AN ABSTRACT OF THE THESIS OF

Tyler J. Goad for the Masters of Science in Health, Physical Education, and Recreation

Presented on: April 11, 2014

Title: Identifying the Determinants of Behavioral Intention in a Mobile Fitness for Life Course

Abstract approved: _____

Mobile technologies are increasingly being integrated in classrooms in an effort to facilitate and enhance students' learning. Academic institutions are investing in mobile devices intended to provide educational value to students. Limited research has been conducted in users' acceptance of mobile learning in higher education and few measuring acceptance when implemented in specific disciplines. The purpose of the present study was to examine the determinants of students' acceptance and use of mobile learning in the context of an online fitness for life course. The participants were students (n=15) enrolled in the online section of PE: 100 Active Living. A modified model of the Unified Theory of Acceptance and Use of Technology (UTAUT) was employed to measure students' behavioral intention. Participants completed the modified UTAUT survey after completing the eight week course. The UTAUT survey examined students responses to six constructs; performance expectancy, effort expectancy, perceived playfulness, attitude towards using technology, facilitating conditions, and self-efficacy significance in determining behavioral intention. A multiple linear regression was calculated to predict determinants of student's behavioral intention to use mobile devices in an online fitness for life course. A significant regression equation was found to account for students behavioral intention.

Keywords: Online Physical Education; Mobile learning; Fitness for Life; Technology Acceptance Model; Unified Theory of Acceptance and Use of Technology Model

INDENTIFYING THE DETERMINANTS OF BEHAVIORIAL INTENTION IN A MOBILE FITNESS FOR LIFE COURSE

_____

A Thesis Presented to

The Department of Health, Physical Education and Recreation

EMPORIA STATE UNIVERSITY

_____

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

_____

by

Tyler J. Goad

May 2014

_____

Approved by the Department Chair

_____

Approved by Committee Chair

_____

Committee Member

_____

Committee Member

_____

Approved by the Dean of the Graduate School and Distance Education

ACKNOWLEDGEMENTS

I would like to express the deepest appreciation to my committee chair Dr. Paul Luebbers, you have been a tremendous mentor for me. I would like to thank you for encouraging my research and guiding me through the process of completing this thesis. Your advice on both research as well as on my career have been priceless. I would also like to thank my committee members, Dr. Michael Butler and Dr. Zeni Colorado for serving on my committee: thank you all of your comments and suggestions that helped guide this research. Without all of your supervision and constant help this thesis would not have been possible.

In addition, a thank you to Dr. Vicki Worrell, Lauren Loucks, and Norma Hodges who have always pushed me to be the best physical educator I could be. All three have been a great inspiration during my time at Emporia State University and helped me immensely during writing of this thesis. Without question I would not be the same teacher today without their support and guidance.

A special thanks to my family. Words cannot express how grateful I am to my mother and father for all of the sacrifices that you've made on my behalf. Your tremendous support during my studies have allowed me to accomplish everything that I have today. I would also like to thank all of my friends who supported me in writing, and motivated me to strive towards my goal. At the end I would like express appreciation to my brother who always reminded me never to be complacent and to set the bar high.

TABLE OF CONTENTS

PAGE

APPENDICES

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

Mobile technologies are increasingly being integrated in classrooms to facilitate and enhance students' learning. Mobile technologies provide new methods for accessing and interacting with information and extend the means of communication and collaboration among students and faculty. Academic institutions are investing in a variety of mobile devices (e.g., tablets, netbooks, multimedia players, etc.) and infrastructure to support a wireless computing environment intended to provide an educational value to students. However, the simple adoption of mobile technologies does not ensure optimal effective integration methods. Theoretical frameworks may provide methods to help researchers understand which components were most effective in successful or unsuccessful implementation (Davis, 1989). Iqbal and Qureshi (2012) indicate that the effectiveness of m-learning programs depends on the field of study it is utilized in and future studies should focus on specific disciplines.

