of the UTAUT were used to develop the research and interview questions. The UTAUT also formed the foundation in which students' experiences were framed in this study.

Nature of the Study

A basic qualitative study allowed for the examination of the experiences of online graduate students, in Master of Education programs, of learning with smartphones. Interview questions and prompts aligned to the four constructs of the UTAUT: performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). Through individual phone interviews with 10 study participants, I uncovered ways students utilize this tool and I then translated their experiences into

recommendations for actionable learning interventions. The individual phone interviews used Zoom, an online communication tool, and were recorded and transcribed to allow the information to be grouped and coded into categories to identify common themes that highlighted the manner in which students described learning using their smartphones.

Definitions

Formal learning: is content delivered to students in a structured learning environment (Pedro et al., 2018).

Informal learning: unstructured learning that occurs outside the classroom and can result from daily work (Kim, Lee, & Rha, 2017; Lo et al., 2016).

E-Learning: Distance education utilizing computer technology and the internet. (Mitchell, Parlamis, & Claiborne, 2015)

M-learning: learning that occurs from the use of technology that is easily transported and can include but is not limited to laptops, netbooks, tablets, smartphones, and PDAs (Martin & Ertzberger, 2016; Raza et al., 2018)

Smartphones: small mobile devices that possess the computing power of many larger computers (Ebiye, 2015; Sung, Change, & Liu, 2016; Tabor, 2016), that allow diverse functionality due to their connectivity to the world wide web and the development of user friendly applications (apps) that are placed on the devices (Al-Said, 2015; Arslan, 2016; Feng et al., 2015).

Performance expectancy: the degree an individual believes the technology will aid in task performance (Venkatesh et al., 2003).

Effort expectancy: the degree of effort an individual believes is required to use the technology (Venkatesh et al., 2003).

Social influence: the degree to which social structures influence the individual's attitudes and behaviors toward the technology (Venkatesh et al., 2003).

Facilitating conditions: the degree to which an individual believes they are supported in the use of the technology (Venkatesh et al., 2003)

Assumptions

All participants in this study were teachers as well as students. I assumed that students, especially teachers, want to share successful learning experiences with others and honestly answered the questions in this study. This desire to help others learn is foundational for most teachers. Therefore, I assumed that teachers would want to participate in this study and share their knowledge. The accuracy of the study results are valid only if the participants are honest in their answers. Verification of honest answers is difficult in an interview; therefore, I assumed that students would respond openly and honestly, especially since the topic of the interview is not personal or embarrassing in nature.

Scope and Delimitations

Online students enrolled in graduate education programs are a population that has not been studied very often. The aim of this study was to examine the experiences of online graduate students studying in Master of Education programs. Online education offers working professionals the flexibility to remain employed full time while pursuing pathways for career advancement through education. Understanding the student

experience is an important step to learn how to best integrate this device into education in a manner that allows smartphone technology to support student learning experiences (Raza et al., 2018). Other graduate majors, as well as undergraduate students, were eliminated to limit the scope of the study population.

Transferability of the results from this study might inform future research into m-learning via smartphones and inform key stakeholders on how to improve smartphone integration into the online classroom environment. Administrators may have an improved understanding of how to invest resources to improve the student online learning experience. Course instructors and designers may have an improved understanding of functionality when thinking about how to implement learning activities.

Limitations

Although the literature review revealed a lack of how online students are affected by smartphone use, this study is limited by the choice of focusing the study on online graduate students enrolled in education programs. Therefore, this study's focus on graduate education majors did not allow for a broader understanding of the experiences that online undergraduate or how those learning outside of the education discipline might be experiencing learning via a smartphone. Future studies of similar, but different, populations would allow for comparisons to be made from the data that was collected in this study.

Another limitation of this study was the number of study participants. Although rich data was collected from study participants, the overall size of this population is large, and this sample was insufficient to truly determine that this is how most of or all online

graduate students use their smartphone for learning. Future studies will need to be completed and data compared for an improved understanding of the student experience. I had no known biases that might influence the results of this study.

Significance

Although research has shown the positive impact of smartphones to support learning (Barchilon Ben-Av & Ben-Av, 2016; Hasan, Ashraf, Abdullah, & Murad, 2016), smartphones and other mobile devices continue to be underutilized for learning purposes (Alwraikat, 2017; Lo et al., 2016 ; Zvjezdana et al., 2015). The aim of this study was to contribute new knowledge of smartphone use in a population that has not been studied. Further, this study qualitatively examined the experience of students based on a conceptual framework, the UTAUT, that has traditionally been reserved for quantitative studies. Findings from this study can promote positive social change by informing learning design, student and faculty training, and administration policies that promote mobile learning opportunities for students that help to create lifelong learners through access to learning that can occur anywhere and anytime.

Summary

In this chapter, information was presented regarding the background and rationale for the study. The problem this study seeks to address as well as the gap in current research was identified. The conceptual framework the study used as well as the methodology for the study and the research questions were introduced and discussed. Further details of these points are given in the next section as well as a detailed overview

of the research that has been performed in the field as they relate to the topics of the

proposed study.

Chapter 2: Literature Review

Introduction

Research findings have shown that smartphones can be a valuable tool to improve learning as well as the student educational experience (Cochrane, 2015). For example, when students were shown how to use the tools found on smartphones, such as calendar reminders and Google Applications, student productivity increased in the learning environment (Cochrane, 2015). However, Cochrane (2015) found that although smartphone technology is a part of the daily lives of university students, the technology is not being used for learning. Further, Alwraikat (2017) identified student nonuse of smartphones for learning as a problem and applied a quantitative research approach to investigate perceived barriers to smartphone adoption by graduate students. Although researchers have found that smartphones can support learning goals, the problem to be explored in this study was that students are not taking advantage of this device for learning (Alwraikat, 2017; Cochrane, 2015).

The purpose of this qualitative study was to explore the experiences of graduate students enrolled in Master of Education programs at online universities when using their smartphones for learning. Using a variety of methodologies to study different populations and devices, researchers have examined topics tangential to this study's focus. However, no other researcher has studied this specific population using the framework or methodologies that I used. Based on UTAUT, I explored the following four constructs laid out by Venkatesh et al. (2003) for learning with smartphone technology: performance expectancy, effort expectancy, social influence, and facilitating conditions.

This basic qualitative approach guided by the UTAUT and applied to Master of

Education graduate students allowed me to add to the current body of research in this

field.

In this chapter, I review recent literature and provide background information that

is relevant to this study. I describe my literature search process and explain the UTAUT

in depth. In subsequent sections, I provide a synthesis of the literature on the topics of (a)

mobile devices as educational tools, (b) the relationship between smartphones and

education, (c) smartphone usefulness, including barriers of use; (d) formal and informal

learning, and (e) learning experiences.

Literature Search Strategy

I reviewed literature on the topics of smartphone use and mobile technology in

education. By focusing my literature search on these subject areas, I sought to discover

what is known regarding m-learning and smartphone usability to identify ways to

improve smartphone adoption into the learning experience. To conduct my initial

literature search, I used the Walden University Library system and Google Scholar. As I

began to develop my search parameters, I set up automated feeds within available

technology systems including a Google based RSS feed reader and Mendeley, a file

organizer with searchable keyword functionality. I used Walden University's Library

portal to access the following databases: Education Source, ERIC, LearnTechLib--The

Learning and Technology Library, SAGE, and ProQuest. I used the keywords,

smartphones, mobile devices, learning, mobile learning, m-learning, electronic learning,

e-learning, higher education, online higher education, online graduate students, and

smartphones in education to identify research directly related to smartphone use in education. These key words also helped me design the literature search to identify research that was directly related to smartphone use in education. I first searched keywords separately, then combined the keywords to better identify the gap in research. I used Mendeley to organize my research articles. As my Mendeley library grew, a search algorithm within the Mendeley system began to populate suggested articles related to my topic and email suggested articles to me. The automated suggestions sent by Mendeley became the most efficient tool to build my data base of peer-reviewed literature, as the most recent literature was being sent to me for review. This allowed me to focus on reading and filtering relevant content. In the resulting literature review, I synthesized the peer reviewed research studies from within a 5 year timespan of 2015-2019. To ensure academic rigor, only articles from peer-reviewed academic journals were used.

Conceptual Framework

The conceptual framework for this study includes the Unified Theory of Acceptance and Use of Technology (UTAUT), as established by Venkatesh et al. (2003). This model was designed to understand individuals' intent to use technology. Venkatesh et al. reviewed eight previous information technology models and consolidated the critical factors of each model to construct the UTAUT (see Appendix A). From these factors, Venkatesh et al. identified four necessary constructs the help explain adoption of technology: (a) performance expectancy, (b) effort expectancy, (c) social influence, and (d) facilitating conditions. These constructs, according to UTAUT, are critical constructs that inform acceptance and usage behavior toward technology. Understanding the four

constructs derived from the theories of UTAUT improved comprehension of how to apply this theory and provide insight into technology adoption.

Performance Expectancy

Venkatesh et al. (2003) described *performance expectancy* as how a specific system or technology aids an individual in job performance. In a quantitative study on university student readiness to adopt mobile learning, Iqbal and Bhatti (2015) found the adoption of m-learning technology was dependent on students' perceptions of how the technology enhanced their performance. Hamidi and Chavoshi (2018) used a survey to collect quantitative data from 300 undergraduate and graduate students on the factors that influence mobile learning adoption in higher education. The researchers found that ease of use had a significant positive effect on usefulness and encouraged user adoption of m-learning (Hamidi & Chavoshi, 2018). While in a quantitative study, Feng et al. (2015) used the UTAUT to examine smartphones and learning styles and found performance expectancy was the strongest predictor of behavioral intention to use a smartphone and concluded app designers need to focus on application effectiveness and tailor applications to meet the differing needs of learners. Thus, as the first of four necessary constructs of UTAUT, performance expectancy is a primary reason individuals choose to use a new technology. As I seek to understand the efficacy of smartphone use in the online classroom, I addressed how participants in my study expected their smartphones to perform specific learning tasks.

Effort Expectancy

Effort expectancy, the second construct of UTAUT, is defined as the degree of ease a particular technology or system is perceived to have by the user (Venkatesh et al., 2003). In a quantitative study, Hyman, Moser, and Segala (2014) investigated usefulness, learnability, behavioral intention to use, and system use of mobile learning. The study focused on the expectations and intent of 140 online graduate students to use mobile devices to access online library content. Hyman et al. (2014) found the importance that ease of use and usefulness play in a mobile device adoption while examining electronic readers delivered on a variety of devices and found student use perception to be dependent on device and task. Further, using a qualitative approach, Raza et al. (2018) studied the beliefs of 300 university students regarding their beliefs towards m-learning adoption. They found that ease of use, along with familiarity of mobile devices, influenced students to complete academic tasks, thereby positively influencing their intention towards m-learning adoption. Using the UTAUT to understand adoption of mobile-learning in students, Sabah (2016) found that perceived usefulness and perceived ease of use were primary factors driving learner use of m-learning. However, Feng et al. (2015) found effort expectancy to have no significant impact on students' use of the smartphones; effort was not found to be a barrier to use because the technology was already widely used. Likewise, Iqbal and Bhatti (2015) found that the wide use of smartphones encourages m-learning adoption due to student familiarity with the technology.

Social Influence

Social influence is the third construct of UTAUT and refers to how individual system use is based on an individual's perceptions of what others believe about the system being studied (Venkatesh et al., 2003). Feng et al. (2015) found social influence had a significant effect on the use of applications for learning. Word of mouth emerged as another important factor in promoting app adoption for learning among students (Feng et al., 2015). Similarly, Briz-Ponce et al., 2016 found student perception regarding ease of use positively affected social influence. Showing how the four constructs are dependent upon each other, students are more likely to recommend its use to peers when technology is easy to use (Briz-Ponce et al., 2016). Yeap et al. (2016) investigated the factors that propel m-learning in undergraduate students. Data collected from 900 undergraduate students using a survey based on the theory of planned behavior found peer influence to be a strong driver in m-learning adoption and recommended that decision-makers encourage student discussions regarding their experiences with m-learning (Yeap et al., 2016). Students are more likely to adopt m-learning when they hear stories about how others have successfully applied the technology to learn (Yeap et al., 2016).

Facilitating Conditions

Facilitating conditions, the fourth construct of UTAUT, refers to the role that organizational support plays in an individual's choices regarding the specific technology system under investigation (Venkatesh et al., 2003). Feng et al. (2015) found facilitating conditions to be an important determinant to support student mastery of learning applications on smartphones. Though, Briz-Ponce et al. (2016) found that students

perceive low levels of university support for learning with mobile technologies. Alwraikat (2017) identified the importance of institutions providing appropriate support for m-learning adoption. Therefore, supporting student choice to utilize mobile technology by offering services is an important consideration for educational institutions. (Alwraikat, 2017; Briz-Ponce et al., 2016; Feng et al., 2015).

I chose the UTAUT as the conceptual framework for my study because it builds upon constructs of eight earlier models regarding technology adoption and use, and identifies four significant constructs that are common in technology adoption (Venkatesh et al., 2003). Researchers have employed the UTAUT to better understand how m-learning technology can be successfully incorporated and supported in higher education (Briz-Ponce et al., 2016; Feng et al., 2015; Sabah, 2016). These studies' conclusions informed the selection of UTAUT as the conceptual framework for my study.

The Mobile Device as a New Educational Tool

Distance education has evolved through the use of the internet and the development of electronic learning tools and platforms that take learning outside of the classroom and deliver it into the home, allowing for greater flexibility in student learning while maintaining academic rigor (Mitchell et al., 2015). This form of distance learning, utilizing computer technology and the internet is frequently referred to as electronic learning or e-learning. Further, M-learning is e-learning that is supported by mobile devices (Krull & Duart, 2017).

M-Learning

By expanding options in the learning environment, m-learning can improve learning activities by providing students with new learning experiences. For example, Koutromanos and Avraamidou (2014) conducted a literature review to explore the impact mobile games have on student learning attitudes and achievement in formal and informal learning settings. The subject of the review was studies regarding primary and secondary students published between 2000 and 2013, with a variety of research designs. Among the results researchers noted an increase in student engagement through hands on learning opportunities, as well as the development of collaborative and peer interaction skills that included debating and argument construction (Koutromanos & Avraamidou, 2014). Crompton and Burke (2018) completed a systematic review of 72 research articles from 2010-2016 that focused on student achievement, student perception, pedagogy, influencing factors and, the device or app use for m-learning in higher education. The researchers found that 16 of the research studies reported positive student achievement outcomes for learners while five studies reported neutral learning outcomes and only one study demonstrated a negative learning outcome for students (Crompton & Burke, 2018). Pereira and Rodrigues (2014) also conducted an extensive literature review on mobile learning applications and technology that encompassed both secondary and postsecondary students. The authors concluded that although mobile technology is still emerging and there is further need to align mobile teaching and learning strategies, mobile learning can provide students with learning experiences anytime and anywhere (Pereira & Rodrigues, 2014). Further, Pimmer Mateescu, and Gröhbiel (2016) used

WhatsApp to examine the m-learning effects of Mobile Instant Messaging to engage nursing graduates in their school to work transition. Using a survey to collect quantitative information on 114 new nursing professionals divided into 2 groups, the first a control group who did not use the WhatsApp and a second who participated in a moderated discussion (Pimmer et al., 2016). The researchers found the moderated group showed higher knowledge acquisition and had less feeling of professional isolation than the control group (Pimmer et al., 2016). Finally, using the UTAUT Chaka and Govender (2017) used a questionnaire to collect quantitative data to study the readiness of 323 college students towards m-learning. Researchers collected data on performance expectancy, effort expectancy, social influence, mobile learning conditions, and behavioral intention to use m-learning in students at public and private institutions (Chaka & Govender, 2017). The data collected by the researchers showed significant positive correlations between performance expectancy, effort expectancy, social influence, mobile learning conditions, and behavioral intention to use m-learning. Researchers concluded that m-learning provided student access to greater learning opportunities through the use of their mobile devices (Chaka & Govender, 2017). Findings from these studies demonstrated how through communication, student engagement, and access to content, m-learning contributed to improved learning outcomes for students (Chaka & Govender, 2017; Crompton & Burke, 2018; Koutromanos & Avraamidou, 2014; Pereira & Rodrigues, 2014; Pimmer et al., 2016).

Capabilities of mobile devices. Through m-learning, students can access a variety of content regardless of setting, giving them greater control of the learning

experience. This control may then lead to increased motivation and achievement. For example, while studying 103 university students enrolled in teacher preparation courses, Martin and Ertzberger (2016) conducted a quantitative study to examine the effect mobile learning has on student attitude and achievement. Martin and Ertzberger (2016) found that students believe that mobile devices unbind the classroom from stationary locations, allowing course content to be easily transported. Further, their results showed the unbound classroom and access to a virtual expert improved student test scores (Martin & Ertzberger, 2016). Cheng, Yang, Chang, and Kuo (2016) conducted a similar study of 32 university students enrolled in a nanotechnology course to examine learning motivation and scientific enquiry abilities. Using a control group and an experimental group, the researchers used a pre and post test to measure learning motivation and scientific enquiry before and after implementation of a mobile learning approach (Cheng et al., 2016). The control group used mobile devices to enhance traditional lecture style learning and the experimental group used a 5E (engagement, exploration, explanation, elaboration, and evaluation) mobile learning approach for an enhanced learning experience (Cheng et al., 2016). Cheng et al. (2016) found the traditional approach, with mobile device enhancement, assisted students in knowledge acquisition, but the 5E approach allowed students to observe scientific phenomena and develop scientific inquiry skills through active observation. The analysis of covariance (ANCOVA) showed the experimental group performed significantly better in regards to self-reported learning motivation. Further, use of a one-way ANCOVA to measure self-reported scientific inquiry ability showed the experimental group performed significantly better than the traditional lecture

group. These research findings demonstrated that mobile learning provides students control over when, where, what, and how they access the information they need, as well as increased student motivation and achievement (Cheng et al., 2016; Martin & Ertzberger, 2016).

Mobile devices can also deliver high-quality flexible learning experiences to students. For instance, Milosevic et al. (2015) used data collected from a quantitative survey of 280 university students and applied the UTAUT model to examine performance expectancy, effort expectancy, the influences of the lecturer, and the quality of the web-based services provided in a higher education setting. Students were then informed of the nature of the study and the meaning of m-learning and completed a written questionnaire. Research findings showed students reported increased access to learning activities due to the ability of this technology to access learning experiences that can occur anytime and anywhere. Their findings further showed that, when compared to older methods of learning, m-learning increased the rate of knowledge acquisition (Milosevic et al., 2015). Milosevic et al. (2015) attributed these findings to the availability of information access, peer interactions and improved student productivity related to m-learning. Additionally, while researching the usefulness of mobile technology for accessing library resources in graduate students, Hyman et al. (2014) found mobile devices used for reading offered online graduate learners asynchronous and ubiquitous instruction delivered via the web. Furthermore, Kim et al. (2017) used an online survey to collect data from 493 university students to examine the effects of resistance and intention to use m-learning in university

students. The authors found the interactions and communication between teachers and students when using m-learning provided a flexible learning approach (Kim et al., 2017).

Student engagement in m-learning. Student familiarity with mobile devices can be a determinant for mobile learning engagement. For instance, using a quantitative design approach, Raza et al. (2018) surveyed 300 university students to study the behavioral and psychosocial factors in acceptance of m-learning. The researchers found student familiarity, as it relates to usefulness and ease of use, positively influenced the likelihood of students to adopt mobile technology for learning purposes. Furthermore, also using a quantitative research approach Iqbal and Bhatti (2015) used the technology acceptance model (TAM) to investigate m-learning acceptance among 244 university students and found student adoption of m-learning increased based on the familiarity with the device. Iqbal and Bhatti (2015) also reported device familiarity increased learning productivity, which they attributed to students feeling the device was convenient to use to access learning content. Shorfuzzaman and Alhussein (2016) conducted a quantitative study of 84 undergraduate students using a modified version of the UTAUT to determine student readiness to adopt m-learning and found that students were ready to adopt m-learning and preferred the flexibility offered by m-learning to that of a traditional classroom setting. The researchers also found that performance expectancy was the most significant construct in determining student readiness to adopt m-learning (Shorfuzzaman & Alhussein, 2016). Further, Feng et al. (2015) used the UTAUT model to study the intention of 250 full-time undergraduate students to use smartphone applications for studying using a quantitative research method. Students reported a mix of prior use

habits: 14% reported never having used a smartphone for educational purposes, 56% reported they currently use smartphones for their educational purposes, and the remaining 30% reported past use but no current use of smartphones for educational purposes (Feng et al., 2015). This study showed similar results to the TAM approach used by Iqbal and Bhatti (2015); Feng et al. (2015) found wide adoption of mobile devices reduced perceived barriers for student use. These findings suggest that familiarity with the m-learning device plays a factor when students are selecting the device they plan to use to engage with m-learning activities, providing evidence for positive engagement outcomes when students are familiar with the learning device.

Student attitudes and device availability are also important considerations for m-learning. For instance, Yorganci (2017) used a quantitative survey to investigate the attitudes and self-efficacy of 480 freshmen attending a vocational college, finding that students reported positive attitudes toward m-learning when they believe they possessed the needed skills to support their learning. Yorganci (2017) further suggested qualitative studies could enrich their findings by exploring core factors that influence performance. Koutromanos and Avraamidou (2014) found mobile devices are often users' first choice for accessing information and communication when the mobile device is familiar to students and ubiquitous in nature. Researchers have also found that, as infrastructure is added and the cost of mobile devices declines, the student population who can be served by access to the use of mobile devices for learning is increasing (e.g., Ally, Grimus, & Ebner, 2014; Pereira & Rodrigues, 2014).

Smartphones

Smartphones are a common device that most people carry on them and use throughout the day. In a meta-analysis review of m-learning trends, Chee, Yahaya, Ibrahim, and Hasan (2016) analyzed 144 refereed journals from 2010-2015 examining elementary, secondary, and higher education students as well as working adults and found smartphones to be the most commonly used device for m-learning. This is similar to findings by Sung et al. (2016) who conducted a meta-analysis of research regarding the integration of mobile devices for teaching and learning from 1993 through 2013 on students in primary, secondary and higher education environments. Sung et al. (2016) found the use of mobile devices to support learning more prevalent than the use of desktop computers, while Martin and Ertzberger (2016) similarly reported the widespread growth and use of mobile devices and phones. Finally, Crompton and Burke (2018) in their systematic review, found mobile phones to be the most reported device for m-learning by college students.

Students use smartphones for activities that could also be used for learning. Tabor (2016) used a mixed methods approach to study the perspectives of 33 undergraduate students regarding technology acceptance. Tabor's (2016) findings showed that handheld mobile technology is more prevalent than personal computers among students. Tabor (2016) also found that 39% of students reported use of their smartphones, iPhones, and Android phones for learning, while only 30% reported the use of laptop computers for learning. Similarly, in a case study by Al-Emran and Shaalan (2015) examining mobile learning attitudes of 383 university students and 54 instructors. Findings showed 99% of

the 437 study participants owned a smartphone or tablet device and that 81.5% of students used their mobile device for educational purposes while 77.8% of faculty indicated they do not use their mobile devices for teaching, however both the students and faculty reported positive attitudes toward m-learning (Al-Emran & Shaalan, 2015). Further, Murphy, Farley, Lane, Hafeez-Baig, and Carter (2014) used a quantitative questionnaire to collect information on how 100 university students use mobile technologies for learning. Murphy et al. (2014) found smartphone ownership was second only to laptop ownership in terms of learning devices preferred by undergraduate college students. Murphy et al. (2014) also found that students use smartphones for collaborative and social activities and that they want access to learning anytime and anywhere, which smartphones enable.

The literature is clear that the mass adoption of smartphones and available data networks created increased educational opportunities for students. For instance, Martin and Ertzberger (2016) found there are almost as many mobile subscriptions as there are people in the world allowing for increased opportunities to provide education through these devices. Al-Said (2015) used a quantitative study of 27 university students to investigate the perception of a mobile learning application, Edmodo. Findings indicated a preference by students to use smartphones for educational communication due to their proficiency with the device as a result of daily use Al-Said (2015). Furthermore, Kee and Samsudin (2014) conducted a qualitative research study of six teenage students between the ages of 13 and 17 about mobile device use by digital natives for learning. Findings indicated that teenage students use smartphones for both formal education (seeking

information from sources outside the classroom) and in informal situations (accessing

information motivated by personal curiosity). Kee and Samsudin's (2014) research

supported the idea that users view mobile devices as an extension of themselves, creating

a natural method of engaging with educational material because of their unique

relationship with the user.

Replicating Classrooms Virtually

Through smartphones, students have an opportunity to communicate in real time

with instructors and fellow students, replicating activities that traditionally have taken

place in a face-to-face environment (Al-Said, 2015; Chuanxue & Junfei, 2015).

Chuanxue and Junfei (2015) explored how smartphones could replicate a traditional

lecture setting by creating a platform that allowed for the delivery of micro-lecture

content on a mobile device. The platform allowed for asynchronous teacher learner

support as well as delivered video content to students. The micro-lecture mobile learning

system (MMLS) gathered quantitative user data from a control group of 60 students

enrolled from 2008 – 2009 who did not use the MMLS platform and an experimental

group of 60 students enrolled from 2010 – 2011, who used the MMLS platform, all

students were enrolled the same course. Findings showed student test scores in the

experimental group, who used the mobile platform to deliver videos, take annotated

notes, and communicate with instructors via smartphones to be higher than the control

group who did not use the MMLS platform (Chuanxue & Junfei, 2015). Using mobile

technology students, instructors, and those involved in supporting learning experiences

can connect to and exchange information with minimal restrictions (Chuanxue & Junfei, 2015).

Institutional Support for Mobile Learning

      Student support needs. Students are more likely to adopt mobile technology if teachers and institutions are invested in supporting them in the use of mobile devices for learning. However, research showed that institutions often do not provide adequate support in this area (Almaiah, Jalil, & Man, 2016; Nikou & Economides, 2017). Because learning is directly impacted by institutional choices, research has shown the importance of supporting student learning through the use of technology innovations (Almaiah et al., 2016; Murphy et al., 2014). Nikou and Economides (2017) used a survey to collect quantitative data on 140 high school students to explore acceptance and motivation of mobile-based assessment. Findings indicated students are willing to use mobile-based assessment when it is perceived as easy and useful (Nikou & Economides, 2017). Further, students who felt autonomous in their learning perceived it easier to use and demonstrated a higher willingness to use mobile-based assessment (Nikou & Economides, 2017). Nikou and Economides (2017) also found students who felt a relationship with their peers and instructors perceived learning and assessment useful and easier and had stronger intentions to use mobile-based assessment. Finally, Nikou and Economides (2017) found when students felt competent in learning and assessment tasks when they perceived the learning as easy. Nikou and Economides (2017) further found students reported a desire for guidance and support from institutions and instructors in using mobile technology in the learning environment. Almaiah et al. (2016) used a

quantitative questionnaire to explore the perspectives of 392 university students to determine the factors that contribute to high quality mobile learning systems. Almaiah et al. (2016) found system quality, information quality, and service quality to be primary factors that contribute to successful mobile learning implantation. These findings demonstrate some of the many factors institutions and instructors should consider when implementing mobile learning (Almaiah et al., 2016; Nikou & Economides, 2017).

Teacher and institutional training and support. Research also showed teachers and institutions need to build m-learning understanding into their professional development and curriculum planning in order to improve student uptake of mobile devices for learning. Ally et al. (2014) reviewed recent literature on mobile learning to investigate teacher readiness to implement m-learning. Ally et al., (2014) found research, content creation and sharing, mobile tool identification and use, social learning, understanding online safety and security, as well as proper attribution to be skills 21st century teachers need to have. Ally et al., (2014) further found a need for a global shift in educational systems to facilitate mobile learning in education to be an emergent theme in the literature. Ally et al. (2014) argued that teachers need to be at the forefront of this shift to take full advantage of these mobile tools. Baran (2014) used a qualitative approach to examine research findings from 329 peer reviewed journals regarding mobile learning in teacher education programs. Baran (2014) found m-learning to be beneficial in extending teachers learning experiences as well as enhancing mobile technology integration skills. Baran (2014) further found positive pedagogical support for m-learning in teacher education. As mobile learning is adopted into educational practices teacher and

institutional support play a key role in the success of mobile learning (Ally et al., 2014; Baran, 2014).

Smartphone Usefulness in Education

Research findings demonstrated the large number of ways smartphones can be used by students. For example, Zvjezdana et al. (2015) used an online asynchronous discussion forum to interview a focus group comprised of 65 students in higher education. This qualitative research forum was moderated by the researchers to understand how students are using their smartphones for learning (Zvjezdana et al., 2015). The authors found students use smartphones for socializing, communicating, and daily information needs, as well as for entertainment. The findings further indicated students consider smartphones to be useful for academic work and learning (Zvjezdana et al., 2015). Students reported using smartphones to access learning content found in courses, perform searches in library systems, interact with peers regarding course work, and take notes (Zvjezdana et al., 2015). Johnson (2016) conducted a quantitative study to examine the differences in the use of punctuation and capitalization of 50 university students focusing specifically on the effects of text messaging and keyboard interactions on cell phones and smartphones. Johnson (2016) focused on institution-level changes in the language skills of students. Findings indicated that when using the full keyboard, students wrote using more words and increased their use of punctuation. Johnson (2016) reported the need for university administrations to understand how this technology is being used so that it can be used to support student learning. Using a survey to collect quantitative data from 460 medical students, Ebiye (2015) investigated the information-

seeking behavior of medical students when using their smartphones and tablets for learning. The researchers found participants had high levels of awareness for how to use smartphones and tablets for the purpose of learning (Ebiye, 2015). Ebiye (2015) further found medical applications, e-books, internet browsing, social networking, and note taking to be common activities associated with smartphone and tablet use by medical students. Results further showed that access to important information saved time and reduced stress for study participants (Ebiye, 2015). In a mixed method study Zhonggen, Ying, Zhichun, and Wentao (2019) examined the effects a mobile learning platform on cognitive load, student satisfaction, and learning outcomes. The researchers compared two groups of college students: Group A was comprised of 169 English students who used the mobile platform and Group B had 171 who did not use the learning platform (Zhonggen et al., 2019). The researchers collected quantitative data on learner satisfaction using a Likert survey (Zhonggen et al., 2019). The researchers gathered qualitative data on learning outcomes by testing student proficiency in four areas; reading comprehension, listening comprehension, speaking, and writing (Zhonggen et al., 2019). Zhonggen et al. (2019) further used a questionnaire to gather information from students regarding their cognitive load as well as a semi structured interview to gather data regarding demographic information, self-reported cognitive loads, student satisfaction, and learning outcomes. Students reported the mobile platform provided improved opportunities to share knowledge and customize their learning experiences (Zhonggen et al., 2019). Further, students reported ease of access to information via their smartphones, as data demonstrated that the ease of access, provided by smartphones, allowed for more

working memory easing the cognitive load on students (Zhonggen et al., 2019). Researchers found an increase in student satisfaction, a reduction in cognitive load, as well as improved learning outcomes for Group A when compared to Group B (Zhonggen et al., 2019). Finally, using a quantitative approach Cheng (2015) collected and analyzed 486 questionnaires to explore how learners' beliefs regarding mobile phone characteristics affected learner intention to use m-learning in university students. Cheng (2015) found device navigation had the greatest impact on students' perceived usefulness and perceived ease of use of mobile devices. Cheng (2015) further found the convenience of the mobile device had the largest total impact on learners' perceived enjoyment of m-learning. These findings suggested that mobile device functionality needs to be user-friendly, easily accessible, and able to access interactive content anytime and anywhere (Cheng, 2015).