The Unified Theory of Acceptance and Use of Technology (UTAUT) is a theoretical framework that is designed to assess the value of certain information technology for organizations that guided the present study (Donaldson, 2010; Moran, 2006; Wang, Wu, & Wang, 2009). Identifying significant determinants of m-learning acceptance and use could support the migration to a more mobile computing environment and aid academic institutions with their decisions whether or not to implement mobile technologies into similar online fitness for life courses. Additionally, by identifying the identification of influential constructs in the context of an online activity course has the

potential to improve the quality, effectiveness, and method of delivery of online physical education.

In order to determine the value of mobile technologies in an online fitness for life course it is important to measure students' perceived acceptance and use of m-learning. The purpose of the study was to identify the structural and contextual factors that facilitate the adoption of mobile devices in an online fitness for life course.

Online Physical Education (OLPE) K-12

During the 2009-2010 school year, 1.5 million K-12 students were enrolled in online or hybrid programs (Mohnsen, 2012). This number includes all of the core curriculum courses and specialty classes (music, art, physical education, etc.) (Mohnsen, 2012). Furthermore, Christensen (2008) predicted that by 2019 half of all high school courses would be online. The implications of this break neck pace must be taken into consideration for accommodating students entering higher education (Christensen, Horn, & Johnson, 2008; Wicks, 2010). This stresses the importance of examining the trends of current practices in K-12 OLPE to be better prepared to accommodate future students.

The first school to offer physical education online was the Florida Virtual School (FLVS). Founded in 1997 with an enrollment of 77, FLVS student population was estimated at 206,000 full/part time students for the 2012-2013 school year ("Florida Virtual School," 2014). FLVS physical education courses were designed to develop overall health and well-being by providing quality physical education programs that meet state standards. A comparison of advance placement exam data from FLVS against the national average for all students taking the exams showed the FLVS program exceed

national averages for results by ten percent (70% vs. 60%) ("Florida Virtual School," 2014; Wicks, 2010).

OLPE has become increasingly prevalent and as of 2012, twenty-two states offer OLPE. Ten of those states require the course be taught by a certified physical education teacher and six of the twenty-two are designed to be aligned with NASPE standards (Daum & Buschner, 2012). Initial guidelines for teaching OLPE were established by NASPE (2007) as a result of emerging use of OLPE in K-12. These standards provide guidelines for OLPE in course content, assessment, technology, instruction design, and course site management. Three trends critical in facilitating growth in OLPE are increases in district programs, blended learning, and mobile learning (Christensen et al., 2008).

For these students, OLPE is the alternative to traditional face-to-face instruction. Originally these courses were developed to reach the needs of diverse students who were unable to be in a school based setting due to special needs, remote location, work, or economics (Mosier, 2012; NASPE, 2007). Students who take OLPE cite reasons such as convenience, use of technology, boredom, low skill level/perceived ability, alienation, and a dislike of traditional physical education (Mosier, 2012). Mosier (2012) suggested that programs like FLVS may become the norm, "with the increased instruction time due to the demands of high stakes testing for core subjects such as reading, writing, and mathematics" (p.9). Students in the near future may not have the decision to choose which format of physical education to enroll in and determining effective methods to deliver OLPE is needed to ensure the quality and effectiveness of programs.

Hybrid model and OLPE. The most prevalent and accepted model of OLPE instruction is the hybrid method, also referred to as blended learning (Brewer, 2001; Mohnsen, 2012; Mosier, 2012; NASPE, 2007). This method consists of the students completing the majority of course work outside of class and periodically meeting in person for assessment, instruction, and safety guidelines (Allen, Seaman, & Garrett, 2007; Mohnsen, 2012; NASPE, 2007). Allen and Seaman, (2012) defined blended/hybrid courses as consisting of 30-79% of content delivered online (see Table. 1). The hybrid model for learning is student centered, allowing for lessons to occur at their own pace, style, schedule, and setting (Allen & Seaman, 2012; Mosier, 2012). Empirical evidence presented by the U.S. Department of Education (USDE, 2008) suggested that students can benefit from online learning, specifically noting that the hybrid model produced better results in student performance than traditional methods.