Research has shown there are a number of factors that can influence students' intention to use smartphones as learning tools. For instance, Feng et al. (2015) found in a qualitative study of 250 undergraduate students that performance expectancy, social influence, and facilitating conditions had a positive influence on the students' behavioral intention to use the smartphone applications for learning. However, effort expectancy did not have a significant effect on student intention to use smartphones for studying (Feng et al., 2015). Further, Cheng (2015) found the direct correlation technology characteristics, device navigation, and convenience has on user perceived use and perceived ease of use of the device. These findings demonstrated the impact on the student's intention to use smartphones for m-learning (Cheng, 2015).

Researchers continue to identify how smartphones can support the student learning experience in higher education. Smartphones provide new opportunities to deliver effective learning experiences (Yorganci, 2017) and give students access to production tools that include applications and tools for scheduling time and setting task and appointment reminders (Cochrane, 2015; Zvjezdana et al., 2015). Using a survey to collect quantitative data from 140 undergraduate and postgraduate students to investigate how their mobile device needs differ, Lau, Chiu, Ho, Lo, and See-To (2017) found although the two populations have differing learning needs there was no significant difference in adoption. Further findings showed undergraduate and graduate students frequently use smartphones to access information via search engines and connect with others on social media but that academic use (searching online databases) was limited. Findings of Zvjezdana et al. (2015) showed that smartphones are used by students for communication, entertainment, everyday information sharing and inquiry as well as academic and personal learning. Further, preforming a literature review that studied the effects of mobile technology notification and tracking tools on graduate students, Sarrab, Elbasir, and Alnaeli (2016) used a set of technical quality aspects that focused on standards and guidelines for learning and mobile application software quality. The researchers found a relationship between the technical quality associated with the m-learning experience and user satisfaction (Sarrab et al., 2016). In a longitudinal study of 36 graduate students that explored the effects of time tracking and monitoring on self regulated learning with a mobile device Tabuenca, Kalz, Drachsler, and Specht (2015) found mobile phones have a positive influence on time management skills and self

regulated learning for students enrolled in online coursework. Johnson (2016) and Raza et al. (2018) concluded that due to increased student mobile phone use for learning, university-focused support of this trend led to higher quality educational experiences than passive efforts to aid learners.

Barriers to Use

Though research has established many positive aspects of mobile technology as a learning tool, there are barriers that prevent mobile technology from becoming an effective mode of educational delivery. For example, Kates et al. (2018) preformed a meta-analysis of 39 studies with participants consisting of both k-12 (135,131) and college-age students (13,752) on how mobile phones influence student performance. Kates et al. (2018) found a small overall negative effect (-.16) that the use of mobile phones had on academic achievement. However, when accounting for the two differing populations the negative effect was greater for the college age students (-.17) than for the K-12 students (-12), The researchers cautioned that the results should not be generalized to an older population because of the age of the study participants reviewed. The researchers further noted that more research was needed to determine if the effects noted were from casual use of the technology or specific to deliberate educational usage (Kates et al., 2018). Aaron and Lipton (2017) recorded 351 college students while the students watched a 12 ½ minute video. Aaron and Lipton (2017) then administered a quiz over the content presented in the video to understand the impact mobile devices have on short term retention. Results showed that students who did not check their device during the video had higher scores than their peers who engaged their devices during the video

(Aaron & Lipton, 2017). Results further showed that those students who were in classrooms that had stricter policies regarding the use of mobile devices performed better on the quiz (Aaron & Lipton, 2017).

Similarly, Deng, Lai Ku, and Kong (2019) used a survey to collect quantitative data from 70 university students regarding the effects of off-task multitasking in the classroom with mobile phones. The researchers focused on the use of social media and instant messaging not related to classroom activities to determine if there was a negative effect on learning (Deng et al., 2019). Deng et al. (2019) found that although students frequently checked their phone when alerted to social communication during class, there was no significant negative effect on learning. These results reflect findings from a computer lab classroom environment causing the researchers to concede that the findings in a lecture setting might differ (Deng et al., 2019). Further, Pereira and Rodrigues (2014) conducted an extensive literature review to understand the emergence of mobile learning and identify factors and gaps in m-learning implementation. The literature reviewed included studies relating to primary, secondary, undergraduate, and graduate student use of mobile devices for learning (Pereira & Rodrigues, 2014). From their review, Pereira and Rodrigues (2014) reported that small screens, low connectivity, and poor input capabilities make desktop computers the preferred learning medium over mobile devices. They further found e-learning constraints including isolation, support issues, and lack of communication between the learner and the instructor to be barriers to mobile learning (Pereira & Rodrigues, 2014). Student affinity for mobile technology and the ubiquity of mobile devices alone do not guarantee student readiness to adopt m-learning (Yeap et al.,

2016). Because of the wide range of options, there is debate in the field as to whether smartphones are a benefit or a distraction from learning.

Student-reported physical, psychological, and behavioral barriers. Students themselves have reported specific barriers to their use of smartphones to access educational materials. For instance, while studying how students in higher education use their smartphones, Zvjezdana et al. (2015) found that due to the small screens, students do not frequently access library resources using their smartphones. The authors further found small screen size to be the reason students do not use smartphones for learning activities like reading or writing. Likewise, Ebiye (2015) found medical students reported power needs and insufficient charging availability as barriers to smartphone and tablet use for learning. Ebiye (2015) further found the fragility of the devices and lack of on-campus support for these repairs to be a problem identified by students. Institutional support for device operation was further reported in the study findings as a barrier (Ebiye, 2015). Students also reported device distractibility, the use of the device for purposes other than learning, to be a barrier for use reported by medical students (Ebiye, 2015). Alwraikat (2017) used a quantitative research approach to investigate perceived barriers to smartphone adoption by 227 graduate students. Alwraikat (2017) found the greatest barriers for students to be university regulations, faculty support, network access, battery life, and charging limitations. Students further reported that perceived usefulness, lack of learning activities, lack of smartphone applications, and lack of known techniques for learning with smartphones to be the lowest barriers (Alwraikat, 2017). These findings indicate the need for institutional investment in supporting the physical requirements of

the smartphone such as access to data networks and charging stations (Alwraikat, 2017) as well as the creation of policies that encourage smartphone use in differing learning environments (Ebiye, 2015).

Although the compact nature of the smartphone makes it portable and accessible, it does create some physical barriers that affect usefulness. Similar to the findings of Pereira and Rodrigues (2014) and Zvjezdana et al. (2015), Hyman et al. (2014) identified screen size on mobile devices as a barrier to reading while researching 140 graduate students use of mobile technology to use library services. Using a questionnaire to collect quantitative data, Hyman et al. (2014) found that navigational differences existed between linear and nonlinear content reading when using mobile devices. Lau et al. (2017) also found screen size and the inability of smartphones to enlarge text to be common student-reported barriers. Al-Said (2015) found students reported issues with battery life and file storage on mobile phones; however, their research did not identify screen size as a barrier for entering information into the device. These research findings suggest that smartphones are not ideal for every learning situation and that institutions and faculty need to identify learning goals and required activities when considering smartphone use (Al-Said, 2015; Hyman et al., 2014; Lau et al., 2017; Pereira & Rodrigues, 2014; Zvjezdana et al. (2015).

The versatility of the smartphone provides an opportunity for improved learning but can also become a hindrance to learners. In a yearlong longitudinal study Tossell et al. (2015) explored the use of smartphones to support learning in 24 undergraduate students. Tossell et al. (2015) found smartphones support undergraduate learners in

specific learning situations, however the research findings also indicated access to smartphone technology alone was insufficient to improve student performance. The authors discovered a decline over time in student engagement with their smartphones for learning even though the students had reported high initial interest in learning using their smartphones. Tossell et al. (2015) further found a disconnect between large-scale adoption of smartphones and smartphone use in the classroom. These findings indicated a need to align course work with learning outcomes to ensure student success with smartphones when used for learning purposes (Tossell et al., 2015).

Lack of institutional and faculty support. Institutional and faculty support are further barriers that have been identified in regard to m-learning adoption in higher education (Abachi & Muhammad, 2014; Alwraikat (2017); Ebiye, 2015; Omede, 2014). Alwraikat (2017) found university regulations, lack of faculty knowledge and training to support learning via smartphones, as well as lack of faculty cooperation to all be obstacles for smartphone adoption reported by graduate students. Ebiye (2015) found smartphone fragility and institutional lack of technical experts to repair equipment a barrier for adoption. Abachi and Muhammad (2014) used a series of quantitative surveys to collect data from undergraduate and postgraduate students as wells as academics to investigate m-learning technology from the learner and educator's viewpoints in higher education. The researchers found student and faculty had concerns regarding information security and coverage at the university that created an issue for adoption (Abachi & Muhammad, 2014). Conducting a similar quantitative study, Omede (2014) surveyed 50 undergraduate students as well as 50 instructors to understand why cell phones were not

being used to enhance learning. The researchers found that although students and faculty were aware of the possible educational uses for mobile phones, a major barrier for utilization was faculty opposition for implementation (Omede, 2014). These findings demonstrate the barriers that are created by institutions and faculty in student willingness to use mobile technology for learning (Abachi & Muhammad, 2014; Ebiye, 2015; Omede, 2014).

Properly investing in the implantation and support of technology can be a risky endeavor for institutions. In recognition of these realities, Fulantelli, Taibi, and Arrigo (2014) used a case study approach and task-interaction framework to investigate the mobile learning activities of two student groups, art students and tourism students. Fulantelli et al. (2014) found a lack of student engagement with mobile learning through a measured use of the mobile systems.

Design barriers. Smartphones have been designed to house a variety of available functions; however, smartphones are not designed specifically for learning and do not always align with educational goals (Kim et al., 2017). Zvjezdana et al. (2015) found that the smartphone is one tool that serves many purposes, but not all of those purposes are geared to learning. In a quantitative study of 450 university students, Arslan (2016) examined the behaviors of students moving from a classic mobile phone to a smartphone. Arslan (2016) found that individual selection of smartphone applications changed from person to person because of the variety of uses for the device. Arslan (2016) further identified students' distraction and disengagement from learning activities due to social media and other similar applications. Findings indicated the wide range of functionality

available to students creates an opportunity for individualized learning to occur (Arslan, 2016). However, there is a risk that if students lack the specific knowledge or needed support of how to best use the smartphone for learning m-learning adoption will not occur (Arslan, 2016). Due to changing social behaviors there are both positive and negative aspects for smartphone use, however, with training the use of smartphones does not have to have a negative effect (Arslan, 2016).

Formal and Informal Learning

Smartphones offer elements that are conducive to formal and informal learning and provide functionality and versatility, assisting students to connect both inside and outside of the classroom and access real-time information in a variety of ways (Zvjezdana et al. (2015). Mills et al. (2014) used a survey to gather quantitative data about information seeking and sharing behaviors of 62 undergraduate students when using mobile learning. The authors found mobile technologies and applications along with information sharing and seeking to be foundational components that facilitated the creative process and created new learning opportunities for students that bridged the gap between formal and informal learning.

Formal learning. The use of mobile devices in formal learning settings has been shown to support m-learning through a variety of activities. For instance, Pedro et al. (2018) conducted a meta-analysis of articles regarding mobile learning integration in formal classroom settings from 2010-2018. Studies in the meta-analysis included students in higher education as well as k-12 classrooms (Pedro et al., 2018). Pedro et al. (2018) found several studies that demonstrated when students use mobile applications like email,

texting, and for social networking related to learning activities, they outperformed their peers who did not engage in such activities. However, researchers also found mobile technologies can create barriers for learning like cheating, cyber-bullying, and classroom disruption as well as students accessing inappropriate material (Pedro et al., 2018). While researching mobile device usefulness, Hyman et al. (2014) found mobile electronic readers supported formal learning and that electronic books can be more interactive than their traditional paper counterparts. The interactive elements the authors found useful for formal learning included audio, video, as well as text to speech. Further, using a mixed method approach to collect data from 120 undergraduate students to understand the use of a smartphone response system in university lecture settings, Barchilon Ben-Av and Ben-Av (2016) found high participation rates among students for formal interactive learning and saw no increase in inattentiveness, as might be expected when allowing smartphone use during lectures. Further, using a quasi-experimental approach Lin and Lin (2016) studied the use of mobile devices for learning of 36 nursing education students. Lin and Lin (2016 found the use of mobile learning combined with the problem-based learning model aided the training experience in the formal classroom setting. These research findings demonstrate how activities in a formal learning setting with mobile technology and smartphones can be used to facilitate formal learning (Barchilon Ben-Av & Ben-Av, 2016; Lin & Lin, 2016; Hyman et al., 2014).

Informal learning. M-learning devices allow for both the consumption and the creation of content (Mills et al., 2014), allowing for student-centered learning approaches. Kim et al. (2017) found university students used their mobile devices for

independent self-education outside the constraints of time and space, making mobile devices an effective device for informal learning. Zvjezdana et al. (2015) also found that students who use their smartphones for learning find the most effective use is for simpler tasks that fall in the context of informal learning. Lo et al. (2016) used a survey to gather qualitative and quantitative data to explore how 51 art and design students at the Hong Kong Design Institute use smartphones to access library services for learning. Although results by Lo et al. (2016) showed smartphone ownership amongst all participants, findings indicated that most students used their smartphones for informal learning activities such as online searches and social communications. Further, in a longitudinal study examining mobile learning trends, Chee et al. (2016) found a preference for informal learning when engaging with these devices. Overall, these findings indicated learning with mobile devices provided students with learning opportunities in informal situations.

Smartphone use as a window to learning styles and new pedagogies. The way m-learning is successfully used in formal and informal learning could lead to understanding of how student use habits inform differing learning situations. Murphy et al. (2014) found students utilized mobile devices for a large range of activities that support both formal and informal learning such as checking email, checking course assignments, listening to lectures, internet searches, reading, checking university learning management systems, accessing social media, discussion forum participation, sharing information with peers, and note taking. Further, Raza et al. (2018) found that by allowing instant access to digital resources, mobile devices increased opportunities for

knowledge acquisition in both formal and informal learning situations. Raza et al. (2018) found teacher readiness improved the chances of student adoption of m-learning and suggested institutions provide training and learning opportunities for both students and instructors to increase learning effectiveness both inside and outside the classroom. Understanding how m-learning impacts student learning in both formal and informal learning environments can inform when and what learning techniques to apply to produce the best results (Raza et al., 2018).

Formal and informal learning are not mutually exclusive, and research suggests that a combination of formal and informal learning strategies could create a richer learning experience for students. Vorley and Williams (2016) used a mixed method approach to examine how effective smartphone apps are in fostering effectual thinking in 60 undergraduate students. Vorley and Williams (2016) found using an independent method-based approach to learning with smartphones added value in formal learning settings when combined with an informal learning approach. Likewise, Tossell et al. (2015) found formal and informal learning may be linked and failing to provide opportunities for one might diminish the results of the other. Fu and Hwang (2018) reviewed mobile technology learning literature from 2007 to 2016. The researchers found mobile collaborative learning is a learning approach used to facilitate student engagement with teachers, peers, and society, in and outside the classroom. (Fu & Hwang, 2018). Fu and Hwang (2018) found an increase in mobile learning technology and the use of collaborative activities by college students. Koutromanos and Avraamidou (2014) found that the combination of formal and informal learning could be used to provide quality

educational experiences citing the need for further research in this area. Research has demonstrated the versatility of the smartphone could bridge opportunities for students to learn in formal and informal learning environments (Mills et al., 2014).