OLPE classes formatted in the hybrid model are comprised of computer based portions (i.e., course readings and lectures) and activity based portions (Mohnsen, 2012; NASPE, 2007). Computer based portions are delivered through a variety of learning management systems (LMS) such as Blackboard, Canvas, and Moodle (Mohnsen, 2012; Wicks, 2010). This is where students access course content (e.g., instructional materials, audio/video, presentations, digital text books, etc.), discussion boards, quizzes, and submit assignments. The LMS allows the instructor to manage the class, upload assignments, develop projects, create discussion forums, and score/grade (Mohnsen, 2012; Wicks, 2010). Communication tools such as discussion boards, chat rooms, and class email are facilitated by the LMS (Mohnsen, 2012; Wicks, 2010). Instructions for the activity based portions are provided by the teacher via the LMS, and the students

Table 1

E-Learning Course Classifications

Proportion of Content Delivered Online	Type of Course	Typical Description
0%	Traditional	Course where no online technology used content is delivered in writing or orally.
1 to 29%	Web Facilitated	Course that uses web-based technology to facilitate what is essentially a face-to-face course. May use a course management system (CMS) or web pages to post the syllabus and assignments.
30-79%	Blended/Hybrid	Course that blends online and face-to-face delivery. Substantial proportion of the content is delivered online, typically uses online discussions, and typically has a reduced number of face-to-face meetings.
80+%	Online	A course where most or all of the content is delivered online. Typically have no face-to-face meetings.

Note: From "Changing Course Ten Years of Tracking Online Education in the United States" (Allen & Seaman, 2012, p. 7).

complete the activities at a location that is most convenient for them (e.g., home, school, park, etc.).

Courses are designed to be flexible so that they can accommodate individual student's interest, activity level, and developmental level in the least restrictive environment (NASPE, 2007). This lets students work independently and allows for flexibility in learning. Instructional design incorporates the linking of content, instruction, and learning elements to the objectives of the course and selecting resources and features that will provide the most effective interactions for learners (Mohnsen, 2012). The tradeoff for this flexibility is online courses often require more time and effort than face-to-face courses (Brewer, 2001; Daum & Buschner, 2012). In turn, for students this creates an online setting where coursework is self-paced, regular meetings do not occur, and the instructor is not available for immediate feedback (Daum & Buschner, 2012; NASPE, 2007). Students may feel committed and accountable when they are among other students meeting at an assigned time and place opposed to the students in the online section, who are more self-directed (Hager, George, LeCheminant, Bailey, & Vincent, 2012). It is suggested the type of student successful in OLPE displays characteristics such as responsibility, autonomy, internal locus of control, time management and communication skills (Daum & Buschner, 2012; Futrell, 2009).

Instructors of OLPE. According to the NASPE (2007) Initial Guidelines for Online Physical education, "Quality physical education programs must include opportunity to learn, meaningful content, appropriate instruction, and student and program assessment" (p.1). The instructor's role is to ensure that learning takes place and motor movements and exercises are performed correctly (NASPE, 2007).

The reality of OLPE presents a different set of challenges when confirming that criteria are being satisfied. Teacher observation no longer is a feasible means to assess participation. Traditional paper and pencil exams and quizzes are no longer practical for assessing the cognitive domain. Richardson (2006) suggested new realities in online education such as open/free content for delivering instruction, 24/7 learning, social collaboration, authentic assessment, and teaching as a conversation. OLPE instructors have the potential to accommodate these new realties by guiding and personalizing learning, assessing student understanding of learning objectives, creating and facilitation group discussions, developing group projects, making constant adjustments to course resources, and responding to student questions (Wicks, 2010). The challenge for OLPE teachers is modifying their instructional approach to incorporate these methods into activity based assignments that meet the same benchmarks, curriculum, and assessment standards of traditional courses (Mohnsen, 2012; NASPE, 2007).