Accessing course content via smartphones brings formal learning into an informal setting, effectively hybridizing the two learning types. Findings from Dold (2016) demonstrated how videos can be used as a replacement for lectures or reading and can be accessed both in formal and informal learning settings. Pimmer et al. (2016) found that although mobile devices allow content access irrespective of physical location, these devices also provide content that can be location specific such as information delivered while visiting a museum exhibit. However, findings by Tabor (2016) indicated not all students are willing to mix their personal and academic lives, which can limit the use of some mobile technologies, such as social media, to support social learning experiences. Several authors concluded that due to the ubiquitous nature of the smartphone and its persistent presence, development of learning activities that support both formal and informal learning could improve student learning outcomes (Koutromanos & Avraamidou, 2014; Mills et al., 2014; Tossell et al., 2015; Vorley & Williams, 2016).

Learner Experience

Understanding the factors that comprise the student learning experience as it relates to m-learning is an important consideration. Using multimedia theory, Dold (2016) conducted a literature review on undergraduate and graduate student use of video for online learning, focusing on mobile device application. Dold (2016) found that content customization through the use of video impacted user-learning styles and

preferences by personalizing the learning experience for students. Further Briz-Ponce et

al. (2016) used the UTAUT to gather quantitative data via a survey to explore factors that

influence medical student intention to use mobile technology for learning. Briz-Ponce et

al. (2016) found a strong correlation between students' willingness to use this technology

(57%) and their willingness to recommend mobile technology for learning (40.5%); these

findings demonstrated the strong effect that social influence had on m-learning adoption.

Briz-Ponce et al. (2016) also found that student perceptions regarding the ease of use of

m-learning was a primary factor affecting social influence. Findings by Briz-Ponce et al.

(2016) demonstrated the importance ease of use plays in student willingness to

recommend mobile technologies for learning. This quantitative approach allowed for an

analysis of smartphone adoption among students but lacked an understanding of the

student perspective (Briz-Ponce et al., 2016). Pimmer et al. (2016) examined 36 empirical

papers to address m-learning in higher education according to their theoretical

underpinnings and what were the educational outcomes of each. Findings indicated that

learners positively accepted recorded lectures as a presentation strategy, however actual

use of these recordings by students was low (Pimmer et al., 2016). Findings further

showed text-messaging sent to learners was also well received and the use of text-

messaging demonstrated gains in learner knowledge acquisition. Findings by Pimmer et

al. (2016) further revealed that in certain situational settings, the use of mobile devices

for learning can produce personalized learning and assist in the learning process (Pimmer

et al., 2016).

Mobile technology that is easy to use can improve the student learning experience in a variety of ways. While studying the behavioral factors that support m-learning adoption in university students, Raza et al. (2018) found m-learning strategies needed to be easy for students to comprehend for ease of adoption. The author's findings demonstrated the social influence peers and colleagues have on m-learning adoption; therefore, educational institutions should provide encouraging environments to support and engage students to accelerate m-learning adoption (Raza et al., 2018). Similar findings by Murphy et al. (2014) indicated university students want institutions to design courses that allow for improved learning experiences via mobile devices that support learning. Findings showed student attitudes toward learning strategies and social supports are important considerations when discussing m-learning and smartphone integration. (Murphy et al., 2014; Raza et al., 2018). Cheng et al. (2016) found students understand how to use mobile devices for information exploration, knowledge integration, and collaboration with peers. Similarly, findings by Fu and Hwang (2018) indicated using mobile technology to learn collaboratively has the potential to facilitate improved knowledge acquisition in university students.

Individual customization. Smartphone applications allow customization for the individual user. For instance, using "app inventor," a free android based app creator, Vazquez-Cano (2014) developed an educational app then used a quantitative study of 388 university students to determine how the app supported learning with smartphones. The researcher concluded that students highly value applications developed for specific end-users. The app's features supported and enhanced learning practices by fostering

collaborative work among instructors and students (Vazquez-Cano, 2014). Vazquez-Cano (2014) recommended universities continue to develop strategies that support smartphone use in learning settings. Abachi and Muhammad (2014) found applications can support learning for disadvantaged students, specifically applications that can be used to assist students with language or speech impairments. Utilizing knowledge gained from students can help shape app development and create a more personal learning experience for students through their mobile device (Abachi & Muhammad, 2014).

The customizability of smartphones also benefits adult learners, who have unique needs that are different from those of the traditional student in a face to face classroom setting, and who are adopting m-learning for a variety of reasons. For instance, Celik, Sahin, and Aydin (2014) used a quantitative questionnaire to study mobile learning adoption in 205 student teachers. Celik et al. (2014) further found mobile devices attracted the attention of the learner, provided time and money savings, increased collaboration, and provided information from multiple sources that can be implemented and updated to create a personalized experience. Abachi and Muhammad (2014) found the use of knowledge, along with the latest communication learning and teaching technology creates a beneficial tool that provides students an opportunity to select the learning technology that achieves the best learning outcomes. Hashim, Hashim, Tan, and Rashid (2015) used a survey to gather quantitative data on 191 adult online leaners to investigate how attitude toward mobile technology contributes to adult online learners willingness to adopt mobile learning. The researchers found a preference by adult learners' to adopt m-learning when the technology supported their mobile connectivity,

allowed for collaboration, provided students a feeling of personal fulfillment, allowed for access to quality information, provided ease of use, and allowed for construction of knowledge while engaged in the learning process (Hashim et al., 2015).

Understanding students' perceptions and preferences in the learning environment can improve students' learning experiences and affect learning outcomes. Hyman et al. (2014) discovered the importance that student learning preferences and needs play in the ease of use and usefulness of the mobile device being utilized for electronic reading purposes. Additionally, Kee and Samsudin (2014) found students preferred learning facts, skills, and language via their mobile devices but conceded that individual preferences, interests, and self-motivation are variables affecting this choice. Further, using quantitative data Bere and Rambe (2016) explored the acceptance of mobile messaging to improve student performance in 223 bachelor students, student academic performance was positively impacted by the adoption of mobile messaging systems. Further finding device mobility, learner control, collaboration capabilities and cost were drivers of leaning in the mobile environment. Likewise, using a survey to collect quantitative data from 61 undergraduate teaching students regarding the use of instant messaging to support learning in higher education, So (2016) found university students who used WhatsApp, a communication application, for communicating with teachers and peers had improved academic performance. Findings also demonstrated positive student perceptions regarding the use and acceptance of this technique for learning both inside and outside the classroom, thereby rejecting the idea that afterhours instruction created a conflict between academic and personal lives (So, 2016). This research demonstrates how

smartphone functionality can be used as an m-learning strategy to support student learning (Bere & Rambe, 2016; Hyman et al., 2014; Kee & Samsudin, 2014; So, 2016).

Use of smartphones for content creation and communication. Smartphones are powerful computers, and as their technological capabilities increase, their potential to be used as content creation tools increases. Using multimedia theory, Dold (2016) conducted a literature review of undergraduate and graduate student use of video for online learning focusing on m-learning applications. Dold (2016) found that content customization through the use of video impacted user learning styles and preferences by personalizing the learning experience for students. The opportunities presented through m-learning provided mobile learners with further content options, thus increasing learner motivation and learning efficiency (Dold, 2016).

As a device capable of multiple forms of communication, smartphones can support social learning experiences. For example, Bere and Rambe (2019) used a qualitative case study approach to investigate m-learning adoption through instant messaging. Nine cohorts were formed from 74 college students to examine social embeddedness in mobile learning (Bere & Rambe, 2019). WhatsApp was used as the communication platform for the cohorts (Bere & Rambe, 2019). Researchers found WhatsApp was appropriate to assist in the cognitive, emotional, and political health of learners (Bere & Rambe, 2019). Further, students reported smartphones and instant messaging as a way to share knowledge with peers that promoted socialization and community engagement (Bere & Rambe, 2019). Fu and Hwang (2018) found mobile devices can play an important role in creating a collaborative learning experience for

university students. Further, Al-Said (2015) found the use of Facebook, Twitter, and LinkedIn as examples of sites easily accessed and used by students to form learning groups. This research demonstrated how through electronic social networks students can work collectively as well as support one another through the learning process (Al-Said, 2015). Finally, Ooi, Hew, and Lee, (2018) used a questionnaire to collect quantitative data on 229 university students to determine if social learning platforms, accessed through mobile devices such as smartphones and tablets, can promote continuous learning. The researchers found usefulness, ease of use, and a sense of belonging to be significant factors that influence satisfaction and directly influence student choice to continue to use smartphones and tablets for learning (Ooi et al., 2018). Research showed how by using available networks, smartphones can connect students to learning content as well as provide an improved ability to communicate and collaborate with faculty and peers, thus improving the learning experience (Al-Said, 2015; Bere & Rambe, 2019; Fu & Hwang, 2018; Ooi et al., 2018).

Summary and Conclusions

The intent of this chapter was to review the recent literature and provide background information relevant to this study. Literature reviewed was on the topic of mobile learning in education and was published within the last five years, and only peer reviewed journals were used. Further, UTAUT (see Venkatesh et al., 2003) was identified as the theoretical framework for the proposed study as well as the research questions the study hopes to address.

Overall, research has shown the positive effects mobile devices can have on student learning. Findings demonstrate that m-learning expands student learning options and increases motivation (Dold, 2016; Koutromanos & Avraamidou, 2014) by providing learner control over when to engage in the learning process (Martin & Ertzberger, 2016; Milosevic et al., (2015). Further, research on m-learning has found a positive correlation between device familiarity and learning adoption (Iqbal & Bhatti, 2015; Raza et al., 2018). These findings indicated that as mobile technology becomes less expensive and is supported by expanding infrastructure, more students will use mobile devices for learning (Ally et al., 2014; Pereira & Rodrigues, 2014).

Smartphones have been shown to further support formal learning environments by adding interactive learning elements and supporting further exploratory learning in classroom environments (Barchilon Ben-Av & Ben-Av., 2016; Lin & Lin, 2016). In informal learning settings smartphones have been shown to improve learning outcomes (Kim et al., 2017; Lo et al., 2016; Zvjezdana et al., 2015). Research is further emerging demonstrating that mobile devices that support m-learning can bridge the formal and informal learning situation, providing learners more control and options for successful learning experiences (Koutromanos & Avraamidou, 2014; Mills et al., 2014; Tossell et al., 2015).

Although many studies found the positive effect that smartphones have on learning, there are identified barriers to use with this learning device. One of the major issues is with the small screen size (Pereira & Rodrigues, 2014; Zvjezdana et al., 2015). Also, because the smartphone has other functions that are not meant for learning, there

exists a risk of the device becoming a distraction (Kim et al., 2017; Yeap et al., 2016).

Battery life and connectivity issues are other problems identified in the research when

considering selecting smartphones for m-learning purposes (Alwraikat, 2017; Zvjezdana

et al., 2015). Lastly, a lack of institutional and faculty support has been identified in

research findings as a barrier to student use for learning (Abachi & Muhammad, 2014;

Alwraikat, 2017; Ebiye, 2015; Omede, 2014)

Smartphones are a learning tool that can facilitate a wide variety of learning

experiences for students. As interest in the use of m-learning in higher education

continues to grow, research has focused on enabling mobile learning systems and

applications on smartphones (Krull & Duart, 2017). Chee et al. (2016) recognized the

important influence smartphone technology had on learning between 2010 and 2015.

Smartphones allow students to increase productivity, access interactive learning resources

anytime and anywhere, communicate and collaborate in a variety of ways, access course

content, and play and create rich media (Al-Said, 2015; Murphy et al., 2014; Shippee &

Keengwe, 2014). With supporting networks, smartphones are always connected to the

Internet, allowing students the opportunity to seek and find information anywhere at

anytime (Abachi & Muhammad, 2014; Al-Said, 2015; Celik, et al., 2014; Cheng, 2015;

Christensen & Knezek, 2017; Lau, et al.; Murphy et. al., 2014; Nikou & Economides,

2017; Sarrab et al., 2016; Shippee & Keengwe, 2014; Sung, Chang, & Yang, 2015). As

institutions work to integrate smartphone technology into classroom environments, they

must understand the student experience, specifically how students perceive the

performance of the technology, the effort involved, social factors, and the support available to them.

Chapter 3: Research Method

Introduction

The purpose of this qualitative study was to explore the experiences of graduate students enrolled in Master of Education programs at online universities when using their smartphones for the purpose of learning. Many researchers have examined the role of m-learning in undergraduate face-to-face and hybrid settings, yet, at the time this study was conducted, little research existed on the experience of online graduate students with m-learning or on smartphone use in education overall (Chee et al., 2016; Kee & Samsudin, 2014; Martin & Ertzberger, 2016; Murphy et al., 2014; Tabor, 2016). In this research study, I examined the experiences of a growing population of online graduate students, as well as the specific implications of the smartphone when used by online graduate students.

In this chapter, I first describe the research design and rationale which includes the research questions and approach. Next, I define my role as the researcher. The methodology section includes data collection procedures as well as participant selection and data analysis processes that I used in this study. I then address issues of trustworthiness. Finally, I conclude by summarizing the key points of the chapter.

Research Design and Rationale

The following research question guided my exploration of online graduate students' experiences using smartphones for learning: How do online graduate students in Master of Education degree programs describe their learning experience related to the four dimensions of the UTAUT when utilizing smartphone technology?

The experiences of online graduate students were central to better understanding how to integrate and support this population in the mobile learning environment. Insights gained from examining the student mobile learning experience may lead stakeholders to an improved understanding of how students use this technology, as well as their likes and dislikes regarding functionality and key influences that drive their use toward this device. For this reason, I selected a basic qualitative approach (see Patton, 2015). This approach uses the participants' experiences and perspectives to explore how the smartphone is used and allowed me to generate suggestions to improve implementation processes.

I selected a basic qualitative research approach over a quantitative approach because the research questions focused on student experiences. In order to answer the research questions, I needed to understand student experiences with learning via a smartphone. A qualitative approach allowed me to understand reasons, motivations, and opinions associated with learning via a smartphone but did not produce numerical data. Because the study was focused on the experiences of online graduate students and no numerical data was to be produced, I ruled out both quantitative and mixed methods research approaches. Gathering descriptive experiential data allowed me to explore the student experience from an outward point of view versus an internal cognitive point of view that might have resulted from a phenomenological approach (see Percy, Kostere, & Kostere, 2015). I chose this basic approach over grounded theory because the UTAUT was used to explain phenomena and no new theories were being introduced. I also ruled out case study and ethnographic study approaches because the research was not limited to studying a single case or culture.

Role of the Researcher

As the researcher, my role was to locate and interview online graduate students in online Master of Education programs in the United States regarding their experiences with using smartphones to support their learning. I found and recruited qualified participants using Userinterviews, an online recruiting service. I interviewed the participants and recorded the audio for transcription so that I could code and sort the information. I report my findings in later chapters.

I selected participants with whom I had no existing relationship. By selecting participants who were unknown to me, I eliminated bias and/or power dynamics that might have occurred if a previous relationship had existed. Further, by selecting participants unknown to me from a pool that existed outside of my professional sphere of influence, I ensured there were no conflicts of interest.

Methodology

This section includes the rationale for participant selection; instrumentation used; and procedures for participant recruitment, participation, and data collection; as well as the procedure for data analysis.

Participant Selection Logic

According to Rubin and Rubin (2012), participants in a study must have experienced the phenomenon being studied. Therefore, inclusion criteria for the study population included adult students currently enrolled in Master of Education programs offered online. Further, these students were required to own and use a smartphone for any related learning activities. Prior to any interview, students were screened using a short

questionnaire checklist (see Appendix B) to ensure they met these participation requirements.

Researchers concede that the number of participants needed in a study to reach saturation is dependent upon the nature of the study itself (Guest, Bunce, & Johnson, 2006; Mason, 2010). Creswell (2007) and Mason (2010) found as few as five participants can be used to reach saturation, while Guest et al. (2006) examined data from 60 interviews and found that data saturation was reached within the first twelve interviews. Foley, Charron, and Plante (2018) reached saturation by interviewing 15 participants in a qualitative study to understand the experiences undergraduate engineering students had when using the CogEx software in replacing logbooks for their capstone projects. Ahmed (2016) reached data saturation in a qualitative study by interviewing six secondary school teachers about their experiences using social media in the classroom. Because data saturation occurs when there is no new data to be found (Fusch & Ness, 2015; Guest et al., 2006), the goal of this study was to recruit between 10 and 15 participants. However the researcher focused less on the number of participants and more on the general concepts for data saturation outlined by Guest et al. (2006), namely, that study participants are no longer providing the researcher with new information, including that there is no new data, themes, or codes that can be created based on the answers of the study participants.

I planned to select student participants using the Walden University participant pool, which is available to all current and former Walden students and faculty members to conduct research. Those interested in participating in research studies can sign up on

the Walden participant pool website and have access to descriptions of studies being

conducted at Walden University. I determined that, if after two rounds of invitations

through the Walden University participant pool, I was unable to secure enough

participants to reach saturation, I would expand the recruitment pool to include other

organizations who offer access to participants. Professional organizations such as the

Association for Educational Communications and Technology (AECT). I further

contacted Userinterviews, a paid online recruiting service, when I was unable to get

participants from the Walden participant pool and the AECT; I was able to locate 10

participants for the study through Userinterviews.

Instrumentation

Online recorded interviews that capture the audio portion of the interview were

used as the primary data source. I developed an interview protocol to align with the

research questions, which was reviewed by my committee members. Using the four

constructs of the UTAUT, I designed interview questions to answer the research

questions. After I designed the questions, two experts not associated with the study

reviewed them for alignment and clarity and to establish content validity (see Appendix

C). Both experts held PhDs and were faculty members at a major online institution.

Further, both experts were engaged in research on online student use of smartphones.

To answer the research question, I developed 10 interview questions to align to

each of the four constructs of the UTAUT. Table 1 maps the interview questions to the

UTAUT constructs.

Table 1

UTAUT Interview Question Alignment

UTAUT construct	Interview question
Warm up and introduction	Warm up: Please tell me a little about your online M.Ed. program?
Performance expectancy	1. Please tell me a little about how you use our smartphone for learning? (do you check email, grades, communicate with faculty. Etc.) 2. What kind of applications are on the smartphone that you use to support your learning?
Effort expectancy	3. Please describe a time when you used one of these applications to support your learning? 4. When thinking about smartphone features and your course work what are the factors that make you choose the smartphone versus another piece of technology?
Social influence	5. Please describe a time when you chose to use a smartphone instead of another device? 5.a. Why did you choose the smartphone in this situation? 6. How do you hear about new applications that might be helpful for learning?
Facilitating conditions	7. Please describe a time when a peer or family member showed you a smartphone application that assisted in your learning process? 8. When you have an issue with your smartphone or an application where do you go for help?
Conclusion	9. Are there any other ideas or stories you might want to share regarding your experiences using a smartphone to learn?

Note. These interview questions were intended to begin a discussion between the interviewer and interviewee. Follow-up questions by the interviewer to probe for further more information or clarification also occurred during the course of the interview.

Following the interview, I debriefed participants by email and provided a summary of key points for member checking. I asked participants to clarify any misunderstandings that were present in the summary and add any additional thoughts or comments they felt were relevant to include in the study. I then added this information to existing data to help clarify and expand on information gathered in the initial interview.

Procedures for Recruitment, Participation, and Data Collection

Planned participant recruitment occurred through the use of the Walden

University Participant Pool. The participant pool is a free resource available to Walden

University Faculty and students in order to obtain participants for research studies and

should include participants that meet the requirements for this study. In order to use the

Walden Participant Pool, I registered on the Walden Participant Pool website and set up

an account using my student credentials. Once I obtained IRB approval (approval number

12-17-19-0543775), I then used the site to post a description of my study and the

requirements for participation. Students who were interested and qualified in my study

contacted me through the Walden Participant Pool. When I failed to recruit enough

participants through the Walden Participant Pool after two rounds of invitations, I

expanded to other organizations that have participant pools whose members meet the

study criteria. The AECT, is another organization I used to obtain access to online Master

of Education students who owned and used smartphones. After receiving IRB approval, I

contacted the AECT membership and provided an invitation email to qualified AECT

members. After failing to locate qualified participants from the Walden Participant Pool

and the AECT membership, I contracted with an online paid participant pool,

Userinterviews, and was able to locate 10 participants for the study.

Qualified participants were invited to participate in the study via email.

Participants were also be asked to complete an informed consent form. One interview

with each participant was scheduled by the researcher via email. Then participants were

given a link for a Zoom meeting and an outline of the interview questions (see Appendix

C) so they could thoughtfully prepare for the interview. Interviews were scheduled for an hour, allowing for time to build rapport (see Rubin & Rubin, 2012) and have a meaningful discussion regarding the use, effort, social influence, and support that online graduate students experience when using smartphones as learning tools. Participant comfort determined the ultimate time for each interview and went shorter or longer depending on the interviewee (see Patton, 2015).

I then collected the data to answer to the research questions using online interviews regarding student experiences with their smartphones. The interviews were conducted using an online video and audio platform that allowed the interview to be recorded. The interviewing process was semistructured to give participants the opportunity to describe their experiences in the most natural way possible. However, the conversations were guided by a researcher-developed interview protocol that aligned with the UTAUT and was designed to answer the research questions that guided this study.

Eliciting honest and thorough answers was important to gather quality data for the study. For this reason, the questions I asked were conversational and open-ended. Although I structured the interview based on preset interview questions (see Appendix C), I explored topics that arose in the conversation by using prompts to clarify information from each interviewee. For example, I asked some interviewees to elaborate on a point by providing an example from their experience. I took notes during each interview to capture the rationale for the prompts. After all the data was collected, I summarized the interview of each participant and sent a debriefing email as described above. Finally, I thanked the participants at the conclusion of the study via email. I also

reiterated the confidential nature of the information they shared and provided them with my contact information in case they had any future questions or concerns regarding their participation in the study.

Data Analysis Plan

Creating procedures to track and analyze data was important, as was having a structure to answer the research question. Data analysis was based on a basic deductive qualitative approach with the theoretical framework guiding the coding to ensure precise alignment to the research questions (see Patton, 2015). A deductive approach using predetermined codes was used to provide the initial categories for the coding based on the four constructs of the UTAUT, the study's theoretical framework (see Saldaña, 2016). A specific file naming convention was used to help organize the many files that were created (see Fritz, 2008; Sutton & Austin, 2015). OneDrive was used to store and manage this information as it provided a secure cloud-based system to store and organize information.

I transcribed each interview. Transcriptions and interview documents, including notes, were stored digitally in OneDrive. Transcription allowed me to interpret participant responses outside of the interview as well as facilitate the coding process (see Rubin & Rubin, 2012). Using the four constructs of the UTAUT as primary grouping categories, I sorted data that examined the participants' perceptions, experiences, and activities to answer the research questions of the study (Saldaña, 2016). After grouping the data into these UTAUT constructs, I began looking for similarities and differences in responses between participants and further grouped the data based on the findings. I

continued to sort and examine these findings, then weighing the information and integrating the results to form a complete picture. Finally, I combined all the findings to generate explanations and descriptions from the data (Rubin & Rubin, 2012; Sutton & Austin, 2015). As I sorted the data, discrepancies in the participants' responses occasionally arose. Discrepant cases are reported in the study findings and can be used to inform future studies regarding the use of smartphones for learning. These processes and procedures allowed for the safe storage and organization of the information as well as provided quality control during the data analysis process.

Saldaña (2016) recommended new researchers consider coding by hand, but conceded the use of Microsoft Word or Microsoft Excel could be used if the researcher has experience with the technology. For this reason, I used both Microsoft Excel and Microsoft Word. Microsoft Word is a powerful tool that can be used to allow for the manipulation and coding of data in a number of useful ways (La Pelle, 2004). Microsoft Word was the primary file type of the transcript. I then labeled the Word document to assist in the identification of topics and themes, allowing me to create the coding titles (Patton, 2015). I transferred the coding to a Microsoft Excel document for organization and manipulation of the data identified in the Microsoft Word document.

Issues of Trustworthiness

Trustworthiness is an essential part of research. To address trustworthiness in this study, I addressed the four components of trustworthiness: credibility, transferability, dependability, and confirmability.

Credibility

Ensuring that the study answers the research questions and that those answers reflect real world experiences are important considerations when establishing credibility (Shenton, 2004). In order to establish credibility in this study, the interview questions were aligned to the research questions and then reviewed by two experts and the feedback received was applied. Further, through the interview process, data was collected from each participant to create a rich description of their experiences using smartphones for learning. I used member checking to ensure that I was interpreting the information correctly. Member checking allows the collected data to be sent to participants to verify the accuracy of the researches understanding to the answers provided (Creswell & Miller, 2000; Schwandt, Lincoln, & Guba, 2007). An email summary of the interview was sent to each participant. The member checking process provided participants an opportunity to provide clarification and further details to ensure I had a complete and accurate understanding of the responses from the interview. As I examined the rich descriptive data from the interview, credibility increased. Data collected from participants using interview questions, interview notes, and the debriefing email allowed for saturation of data and ensured that the information was accurate and aligned.

Transferability

Transferability in qualitative research can be difficult as the number of variables for the study can sway results from one group to another (Shenton, 2004). I have provided rich descriptions of the study to give other researchers a detailed account of how the study was conducted and allow for judgement on transferability (see Creswell &

Miller, 2000; Schwandt et al., 2007). To further assist in addressing transferability of the results from this study, I have defined the participant group being researched and described the manner in which they were selected and recruited. This information includes who is eligible to participate in the study and the pool from which the participants were selected, as well as the number of participants who were selected to participate in the study. Further information on any variations in participant selection was added after the participants had been located. These steps provided the appropriate information for researchers and readers to judge the transferability of this study.

Dependability

Dependability in research is accomplished when a study can be repeated and similar results obtained (Anney, 2015; Shenton, 2004). Lincoln and Guba (1982) and Schwandt et al. (2007) suggested that creating an audit trail for the purpose of research replication by other researchers or auditors is the best way to ensure research results are reliable and dependable. The methods that were used in this study were detailed creating notes that explained the process and rationale of the choices made (audit trails). The recording of this information allowed others to replicate the study to validate the results and add to the study findings. Procedures for the collection and analysis of how and when data was collected have also been kept and can assist in the replication process. This procedural documentation enhanced the dependability of this study.

Confirmability

Confirmability occurs when study findings are that of the participants and do not reflect researcher ideas or preferences (Anney, 2015; Shenton, 2004). Interview notes

created an audit trail that allowed for researcher reflexivity and for others to check the confirmability of this research (Anney, 2015; Lincoln & Guba, 1982; Schwandt et al., 2007). By recording my thoughts and actions during the study as well as the responses of the participants, I have allowed others to evaluate the quality of my work. This process allowed for easy auditing to identify if bias exists. Understanding possible areas of bias allowed me to identify areas of risk in the future and take steps to avoid any unforeseen issues. Frequent review of artifacts further enabled me to maintain the objectivity of the study.

Ethical Procedures

The Walden participant pool was used to gain access to online Master of Education students. The qualifications for participation were posted and, once identified, participants were asked to complete a consent form and were given information regarding the study. Participants were further informed of their right to refuse to continue in the study or withdraw from the study at any time.

Data collected was kept confidential. Digital assets including recordings, transcripts, notes, and journals were stored in OneDrive, a secure online cloud-based storage system. Physical artifacts, such as hand-written notes, are stored in a locked cabinet at my home for 5 years, then destroyed. My committee members and I have access to this information.

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Summary

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To ensure the accuracy and dependability of this work, I presented a detailed plan for a basic qualitative study. The research plan outlined the criteria for study participation

as well as recruitment that included how the participants were to be treated during the study. The chapter further included the research design, rationale, and explains the role of the researcher. In the chapter, I also described alignment of the conceptual framework to the research questions, as well as the instrumentation the researcher used. I further described how the data was collected, stored, and analyzed. Finally, I concluded the chapter by addressing issues of trustworthiness. In the next chapter, I provide a comprehensive analysis of the findings.

Chapter 4: Results

Introduction

The purpose of this qualitative study was to explore the experiences of graduate students enrolled in Master of Education programs at online universities when using their smartphones for learning. The UTAUT (Venkatesh et al., 2003) was used as the conceptual framework for this study and to guide the interview questions to understand how online graduate of education students use their smartphones in relation to performance expectancy, effort expectancy, social influence, and facilitating conditions. The findings of this study added further information to the literature on the experience online graduate education students have when using their smartphones for learning. The following research question guided the study: How do online graduate students in Master of Education degree programs describe their learning experience related to the four dimensions of the UTAUT when utilizing smartphone technology?

In this chapter, I describe the setting and demographics of the study participants. I then discuss the processes used for data collection and data analysis. Next, I provide evidence of trustworthiness by addressing each of the four qualities of trustworthiness: credibility, transferability, dependability, and confirmability. I then discuss the results of the study and how the information from the study answers the research question. Finally, I provide a summary of this chapter.

Setting

Study participants attended different educational institutions and were located in different parts of the United States. All the educational institutions offered online

graduate degrees in education. I conducted all interviews with participants from the privacy of a home office. All interviews were conducted and recorded using my personal password protected Zoom room. Each Zoom room was set up prior to the interview and participants were emailed the room and password information within 5 minutes prior to the interview using the Userinterviews messaging system. All interviews were conducted online and I did not have control of the conditions or environment of the participants. I am not aware of any conditions that negatively influenced the participants or would adversely impact the results of this study.

Demographics

Participants in this study were students enrolled in Master of Education programs at online universities. The study included 2 men and 8 women. All participants were from the United States but lived in eight different states. Participants were further enrolled in a variety of education programs and were at different stages in their respective programs. Table 2 portrays the participant demographics.

Table 2

Participant Demographics

Participant	Location	Type of Graduate Program	Location in the Program
1	Florida	Early Childhood Education	Middle
2	New Jersey	School Counseling	End
3	Wisconsin	Digital Learning & Educational Technology	Middle
4	California	Educational Phycology	Middle
5	Massachusetts	Curriculum and Instruction	Beginning
6	Texas	High School Librarian	End
7	Florida	Education	End
8	Tennessee	Music Education	Middle
9	California	Elementary Reading Education	End
10	Illinois	Education	Middle

Data Collection

Upon receiving IRB approval on 12-17-2019, I posted my study on the Walden

University participant pool portal. After reposting my study with no results, I requested

permission from the IRB to also recruit participants from the Association for Educational

Communications and Technology (AECT). I contacted and spoke to an AECT official

and was directed to the graduate subgroup of the organization for members who would

best meet the criteria for participation in my study. The request was made on January 28, 2020 and approved on February 13, 2020. Once I received IRB approval to recruit participants using the AETC membership, I forwarded the recruitment information to AECT who forwarded it to their membership. After another month with no responses from either the Walden participant pool or the AECT members, I requested IRB approval to add an incentive as well as use Userinterviews, a paid service, to recruit participants. The request occurred on March 12, 2020 and was approved on March 25, 2020. Upon receiving approval from the IRB I began recruiting participants from Userinterviews.

The initial set up for Userinterviews was to identify participant criteria and create a description for the study and details for the interview session (Appendix B). Next, a screening survey was added to help identify qualified participants (Appendix D). Qualified participants were then sent to my Userinterviews research dashboard for my selection and invitation to participate in the study. I set up the Userinterviews calendar for participants to select available times to be interviewed. At the time of the interview, I set up a Zoom meeting room and messaged the participants I was ready to begin. At the scheduled time, the participants joined me in the Zoom meeting room where I conducted and recorded our interaction.

The first nine interviews were conducted over the course of 1 month from April 2, 2020 to May 1, 2020. The final interview occurred on June 1, 2020. Although interviews were scheduled for an hour, most took between 30-40 minutes. After each interview was completed, I created a rough transcript and summary. I emailed the summary to the participants for validation and to provide an opportunity to add additional information.

Once I received confirmation from the participants, I finalized our interaction in the Userinterview system that triggered payment of the study incentive to the participants.