Daum and Buschner (2012) described a constructivist learning style for OLPE that, "requires the instructor to use collaborative, cooperative, and self-paced strategies to achieve the desired learning outcomes. The instructor facilitates individual learning in order for students to develop personal meaning and eventually apply what they have learned" (p. 88). Assignments that support this method are; journaling, activity logs, discussion boards, and self-improvement projects. The objective of these assignments is to enhance student learning, collaboration, decision making, problem solving, and goal setting (Daum & Buschner, 2012; Wicks, 2010).

Instructors should be cognizant of the required time commitment, training, and professional development needed to be effective in an online environment (Brewer,

2001;Daum & Buschner, 2012; NASPE, 2007). In Brewer's (2001) study comparing an online wellness for life course to a course taught face-to-face, the instructor kept a log of time spent on the class and logged 94 hours of time devoted to the OLPE course and 79 hours spent on instructing the face-to-face course. The extra time spent on the OLPE course consisted of preparing the course for delivery in the learning management system (LMS), responding to individual student email, troubleshooting unforeseen technical difficulties, and evaluating assessments in an online environment (Brewer, 2001; Mohnsen, 2012;NASPE, 2007).

Daum and Buschner (2012) conducted a descriptive study over 9-12th grade OLPE instructors (N=32) using a survey that employed both qualitative and quantitative measures. The purpose of the study was to investigate high school OPLE course content, instructional design, and teaching methods. Key findings in the study were OLPE program's lack of motor skill development and student participation. Seventy-two percent of the instructors surveyed indicated that their OLPE course did not meet the NASPE standard of 225 minutes a week. The authors concluded that this could have been a result of inexperience in teaching OLPE due to the fact that 63% of the instructors in the study had only been teaching OLPE for 2 or less years. The authors suggested training and professional development for OLPE teachers in order to improve upon these findings, but especially those new to online education.

Perceptions of OLPE. OLPE has been viewed by some within the field and outside as an oxymoron (Mohnsen, 2012). Concerns about the validity of implementing OLPE has come into question. Apprehensions surrounding OLPE (Table 2. Outlines a full list of advantages and disadvantages of OLPE) range from student accountability,

course rigor, safety, retention rate, and ability to meet the same set of standards set in traditional face-to-face physical education courses (Allen & Seaman, 2012; Daum & Buschner, 2012; Mohnsen, 2012; NASPE, 2007; Wicks, 2010). The reality is the landscape of education is changing and with it instructors of OLPE must identify program strengths and weakness to better accommodate the online student (Mohnsen, 2012).

Daum (2012) conducted a qualitative study investigating physical education teacher educators' attitudes about OLPE. A consensus was found among the participants (N=25) that K-12 OLPE was equipped to meet NASPE Standard 2 relating to the cognitive domain, but viewed it as unable to facilitate NASPE Standard 1 that pertains to the psychomotor domain. An unavoidable concern expressed by the OLPE instructors is student accountability in completing physical activity requirements (Daum, 2012).

Currently in OLPE most teachers rely on activity/signature logs, discussion boards, video submission, and the honor system to assess if students are participating in activity based assignments (Daum, 2012; NASPE, 2007). McNamara et al. (2008) recommended that students complete their activity assignments in a fitness facility where it can be monitored for safety and to confirm students completed the workouts. Physiological measuring devices such as heart rate monitors, pedometers, and fit bands (trackers) do exist, but barriers in reliability and cost have most OLPE instructors relying on activity logs (NASPE, 2007).