Upon initially setting up my interviews, I discovered I had several participants who were not in rolled in Master of Education programs and therefore did not qualify for the study. To make this correction, I changed the wording of my initial screening questionnaire. As universities began switching to distance education due to COVID-19, I also found that I had participants who were originally enrolled in campus-based programs but had switched to online learning. I also did not include these participants in my study as my original intent was to study fully online programs.

Data Analysis

I used a basic inductive qualitative approach to organize the interview data collected from participants to answer the research question (Saldaña, 2016). I entered the transcriptions from the interviews into Dedoose in order to organize and manipulate the data. Using emergent coding I created codes and categories based on identified words and phrases (Saldaña, 2016). First interview data was coded and categorized from each participant individually, then I analyzed the coded findings as a whole to better understand the shared experiences of all participants. I grouped the coded word groups into categories. I created themes based on the categories identified in the coding process. The coding process was iterative and allowed for multiple connections within the data to occur. Finally, I organized the findings to align to the constructs of the UTAUT in order to answer the research question. The tables have further been organized by the constructs of the UTAUT. The first construct of the UTAUT is performance expectancy.

Performance expectancy is how users expect technology to perform (Venkatesh et al.,

2003). In response to Interview Questions 1-3, that align to performance expectancy,

Table 3 details the codes, definitions, categories, and themes found for performance

expectancy.

Table 3

Performance Expectancy Codes, Definitions, Categories, and Themes

Code	Definition	Category	Theme
Note taking	The act of recording information used during learning	Information gathering and retention	To help students gather and retain information
Study	The act of consuming content for the purpose of learning	Information gathering and retention	To help students gather and retain information
Research	The act of locating new information for the purpose of learning	Information gathering and retention	To help students gather and retain information
Communication	Smartphone use that allowed for the exchange of information.	Communication and collaboration	To assist students in communication and collaboration with peers and instructors
Document review	Smartphone use that facilitated review and editing of documents.	Communication and collaboration	To assist students in communication and collaboration with peers and instructors
Organization	Smartphones use to help organize learning.	Course organization and planning	To help students organize and plan their course work
Travel	Smartphones allowed students the ability to access their coursework and learning activities while they were traveling from one location to another.	Mobility of learning	To provide convenience and mobility in learning
Cross device functionality	Smartphones share programs that are accessed on multiple devices providing choice for content access.	Mobility of learning	To provide convenience and mobility in learning
Listening to audiobooks	Consuming content via audio	Information gathering and retention	To help students gather and retain information
		Mobility of learning	To provide convenience and mobility in learning

The second construct of the UTAUT is effort expectancy. Effort expectancy is how users perceive the ease with which technology is used (Venkatesh et al., 2003). In response to interview questions 4-5, that align to effort expectancy, Table 4 details the codes, definitions, categories, and themes found for effort expectancy.

Table 4

Effort Expectancy Codes, Definitions, Categories, and Themes

Code	Definition	Category	Theme
Access to the device	Smartphones are easily available for student use.	Easy access	Smartphones provide easy access to educational material
Common life tool	Students carry the smartphone with them as they go about their day.	Easy access	Smartphones provide easy access to educational material
Intuitive	Software design makes use instinctive.	Intuitive, stable, and functional applications	Smartphone apps must be intuitive, stable, and functional
Application stability	Software is free from technical errors.	Intuitive, stable, and functional applications	Smartphone apps must be intuitive, stable, and functional
Application functionality	Software works as described.	Intuitive, stable, and functional applications	Smartphone apps must be intuitive, stable, and functional
Smartphone as a companion tool	Learning situations in which the smartphone is used with another device by students.	Smartphone as one available tool	Smartphones are easily used in combination with other tools to help facilitate the best workflow for the student.
Smartphone as a primary tool	Learning situations in which the smartphone is the main device used by students.		

The third construct of the UTAUT is social influence. Social influence is the role

the opinion of others plays in student choice of technology (Venkatesh et al., 2003). In

response to interview questions 6-7 that align to social influence, Table 5 details the

codes, definitions, categories, and themes found for social influence.

Table 5

Social Influence Codes, Definitions, Categories, and Themes

Code	Definition	Category	Theme
Fellow student recommendations	When other students provide guidance that influences student choice for smartphone technology to use.	Peer influence for smartphone use	Student technology choices based on recommendations from peers
Coworker recommendations	When coworkers provide guidance that influences student choice for smartphone technology to use.	Peer influence for smartphone use	Student technology choices based on recommendations from peers
Family recommendations	When family members provide guidance that influences student choice for smartphone technology to use.	Peer influence for smartphone use	Student technology choices based on recommendations from peers
Instructor guidance	When smartphone use is based on direction found in course or provided by the course instructor.	Authoritative influence for smartphone use	Student technology choices based on directions from institutional authorities
Self-exploration	When students make choices for use of smartphones by researching available offerings and reviews to meet specific needs.	Smartphone use guided by personal research	Student technology choices based on personal research

The fourth construct of the UTAUT is facilitating conditions. Facilitating

conditions are how users perceive support for the use of technology (Venkatesh et al.,

2003). In response to interview questions 8-9, that align to facilitating conditions, Table 6

details the codes, definitions, categories, and themes found for facilitating conditions.

Table 6

Facilitating Conditions Codes, Definitions, Categories, and Themes

Code	Definition	Category	Theme
Self-directed	Student perceives ability to resolve issue on own utilizing prior knowledge or online resources.	Personal resolution	Personal resolution of technology issues is often sufficient
Industry support	Student perceives available assistance for smartphone issue from service provider or smartphone manufacturer.	Carrier, manufacturer, point of sale support	Technical assistance directly from industry professionals is available
University IT	Student perceives assistance with smartphone issue from University IT resources is available.	University support for smartphone issues	Technical assistance via school resources is available
Instructor support	Student perceives assistance with smartphone issue from instructor resources is available.	University support for smartphone issues	Technical assistance via school resources is available
Fellow students support	Student perceives assistance with smartphone issue from other students is possible.	Peer support for smartphone issues	Technical assistance from friends, family, coworkers, and fellow students may be accessed
Family support	Student perceives assistance with smartphone issue from family members is possible.	Peer support for smartphone issues	Technical assistance from friends, family, coworkers, and fellow students may be accessed
Coworker support	Student perceives assistance with smartphone issue from coworkers is possible.	Peer support for smartphone issues	Technical assistance from friends, family, coworkers, and fellow students may be accessed
Work IT	Student seeks assistance with smartphone issue from employer IT department.	Work Support for smartphone issues	Technical assistance from friends, family, coworkers, and fellow students may be accessed

Discrepant Case

There were no discrepant cases identified in the study results. Although no two participants reported using the smartphone in the same way, all students reported using their smartphones for learning purposes. Further, all students reported having different reasons for how and why they used their smartphones.

<div align="center">

Evidence of Trustworthiness

</div>

In qualitative research trustworthiness assists in providing sound data collection processes and to ensure the study is productive (Shenton, 2004). Patton (2015) established that trustworthiness is a necessity to produce a quality quantitative study. Credibility, transferability, dependability, and confirmability are the hallmarks of a valid qualitative study.

Credibility

In this qualitative study credibility was addressed in a number of ways. First interview questions were created to allow participants to relate their real-world experiences with smartphone use for learning (Shenton, 2004). These questions were further reviewed by two experts to ensure alignment. Next member checking was used to ensure accuracy of participant responses (Creswell & Miller, 2000; Schwandt et al., 2007). Participants were sent an email summary of their responses and provided an opportunity to make corrections or additions to the interview. All participants responded to verify receipt of the summary, but no participant submitted corrections or additions to the provided summary. Interview transcriptions were used to code and group the data ensuring data saturation and alignment to the research question.

Transferability

Transferability in qualitative research occurs when the results of a study can be transferred into another context or setting (Patton, 2015). In order to ensure transferability, I provided rich descriptions of the participant population and the setting in which they are operating. Through the descriptions of the findings I have provided detailed explanations of the study context (e.g. how the devices are being used by participants). By doing this I have provided reader context to identify similarities for their setting to justify the transferability of this study.

Dependability

Dependability in quantitative research occurs when a study, if repeated, would furnish similar results (Patton, 2015). In order to accomplish dependability, I provided details of the participants, and how the data was collected and analyzed. I further created audit trails through the use of interview transcripts and member checking emails (Schwandt et al., 2007). My methods for the study were documented and the rationale for the processes used and the choices made allow for replication of the study. This information allows others the opportunity to validate the results of this study.

Confirmability

Confirmability in qualitative research occurs when study findings reflect the views of participants and not the ideas of the researcher (Shenton, 2004). Member checking was used to verify with participants that the researcher correctly understood the information provided during the interview. Participants were sent a summary email and asked to correct any misunderstanding on the part of the interviewer or add additional

thoughts for clarification. I further reviewed the transcripts and listened to the audio interviews multiple times to ensure accuracy of information and remove researcher bias.

Results

This basic qualitative study explored the experiences of graduate students enrolled in Master of Education programs at online universities when using their smartphones for learning. In-depth interviews with graduate students were used to collect the data. I have organized the results of the study in a manner that addresses answers to the research question and aligns with the four constructs of the UTAUT that guided the research question. I further organized the results by theme within each guiding construct. The guiding research question was, "How do online graduate students in Master of Education degree programs describe their learning experience related to the four dimensions of the UTAUT when utilizing smartphone technology?"

Performance Expectancy

Study findings indicated that students used their smartphones to access learning material, conduct research, as well as organize and complete coursework. Students further used their smartphones to collaborate and communicate with other students and university faculty. Participants also expected that the smartphone could be used as a mobile learning tool. In this next section, I discuss how study participants expected their smartphones to perform when the smartphone is used for learning.

Theme 1: To help students gather and retain information. All the participants indicated they expect their smartphones to support learning-related activities. In particular, participants discussed the variety of ways they expected their smartphones to

perform for different writing tasks. P3 discussed note taking as one way in which the smartphone is used to perform educational writing tasks stating, "I take notes on my phone a lot." P9 further noted how the use of note taking on the smartphone was beneficial for taking field notes while observing students in the learning environment. P6 and P10 discussed using notes on their smartphones to be placed in formal writing documents, later stating that they preferred formal writing on their computer. Participants P3, P5, P6, P7, and P8 described using their smartphone to participate in discussion posts.

Many participants also expected to use the smartphone when studying. P3 described using Google Docs (a cloud-based word processor) to aid in studying. Participants P1, P2, P3, P4, P5, P7, and P8 used the smartphone for reading. While P6 only used the computer for reading digital assignments. Access to eBooks was one of the factors that determined how the smartphone was used for reading. If eBooks or PDFs of articles were choices participants frequently choose those as reading options and access them on their smartphones. P4 discussed using the Kindle app as well as a library app to locate e-books as this reduced cost associated with buying books as well as making it available via a smartphone app. Further ways in which students consumed course related content was the use of audio books, text to speech apps, and the watching of videos.

Theme 2: To assist students in communication and collaboration with peers and instructors. All the study participants indicated specifically that they expected to use their smartphone for some type of academic communication. P1 described utilizing text messaging to keep in contact with other students. While P2 utilized GroupMe (a mobile group messaging app) for group collaboration and communication but preferred

texting for one-on-one messaging. P5 and P9 described using Zoom (a video communication platform) to communicate with faculty. Approaches to communication and collaboration varied but most participants also used communication apps to contribute to group work.

When working in groups smartphones were used to communicate in a variety of ways. Group work was done utilizing texting, email, and third-party apps that provided instant messaging, as well as audio and video communication. Participant 3 described different ways they used smartphones to facilitate group work.

Findings further showed students expected smartphones to be able to support group work by allowing for document viewing and sharing on the go. P9 described document sharing with mentors to check course work. P6 and P10 also discussed using Google Docs to collaborate with groups and check work while on the go. P4 discussed how they preferred the use of Microsoft 365 (a suite of Microsoft Office products available to subscribers on a variety of devices) and described creating group presentations, in PowerPoint, utilizing the smartphone app while at work. P4 was able to work on the presentation on the smartphone throughout the day with a peer in order to prepare a presentation for delivery later that evening.

Theme 3: To help students organize and plan their course work. Participants also discussed how they expected notifications on their smartphones via email, calendars, and learning management system (LMS) settings to keep track of course work and help them stay informed of course updates. P1, P2, P3, P4, P5, and P6 described how they used their smartphone calendars in order to plan their term. Participants further discussed

how the use of system notifications from their LMS helped to remind them of when assignments were due, when assignments had been graded, and when instructors posted announcements or provided other information. P4 discussed the use of notifications via the LMS app stating, "Blackboard sends any type of message or notification; it shows up in my actual calendar. Cause that's pretty much the first thing I check every morning."

Theme 4: To provide convenience and mobility in learning. P1, P4, P6, and P8 discussed how they expected smartphones to be able to access content while traveling. P1 and P4 described using their smartphone for learning "on the go." Participants further expected smartphones to be able to access information online so they can write or research on their smartphone but can then move to another device like a computer and access the same information.

P1, P2, P4, P6, and P10 expected that the information can be stored and accessed on a variety of devices. P6 discussed how information was saved using Google Drive during a hurricane and although the information was lost on the computer it was still accessible via the phone. P1, P3, P9, and P10 discussed looking information up of the phone to be transferred to the computer for later writing. P9 and P3 discussed taking notes and researching on their smartphone while they wrote on their computer. P3 described how the smartphone can aid in research while writing on the computer stating, "I have the program open on my computer and I'm typing something, and I already have too many tabs open, then I just grab my phone and my phone is really use to me going to Google scholar."

In this section, I discussed study findings related to performance expectancy. The findings indicated that students used their smartphones to complete course work while on the go. Findings also showed that students utilized communication and collaboration functionality of the smartphone to work with other students as well as seeking information and clarification from instructors. Participants valued the diversity of functionality and mobility of performance that smartphones offered.

Effort Expectancy

Below I discuss how effort expectancy informed student choice when the smartphone is used for learning. Study participants described ease of access to educational material as an important factor for choosing their smartphones as a learning tool. Students further described how the functioning of the smartphone influenced their choices for utilizing the device and software and how the smartphone can be easily used in conjunction with other devices to create the most productive workflow.

Theme 1: Smartphones provide easy access to educational material.

Participants expect that their smartphones are easy to access and use. P1, P2, P3, P5, P7, P8, and P9, described having their smartphone always on them and how it is a common device they use daily. While discussing ease of access P2 stated, "My phone is such a natural part of my life." P5 also shared frequently accessing the LMS app. P1, P2, P7, P8, and P9 described the ability to quickly access their smartphones to do their schoolwork as a major reason for the selection of the smartphone as a learning tool. While discussing how easy the smartphone is to access content P7 stated, "I can just click on, like tap on a document or tap on the website that I want to go to and have it open up." P9 discussed the

ease at which videos are accessed via the smartphone. P1 and P7 both reported that using

the smartphone was easier than opening up a laptop and having to login as the app

allowed for instant access and did not require boot time. P1 described how the

smartphone is convenient for accessing information.

P2, P3, and P4 expected smartphones to make it easier to multitask while

engaging in studies. P4 discussed how the smartphone was used to engage in learning

while doing other activities like shopping, playing with children, walking, and at work.

P4 expects the smartphone to aid in learning in smaller chunks during the day to utilize

downtime for learning. P2 discussed how the smartphone was used while working as a

nanny. P3 described using the smartphone in the following manner:

> Having a four-year-old she's like doing her coloring and counting and I'm sitting
>
> there helping her. But then I also need to respond to a message or answer a forum
>
> post or something like that. And so, I just ended up doing it on my phone.

Theme 2: Smartphone apps must be intuitive, stable, and functional.

Participants identified different ways that they expected to engage with their smartphones

for learning. Many participants described a desire for easy interactions when using the

smartphone for learning. P2, P4, P5, P6, and P9 reported the intuitive nature of

smartphone apps as being critical for integration. P5 described the need for a user-

friendly interface. P2 also discussed the need for apps to be easy to understand and use

stating, "I like it when things are really intuitive."