Perlman et al. (2008) conducted a study investigating physical education teachers' perceived technology abilities and actual use in the gym. The participants (N=114) were K-12 physical education teachers who were members of the Northwest District

Table 2

Advantages & Disadvantages of Implementing OLPE

Advantages	Disadvantages
• Students can sleep in and complete coursework at times that work for them. • Students can progress at their own pace. • Students can complete coursework from anywhere • Students can easily communicate with the teacher • Students can easily communicate with other students when they want to. • Students living in remote areas may be better served. • Students receive immediate feedback. • Students can review material that is unclear to them. • Teachers can make content changes quickly and easily. • Teachers can personalize teaching for each student.	• There is little research to support online learning in physical education. • There are accountability issues in terms of student learning and performance. • The current focus seems to be on fitness; most publishers and developers have not addressed comprehensive physical education. • The accountability of students' level of physical activity is lacking.

Note: from "Implementing Online Physical Education" (Mohnsen, 2012, p.43)

Association of the American Association of Health, Physical Education, Recreation, and Dance.

The Physical Education Technology Usage Survey for Physical Education Teachers (PETU-PE) was used to assess participants in six computer usage categories: productivity, peripherals, physical education technology applications/basic programs, computer basics/ operating systems, trouble shooting, and design and delivery. For each category, participants where to rate their perceived competency indicated by either proficient, intermediate, or beginner. Results through the survey indicated the instructors used technology in a variety of ways, but most prevalent was the use of video recording, pedometers, timing devices, and aerobic exercise equipment (Perlman, Miao, Karp, & Woods, 2008). Perlman et al. (2008) noted that, "The teachers believed they were beginners in using databases, handheld PCs and software, heart rate monitors, and body composition analyzers" (p. 94). Barriers to these technologies indicated by the participants where lack of financial support, training, time, and preparation in their physical education teacher education courses (Perlman et al., 2008).

Wicks (2010) suggested that the people who perceive online education as ineffective do so out of a misunderstanding, and that this belief is contrary to the published studies on online learning which have found the courses to be as effective as the traditional courses to which they were compared. "They do not realize the extent of teacher communication, student involvement, the quality of material available online, and the academic rigor of many online courses" (Wicks, 2010, p.39).

According to Allen & Seaman's (2012) annual report on the status of online education, there was an increase from 53% of academic leaders in 2003 who rated the

online learning outcomes as equal to or superior those in face-to-face to 77% who now support this in 2012. This report shows a gradual shift in the way online education is being perceived by administrators.

Proponents of e-learning and OLPE indicate that online learning enables students to experience independence, accelerated learning, frees up physical boundaries, and allows them to take courses not offered locally (Mosier, 2012). The reality is that the demand for online learning is not going away and the question is no longer "if OLPE is practical" but what is the most effective way of administering OLPE that needs to be answered (Daum & Buschner, 2012; Mohnsen, 2012).

Wellness for life. The most commonly provided form of OLPE in higher education is a fitness elective, which is sometimes known as a wellness for life courses (Cardinal, 2012; NASPE, 2007). In some colleges and universities, these courses are a requirement for students' general education credit hours (Brewer, 2001; Cardinal, 2012; Hager et al., 2012). The objective of these courses is to improve health behaviors and students' activity levels (Hager et al., 2012). Even though a healthy behavior change cannot guarantee reduction in disease, evidence indicates the adoption of a healthy lifestyle has a positive effect of reducing the risk (Hager et al., 2012). Several studies have documented that university students do not get the recommended amount of physical activity and report a lack of concern about their dietary practices (Hager et al., 2012). Thus, establishing practices that promote a healthy lifestyle in college students could potentially reduce risk for chronic disease later in life (Brewer, 2001; Cardinal, 2012; Hager et al., 2012).

Several studies have been conducted on the effectiveness of wellness for life courses held in a traditional setting versus online in relation to gains in knowledge and fitness. Hager et al., (2012) conducted a study spanning three semesters (n=2971) comparing students' fitness and knowledge gains made in general education health and wellness courses delivered traditionally and online at Bingham Young University. The study found similar improvements made in health wellness knowledge, but a significant difference in fitness level gains made in the traditional course that did not occur in online courses (Hager et al., 2012). Hager et al. (2012) concluded that, "More research and curriculum development may be needed if online approaches in wellness courses are going to have comparable impact as class lecture formats" (p.268).