P2, P3, P4, P5, and P7 further expected apps to be stable and work as described.

P5 described app stability as follows:

It has to not crash. I've had a lot of apps that just, you open them and then they just shut down and crash has to be updated. And just like easy to use. I hate when I get an app and then I just don't know what to do with it or how to best use it. I have to know, this is what this is for, this is how I'm going to use it. Things like that. I don't want to waste time learning how to use it.

P3, P4, and P7 reported that if they had difficulty using an app, they would first delete and reinstall and that if the problem was not corrected the app would be discarded. P7 explained the process used when an app was not easy to use saying, "I've kind of learned to delete it completely out of my phone, shut my phone off, turn my phone back on and reinstall it."

Participants expected to use a wide variety of apps on their smartphones to complete tasks. However, many participants stated that their rationale for the selection of the app was directly related to how functional the app was to use. P5 described functional apps as "something that works well on a phone. It looks like it's made for a phone screens, dimensions. I hate when I have to zoom in and zoom out and go sideways and horizontal scrolling. That's the worst."

Theme 3: Smartphones are easily used in combination with other tools to help facilitate the best workflow for the student. Participants expect their smartphone to perform many educational tasks saving time and energy with less effort required for use. Smartphones however are not the only device available for students to use to engage in course work. Participants expect that they can choose the best device for the situation, therefore they also used computers and tablets for online course work as they deemed

appropriate. Participants had a variety of expectations that determined when the smartphone is the best tool, when another device should be used, or when devices could be used together.

All participants expected the smartphone to be the primary communication device. Participants discussed the ease of messaging via email, text, or third-party apps on their smartphones. P3 described how easy it is to "pick up my phone when I'm in the middle of doing something else" to respond to feedback from faculty or resubmit a paper. P2 discussed how they used the phone as their primary email device. P1, P2, P3, P4. P6, and P10 discussed the ease and convenience of using text messaging to communicate with fellow students. P1 stated about texting "it's the fastest way to get in touch with everybody." P2 also discussed the ease of text messaging one-on-one but that GroupMe worked better for group messaging. When making calls on the smartphone participants reported using video chat through third-party apps like Zoom. Students reported using this type of feature on their phones as well as their computers, P4 described the ways they used Zoom saying, "I don't only use it in my computer, but I use it on my phone." P5 further discussed calling her professor on Zoom to discuss feedback on a paper.

Participants expected that the smartphone will not always be the easiest tool to use for learning. P7 discussed using the tablet, computer, and smartphone interchangeably as needed for the best results. P4 reported using a mixture of the phone and computer describing 80% of work via the smartphone and 20% of work on the computer. All participants expect the computer to be easier to write major assignments. In reference to writing, P10 stated, "I prefer a computer. I mean it's much easier to type

on a computer then try to type on your phone. I mean if I'm stuck in, if I'm stranded, of course I'll use the phone, but I find it easier to do it on the computer." P3 and P9 reported using the phone to look up information while using the computer to write. Further, P2 preferred the ease of reading on her computer versus the phone but listens to PDF articles on her phone when busy. When P8 described a situation where an app did not work on the phone, they used the app on the computer and resolved the app problem. P4 discussed the ease at which switching between phone and computer occurs. P9 reported the of ease taking notes on the smartphone while reading on the computer. P1, P3, and P5 discussed how the ease at which files can be accessed and edited on the smartphone creates a complementary workflow between the devices.

In this section, I discussed study findings that related to effort expectancy. I described how students reported the need for the smartphone and smartphone related apps to be easy to use. Further, participants reported how they expected their devices and software to be free from technical issues and work as described. Finally, this section reported how students used the smartphone in combination with other technology to increase learning productivity in the online environment.

Social Influence

Below I discuss how social influence contributed to the decisions of study participants when the smartphone is used for learning. I describe the influence of peers and academic institutions on participant device and app selection. I also discuss study findings that show how students find and make decisions on their own when smartphones were used for learning.

Theme 1: Student technology choices based on recommendations from peers.

Participants expect people around them to offer assistance and guidance when trying to find the best resources for engaging in learning. This type of influence is an important way in which participants indicated they learned about new ways in which to utilize their smartphones for learning. P8 described this interaction saying, "I most of the time learn about new things from other people." Further, P2 discussed learning about new ways to use the smartphone during group interactions, "it's through group work, through requirement's in class and recommendations from my classmates, friends and teachers."

One such source many participants expect to look to is their family. P4 described how a spouse recommended Microsoft Office 365 for use on the smartphone, becoming a frequently used tool for learning. P5, P7, and P8 discussed the influence of siblings when discussing technology to assist with learning. P7 described how their sister used the smartphone to teach them algebra.

Participants also expected fellow students to be able to provide guidance and recommendations for how to use their smartphones to engage in learning activities. P3 described being open to this process saying, "I don't mind when we try new programs and sometimes my fellow students know a program that's really great that I've never heard about." P8 described learning about new smartphone apps from a friend from college. P6 and P7 discussed asking coworkers, who were students at other institutions about smartphone technology. P1, P3, and P8 further discussed how they shared information with coworkers regarding learning solutions via the smartphone.

Theme 2: Student technology choices based on directions from institutional authorities. Some participants expected technology guidance from their instructors, or the course work given by the school for locating learning apps. P1 described how the courses contained technology as part of student development stating, "they always try to expose us to new technology, I guess because they know that technology is going to play a big part in future educational practices." P1 further described that the choice of technology used in the course work appeared to be directed from the course instructors and education department and not the university. Students further expected the instructor to be familiar with the technology. P5 discussed how the instructor's ability to use the technology in the course reinforced the value of the technology as a viable educational tool. P5 compared this to an interaction with their principle at work and how the principle struggled to use new technology appropriately and how that event dissuaded the use of the technology. P6 described how Flipgrid (an educational video platform) was used in their graduate program as an example of something that could translate to their classroom environment. However, the use of an app by an instructor did not always extend beyond a particular class. P2 discussed the use of an app that was related to the course stating, "I used to use Flipgrid because my professors wanted us to, but we all hated it and it never caught on."

Theme 3: Student technology choices based on personal research. Participants expected they could research smartphone and app functionality to customize the use of their smartphone to meet their personal learning needs. P1, P2, P4, P5, P6, and P8 expected to find educational apps for their smartphones on their own. P1 and P5

described using Instagram (a social photo and video sharing network) to look for recommendations. P1, P2, and P4 discussed using search engines to find information when looking for apps for learning. P5 and P8 further described using the app store to find and review possible educational apps for use on their smartphones. P4 and P10 discussed how they share apps they find with others. P6 expected to find apps that can be used with students commenting:

> I think that as teachers on a whole, we really focus on our students. Right? And so when I was using applications or programs or different things in my program, I wasn't really thinking about how would this make my life better? I was thinking, how am I going to use this with my students? I think we as a whole, that's kind of how we function in this world. And we need to do both, but we need to say how can I be a better learner and not just focus on how would teenagers use this in their lives.

This section described the role social influence had on participant decisions regarding smartphone technology. I discussed how participants reported interacting with peers and families when looking for the best use of their smartphones for learning. I further described study results that showed the influence instructors and educational institutions had on student choices when engaging in learning with their smartphones. I concluded the section by reporting on how students described finding information about smartphones on their own.

Facilitating Conditions

Below I discuss how facilitating conditions influenced student decisions when the smartphone is used for learning. I describe how students first attempt to resolve technical issues on their own. I then outline how participants utilized other resource like; friends, family, work and academic to resolve issues associated with the use of the smartphone for learning.

Theme 1: Personal resolution of technology issues is often sufficient. All participants expected to be the primary source for resolving technical issues for their smartphones. P2, P5, P6, and P8 discussed the need to first identify the issue, then seek the appropriate source for assistance when they experience an issue with their smartphone or apps. P1, P3, P4, and P10 discussed using online resources to research for known issues to troubleshoot. P5 also discussed their process for resolving problems saying, "I don't have a lot of problems with apps. I feel like I can usually figure it out myself." P3 and P7 expected that deleting and reinstalling apps as well as restarting the smartphone will resolve most issues.

Theme 2: Technical assistance directly from industry professionals is available. Some participants reported seeking answers to technical issues utilizing industry resources. P3 and P10 described going to the service providers website to troubleshoot the issue and find known solutions. P5 has contacted app providers directly to resolve issues with apps. When asked about sources for assistance with the smartphone P7 described visiting the AT&T store near their home to find assistance and ask questions.

Theme 3: Technical assistance via school resources is available. When the issue is related to resources associated with their university, participants expected the university to have supports in place. P1 explained the different options available for support saying, "what I usually do is just reach out to my portfolio coach. If I can't get it on my own or get one of my cohort members to give me help or guidance, I usually just email or text the professor."

P2, P3, P5, P6 P7, and P9 expected they could contact the university IT department to assist when a technology issue arises. P2, P5, P7, and P9 reported having positive experiences with university support. P3 and P6 also discussed that they were able to get their issues resolved through the university IT resources but commented on the length of time that it took and a lack of direct communication in resolving the issue. P8 described using university IT support as an undergraduate but stated that there has not been a need in their current graduate program.

Theme 4: Technical assistance from friends, family, coworkers, and fellow students may be accessed. Participants reported that they expected friends, family, coworkers, and fellow students to be possible resources for technical assistance if the need arises. P1 shared the willingness of other students to assist with technology issues stating "it was great to have that cohort" that could help because of their experience and knowledge. P7 shared that her husband is a great resource that assisted her in resolving technology issues. P5 described a coworker that she discusses issues with to help find solutions for technology issues. P6 and P9 both reported onsite information technology

support at their local school and contacting that person when they needed support to address technical issues with their smartphones.

This section discussed how students seek assistance when they encounter issues with their smartphones. Students' primary source for resolving technical issues was to trouble shoot the issue themselves. If they could not figure it out on their own, they sought assistance from a variety of sources including friends, coworkers, family, as well as industry and university resources.

Summary

In this chapter, I described my data collection and analysis process. I summarized the data gained from the interviews to answer my research question. The results of my study showed how online graduate students are using their smartphones for learning according to the four constructs of the UTAUT.

Students described how they expected their smartphones to perform to complete learning tasks. Participants shared that they used their smartphones to assist in gathering and retaining information for the purpose of learning. Students discussed how they experienced learning through the use of smartphone communication features allowing for communication and collaboration with faculty and peers. Students further shared the use of the smartphone as a planning tool to assist in the organization of learning experiences. Finally, students related how the smartphone as a tool that could be used as they traveled both on vacation and throughout the day.

Participants shared the role ease of use played in their decisions to use the smartphone for learning. Students described the need for the smartphone to be easy to use

and allow for convenient access to learning materials. Students also discussed their experiences with application use and the important role that stability and functionality played in their choices for using the smartphone for learning. Lastly, students reported the ease at which they expected the smartphone to be used with other devices to create the best workflow for learning.

Participants discussed how their choices for using the smartphone was influenced by others. Students shared their experiences with peers when selecting apps for learning. Students further described the influence of the university as to how they would use their smartphones for learning. Participants also discussed how they performed their own research when seeking new ways in which to use their smartphones.

Participants also described where they get support when having issues with their smartphones for the purpose of learning. Students reported being self-directed when searching for solutions to technical issues. Students reported utilizing industry resources to problem solve issues. Participants reported some support available through their universities and course instructors. Students also described how they sought support for technical issues by relying on the knowledge from personal and professional peers.

In the next, chapter I provide an interpretation of the findings from the study. I further discuss the limitations of this study. Lastly, I make recommendations for moving this work forward.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this qualitative study was to explore the experiences of graduate students enrolled in Master of Education programs at online universities when using their smartphones for the purpose of learning. Ten participants, eight females and two males, were interviewed to better understand the experiences they were having when using smartphones in their learning. The participants all used their smartphones to engage in different learning activities in their online graduate programs.

I used the four constructs of the UTAUT (Venkatesh et al., 2003)—performance expectancy, effort expectancy, social influence, and facilitating conditions—to better understand how online graduate education students are using their smartphones for learning. The constructs of the UTAUT are closely related and dependent on one another (Briz-Ponce et al., 2016; Chaka & Govender, 2017). Key findings from this study showed the major driving factors for participant use of smartphones were performance expectancy and effort expectancy. Students made decisions on how they used their smartphones for learning based on tasks they needed to perform and how easy the smartphone was to use to support that need. Study findings related to social influence indicated that participants engaged with peers to discover new ways to use the smartphone, but peers had limited influence on if participants utilized the smartphone as a learning tool. Facilitating conditions also played a minor role as most students reported seeking outside support from institutions, technology providers, family members, or

peers. In the following sections I discuss how my findings align to the constructs of the UTAUT and align to the literature found in Chapter 2.

Interpretation of the Findings

Performance Expectancy

Answers from the interview questions that aligned to performance expectancy (the first construct of the UTAUT) demonstrated the ways participants expected their smartphone to function when used for learning, including to help students gather and retain information, to assist students in communication and collaboration with peers and instructors, to help students organize and plan their course work, and to provide convenience and mobility in learning. This study showed the important role performance expectancy plays in students' willingness to utilize their smartphones for learning. This finding confirms the findings of both Iqbal and Bhatti (2015) and Shorfuzzaman and Alhussein (2016) who found performance expectancy to be the most significant construct in determining student intent for device adoption for learning.

Personalization of learning allows students to customize their learning experiences to create the best learning strategy to meet their individual needs (Pimmer et al., 2016). Study findings showed participants engaged with similar apps and participated in similar learning activities but customized smartphone use to meet their individual learning needs. Smartphone use for personalized learning is in alignment with the findings of Arslan (2016) who found that the manner in which students used their smartphones for learning changed from person to person.

Students described performing educational tasks including researching, note taking, writing, editing, and consuming course content. These findings extended research by Ebiye (2015) who found reading, listening to lectures, and taking notes common activities medical students engaged in on mobile devices. Studies by Lau et al. (2017) and Zvjezdana et al. (2015) further showed how smartphones were used by graduate students to locate online information while studying. Students frequently used their smartphones to communicate with faculty and other students (Kim et al., 2017; So, 2016). Findings from this study showed how participants used smartphones to communicate with faculty and collaborate with peers on group projects. These findings extend the work of Fu and Hwang (2018) who found mobile collaborative learning facilitated learning among college students.

Study participants used smartphone calendar apps and LMS notifications to assist in assignment completion. This use aligned to findings by Cochrane (2015) and Zvjezdana et al. (2015) who found the use of calendar and appointment reminders among graduate students increased student productivity. The smartphone was further used by study participants as a device to manage time, which extends the findings of Tabuenca et al. (2015) who found that smartphones had a positive influence on self-regulated learning in graduate students. Study participants used their smartphones to access educational content at work, while they traveled on vacation, watched children, worked out, shopped, and engaged in other daily activities. Study results confirmed the findings of Martin and Ertzberger (2016) who concluded that m-learning unbinds participants from having to learn in stationary locations. Findings from studies by Bere and Rambe (2016) and

Milosevic et al. (2015) showed similar results of how college students used mobile learning to engage in educational practices while they traveled throughout their day.

Effort Expectancy

Interview responses about effort expectancy reported course material on smartphones needed to be easy to access, easy to use, and be free from technical errors. Findings confirmed effort expectancy to be a major consideration by study participants for smartphone integration into their daily studies aligning to the findings of Hamidi and Chavoshi (2018), Raza et al. (2018), and Sabah (2016) who found effort expectancy to have a positive impact on student willingness to utilize mobile devices for learning.

Many studies reported how ease of access of the smartphone makes it an ideal tool to quickly access educational material (Iqbal & Bhatti, 2015; Martin & Ertzberger, 2016; Raza et al., 2018). Study participants used their smartphones for learning because the devise is easy to access as they carry it with them throughout the day. Study participants further chose to use their smartphones because it is almost always turned on and content can be accessed by simply tapping on the smartphone screen without required device start up or log-in.

Similar to Sarrab et al. (2016), the choice of which smartphone app online graduate students used depended greatly on how intuitive the app was and how stable and functional the smartphone app was for the intended learning task. Study participants reported expecting minimal effort to be used to figure out how smartphone apps would work to support learning. Participants further expected that the app would not

malfunction during use as an app that frequently malfunctioned required greater effort and wasted time.

Studies by Crompton and Burke (2018), Martin and Ertzberger (2016), and Sung et al. (2016) showed the prominence of mobile devices as compared to the use of computers to support learning. This study expands these findings from these previous studies by providing further context for how students are using their smartphones compared to computers and other mobile devices. Study participants frequently reported using the smartphone in conjunction with other technology devices.

Social Influence

Answers from the interview questions that aligned to social influence (the third construct of the UTAUT) demonstrated the ways participants learn about smartphone applications to support learning. Study participants reported choosing technology based on recommendations from peers, directions from institutional authorities, and personal research. Findings from Feng, Worrachananun, and Ka-Wailai (2015) and Yeap et al. (2016) showed social influence to be a major factor in how students found new ways to use their mobile devices to support m-learning. Findings from this study contradicted those previous results showing social influence to play a minor role as most study participants reported exploring smartphone learning options on their own.

Learning about how to incorporate technology for learning through the experiences of others is a common method of how students learn about new apps and uses for learning with their smartphones (Cheng et al., 2016; Feng et al., 2015). Study participants reported engaging in conversations with family members, fellow students,

and coworkers to discover new ways in which to improve their online learning experience. Some study participants related that their course work had technology resources integrated into the educational experience. Participants reported the rationale for this inclusion was twofold; first, to engage students in personal learning and second, to expose students to technology that they could use in their own classroom. These findings confirmed those of Raza et al. (2018) who found that when teachers are exposed to m-learning as students there is an increased chance m-learning will be used in their classrooms.

Most study participants used personal inquiry to locate apps and discover new ways in which they could utilize the smartphone to assist in their educational journey. Students reported the use of online search engines, app stores, and social media to locate apps when they needed to find a mobile educational solution. These findings disconfirm other researchers who showed discussion with peers to be the primary way students learned about m-learning apps (Cheng, et al., 2016; Feng et al., 2015; Yeap et al., 2016).

Facilitating Conditions

Answers from the interview questions that aligned to facilitating conditions (the fourth construct of the UTAUT) demonstrated the ways participants sought support when they experienced an issue with their smartphones. Study participants reported resolving technology issues on their own, through school resources, or receiving assistance from friends, family, coworkers, and fellow students. Findings from previous research showed institutional support in higher education to be the primary driver for facilitating conditions (Alwraikat, 2017; Briz-Ponce et al., 2016; Feng et al., 2015). However,

findings from this study showed that participants preferred self-directed inquiry to support from peers and support from technology providers when faced with technology hurdles.

When participants had issues with their smartphones, the most common response was to troubleshoot the issue themselves. Findings that most study participants resolved technical issues themselves contradict the findings of Alwraikat (2017) who found that institutional support for technical issues played a significant role in graduate student smartphone adoption of m-learning. Participants who are unable to resolve the issue themselves reported seeking assistance directly from the app developer or the smartphone provider. This previously unreported information provides new insight into how students are seeking solutions to technical issues with their smartphones.

Limitations of the Study

I have identified and organized three possible limitations associated with this study using trustworthiness as my standard. The first possible limitation deals with transferability. The inclusion criteria for this study focused solely on the experience that online graduate students in Master of Education programs were having when learning with their smartphones. This does not permit an understanding of other graduate disciplines or of how students in campus-based programs are utilizing their smartphones for learning.

The other possible limitation of this study dealing with transferability is the small sample size for the study, 10 participants. Having a limited sample size for this study may create data saturation limitations. While qualitative research allows for the collection of

rich descriptions of the experiences that participants describe in the interview process, the small sample size could limit the ability of the study to be generalized. Participants in this study resided in multiple states and were enrolled in multiple graduate programs. While the diversity in participant and program location aids in providing an assortment of participant experiences in the studied population, it does not guarantee that experiences of all graduate education students are represented in the findings.

Another possible limitation of this study deals with credibility. Member checking was used, and every participant responded that they reviewed the researcher's summary and had nothing to add or change. However, if every participant did not review the summary and only replied to the email then this would present a limitation to the study. I found no limitations associated with confirmability or dependability.

Recommendations

Smartphones offered users access to learning opportunities that meet students where they are regardless of time or location. Further, the functionality available on smartphones allowed users to customize and personalize their learning experiences (Pimmer et al., 2016). I recommend that instructional designers utilize the information in this study when considering how students are engaging in learning. Instructional designers should consider the mobile and collaborative nature of the smartphone and design learning experiences that are easy to access and easy to use any time anywhere.

In order to gain further insight into the best use of the smartphone to support learning and address the limitations described above I recommend future research studies investigate how other graduate students both online and in campus-based programs are

using their smartphones for learning. I recommend conducting qualitative research on how graduate students in other disciplines are using their smartphones for learning in the online environment (Alwraikat, 2017). Understanding how online graduate students in other fields are using their smartphones for learning provides a more comprehensive understanding of how graduate students overall are using smartphones when engaging in learning. This understanding may validate common uses between all online graduate students as well as highlight specific differences based on program and major. This type of information further assists in the understanding of how to best support all students through the use of smartphone integration in higher education programs.

I also recommend qualitative research be extended to how graduate students are using their smartphones for learning in campus-based programs (Alwraikat, 2017). Understanding how campus-based graduate students utilize their smartphones for learning allows for differentiation in how these two groups of learners are using their smartphones to support m-learning. Understanding how campus-based graduate students utilize their smartphones for learning further allows for a greater understanding to support both campus-based and online graduate students in their specific learning environments.

Findings from this study showed the important role performance expectancy and effort expectancy played in m-learning adoption via the smartphone. For this reason and to provide further details with a larger study population I recommend quantitative research to measure student performance expectancy (Hamidi & Chavoshi, 2018) and student effort expectancy (Sabah, 2016). By specifically studying these two constructs of the UTAUT with larger study populations specific use cases can be better understood that

can inform the design process based on how students expect to perform learning tasks and ensure that ease of access and ease of use are integrated into the learning tools for future learners.

Implications

As more and more working professionals seek to improve their lives through educational opportunities available online the need to find personalized support for these learners will grow. The ubiquitous nature of the smartphone and the variety of ways it can be used to shape the learning environment make it an ideal tool to assist these learners as they seek to obtain higher levels of understanding in educational programs (Tossell et al., 2015; Vorley & Williams, 2016). This study showed the value of the smartphone for use as an educational tool. Findings from this study further showed how students are engaging in the use of the smartphone for learning.

Participants in this study represented a group of online learners seeking advanced degrees in education. Through the sharing of their experiences with online learning and utilization of the smartphone an improved understanding was gained that can help inform future decisions regarding m-learning via the smartphone. Findings that smartphones were the preferred device for mobile learning provides information for faculty, instructional designers, and other course and content developers to provide students learning opportunities that align to the busy life schedule of online graduate students. Instructional designers should consider how students will experience their courses in the online environment utilizing a spectrum of devices, not just a computer. Instructional designers should also provide students with content and learning activities that can be

easily completed on their smartphones. Faculty should consider the collaboration and communication functionality of the smartphone to increase student engagement and access to timely feedback. Software developers should consider creating m-learning platforms that integrate with multiple systems and devices that are easy to use and intuitive. Content developers should create m-learning activities that can be completed in small chunks of time utilizing mobile interfaces for quick access and completion. Finally, learning institutions should create strategies and invest in the resources that best support student learning and institutional goals.

This study also has possible implications for the application of the UTAUT. Performance expectancy and effort expectancy both played a major role in smartphone adoption by students. Study findings also showed social influence's minor role in smartphone and app adoption. Facilitating conditions appeared to have no role in student willingness to adopt smartphones for use. This finding causes the researcher to wonder if advancements in technology and a more informed end user has created a situation in which facilitating conditions no longer has a role in the UTAUT.

The implications for m-learning via the smartphone from this study can impact a variety of stakeholders who provide online delivery of courses and content in higher education. The results of this research could support positive social change, as each of these learners will in turn impact the students that they engage with as educators. It is reasonable to assume that creating and exposing learners to educational experiences, that they can access anytime and anywhere, will inspire them to do the same for their students. This cyclical sharing of knowledge and skills can have a generational impact on

the way we approach education and help create a generation of lifelong learners who know how to access information and explore their interests, learning anytime and anywhere.

Conclusion

Distance education and online learning offer students' new ways in which to seek educational experiences. Smartphones further offer learners a variety of options to create personalized learning experiences. Online courses that already have the element of technology included can be easily adapted to m-learning via the smartphone. Online graduate students in this study have found a number of ways in which to incorporate their smartphones to improve their learning experience.

Study findings indicated that students used their smartphones for research, collaboration, communication, organization, and to learn while both on the go and in stationary learning environments. Students described the smartphone as a daily part of their lives and that learning experiences via their smartphones needed to be easy. Participants discussed how smartphones needed to be intuitive, allowing for ease of access to content and the smartphone to be easy to use, providing positive interactions with m-learning on the smartphone. Study participants discussed the ways in which the smartphone was used to make learning personal. Students further described the ways in which they seek information on their smartphone as well as the role peers played in their choices for using the smartphone for learning and finding new ways to support m-learning. Participants in this study did not question if they should use this common device

for learning but asked themselves what are the best ways in which the smartphone could be used to support their learning experiences.

For busy graduate students who are juggling family commitments, work responsibilities, and the need to obtain an advanced degree, smartphones become a natural tool to assist in achieving their learning goals while meeting all the other demands of life. These students are already finding ways in which the mobility and freedom offered by the smartphone can help with their pursuit. Deliberate planning by the stakeholders responsible for aiding in this journey can continue to grow this learning tool into a product that will allow for learning anytime and anywhere. This planning can help open paths forward for more students who desire to improve their lives by seeking further education but are currently experiencing barriers to achieving these goals.

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Appendix A: Foundational Models and Theories of UTAUT

Understanding the eight theories of UTAUT can provide deeper insight into UTAUT and how it can improve understanding of intent to use technology. The first theory Venkatesh et al. (2003) examined when developing UTAUT was the theory of reasoned action, which was first introduced by Fishbein and Ajzen (1975). Fishbein and Ajzen examined the relationship between attitudes and behaviors in an attempt to predict individual action based on preexisting behaviors. From this theory, Venkatesh et al. identified attitude toward behavior and subjective norm as critical factors to inform the UTAUT.

The technology acceptance model (TAM), developed by Davis (1989), was the second theory that contributed to UTAUT. In this model, Davis investigated the factors that influence technology acceptance. From this model, Venkatesh et al. (2003) identified perceived usefulness, perceived ease of use, and subjective norm as critical factors to inform the UTAUT.

Davis, Bagozzi, and Warshaw (1992) applied the motivational model (MM), a model used in psychology, to understand new technology. With this model, Davis et al. attempted to explain how motivation affects behavior toward technology adoption. From this model, Venkatesh et al. identified extrinsic motivation and intrinsic motivation as the critical factors to inform the UTAUT.

The fourth and fifth models Venkatesh et al. (2003) examined were the theory of planned behavior (TPB) and a combined model, titled the technology acceptance model and the theory of planned behavior (C-TAM-TPB). TPB was developed by Ajzen (1991)

and expanded TRA to predict intention and behavior in individual technology acceptance. From this theory, Venkatesh et al. identified attitude toward behavior, subjective norm, and behavioral control as critical factors to inform the UTAUT. C-TAM-TPB was developed by Taylor and Todd (1995) and combined the TAM and the TPB. From this model, Venkatesh et al. identified attitude toward behavior, subjective norm, perceived behavioral control, and perceived usefulness as critical factors to inform the UTAUT.

The model of PC utilization (MPCU), developed by Thompson, Higgins, and Howell (1991), using Triandis' theory of human behavior, was the sixth model examined by Venkatesh et al. (2003). With this model, Thompson et al. attempted to understand intention and behavior toward technology adoption. From this model, Venkatesh et al. identified perceived usefulness, complexity, long-term consequences, affect towards use, social factors, and facilitating conditions as the critical factors to inform the UTAUT.

The seventh and eighth models Venkatesh et al. (2003) examined were the innovation diffusion theory (IDT) and social cognitive theory (SCT). IDT was developed by Rogers (1995) in 1962 and refined in 1995 to study innovation. From this theory, Venkatesh et al. identified relative advantage, ease of use, image-visibility, compatibility, results demonstrability, and voluntariness of use as the critical factors to inform the UTAUT. SCT was developed by Bandura (1986), developed from an early 1961 model of social learning theory. SCT holds that people model behaviors observed in others (Bandura, 1986). From this theory, Venkatesh et al. identified relative advantage, ease of use, image-visibility, compatibility, results demonstrability, and voluntariness of use as the critical factors to inform the UTAUT.

By examining and combining these eight previously-developed models, Venkatesh et al. (2003) synthesized a model that took into account the most critical factors of each of the previous models, condensing these factors into four constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. These constructs play a significant role in technology acceptance and behavioral action. In this study, I will use these four constructs to focus and guide my information collection and analysis regarding the experiences of online graduate students when learning with smartphone technology. In the following subsections, I will delve into how researchers have defined and used these constructs in the scholarly literature.

Appendix B: Survey checklist

Thank you for your interest in participation is this study:

Smartphones as Learning Tools: Understanding the Student Experience

Please complete this short survey to ensure that you meet the requirements for study participation.

1.   Are you enrolled in an online graduate education program?

2.   Do you own a smartphone?

3.   Do you use your smartphone for school related activities?

If all questions are answered yes the participant will be contacted for study participation.

If any of the questions result in a no answer the candidate will be contact thanking them for their interest but informing them they do not meet the requirements of the study.

Appendix C: Interview questions

How do online graduate students in Master of Education degree programs

describe their learning experience related to the four dimensions of the UTAUT

when utilizing smartphone technology?

Warm up: Please tell me a little about your online M.Ed. program?

1. Please tell me a little about how you use our smartphone for learning? (do you check email, grades, communicate with faculty. Etc.)

2. What kind of applications are on the smartphone that you use to support your learning?

3. Please describe a time when you used one of these applications to support your learning?

4. When thinking about smart phone features and your course work what are the factors that make you choose the smartphone versus another piece of technology?

5. Please describe a time when you chose to use a smartphone instead of another device?

5.a. Why did you choose the smartphone in this situation?

6. How do you hear about new applications that might be helpful for learning?

7. Please describe a time when a peer or family member showed you a smartphone application that assisted in your learning process?

8. When you have an issue with your smartphone or an application where do you go for help?

9. Are there any other ideas or stories you might want to share regarding your experiences using a smartphone to learn?

Appendix D: Userinterviews Screening Questions

Question 1

Pick one

1. Are you enrolled in a fully online graduate program working toward a degree in education? (In a college of education or teaching)

- o I am working toward a Masters degree in education (M.Ed, MS, MA) and my program is online. (accept)
- o I am working toward a Master is education (M.Ed, MS, MA) and my program is in a face to face classroom setting (reject)
- o I am not enrolled in a Master of Education Program. (reject)
2. Question 2

Pick one

2. Do you own a smartphone?

- o Yes (accept)
- o No (reject)
3. Question 3

Pick one

3. Do you use your smartphone for school related activities?

- o Yes I use my Smartphone for school related activities all of the time. (accept)
- o Yes I use my Smartphone for school related activities some of the time. (accept)
- o No I never use my Smartphone for schools related activites. (reject)
4. Question 4

Pick one

I have read and understand the information provided in the project overview.

- o Yes, I have read and understand the information provided in the project overview and am consenting to be included in the study.. (accept)
- o No I have not I have read or understand the information provided in the project overview. (reject)