In a similar fashion, the McNamara et al. (2008) study investigated wellness knowledge and strength gains made in a university weight training course. The results demonstrated that significant gains could be achieved in strength and wellness knowledge in the courses being delivered traditionally and in a hybrid format, but in the online format only wellness knowledge improved (McNamara, Swalm, Stearne, & Covassin, 2008). McNamara et al. (2008) speculated that the reasons for a lack of strength improvements in the online section could be attributed to low student motivation and/or lack of face-to-face interaction with the student by the instructor. Furthermore, McNamara et al. (2008) noted that there does, "Seem to be a point of saturation where too much technology results in poor performance. It seems that the practitioner must balance instruction and training with just the right amount of personal attention and modern technology" (p. 1167).

In contrast to these studies, Brewer (2001) found both fitness and wellness knowledge gains significantly increased in traditional and online sections of wellness for life courses. The study examined two sections of a wellness for life course during the course of a semester; one section taught online and one face-to-face. Both courses presented identical course material and were designed to expose students to specific areas of fitness (focus on walk/jog activities), nutrition, and stress management (Brewer, 2001). Mean scores for both groups improved pre to post test and "No significant differences for scores between the web-based and face-to-face courses were revealed for any of the variables tested" (Brewer, 2001, p. 187). Brewer (2001) attributed this to sound course design and a flexible work schedule for online students.

Mobile Learning

A study done by Strategy Analytics in 2010 found that 530 million people used a cell phone or Smartphone to access the mobile web and predicted by 2015 over 1 billion would use their mobile device for internet access (Williams, 2011). With the introduction of Smartphones, the concept of phone applications (apps) was introduced. Smartphones have now become a reliable and effective way to access the internet (Wicks, 2010). Wicks (2010) suggested the emergence of Smartphone apps changed the way students access the internet content and significantly changed how instructors present content and course material.

Mobile learning (m-learning) is defined as, "any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of learning opportunities offered by mobile technologies" (Vavoula, 2005, p. 11). Wei and Liqiang (2011) suggested m-learning as an extension of

e-learning in that the content is the same, but the way students acquire knowledge and content is by the use of a mobile device. This provides the student with additional support for learning that is flexible and provides a wide variety of channels for communication.

While the concepts and instructional issues surrounding m-learning are still evolving it is evident by the number of people using mobile devices to access the web and communicate that there are potential benefits for adoption in higher education (Donaldson, 2010; Iqbal & Qureshi, 2012; Moran & Hawkes, 2010; Wang et al., 2009). "The disparity in availability of computers and internet access among students," (Wicks, 2010, p. 36) better known as the digital divide is quickly shrinking. Kukulska-Hulme (2013) study stated that 52% of American children have used a smart device (iPad or video-capable iPod). Instructors in physical education are now teaching a generation of students, often times referred to as "digital natives" who have never known a life without computers, cell-phones, and the internet (NASPE, 2009).

A common assumption is that all students are familiar with the basic functions of mobile phones and that knowledge will translate to other mobile devices and software (Attewell, 2009). This oversimplification does not account for the wide variety of mobile platforms available possessing unique functions and capabilities (Evans, 2014). Training and support for students will still be necessary. Little research has been done identifying the determinants for student acceptance and use of mobile devices in academic disciplines (Donaldson, 2010). Furthermore, in order to develop well informed mobile initiatives more research is necessary to examine the factors of student's acceptance and use in specific disciplines (Iqbal & Qureshi, 2012).

The miniaturization and data tracking functions of fitness monitors has spurred the research in the effectiveness of mobile technologies in improving health behaviors. A meta-analysis by Fanning (2012) examining studies on mobile devices and there role in influencing physical activity behavior found them to be an effective means to positively influences multiple health behaviors. The limitation of the meta-analysis is the inability to determine the unique feature of the mobile devices that contributed in increasing physical activity levels. Further investigation into the factors that contribute to the modern students' acceptance of mobile devices will facilitate instructors and higher education in implementing m-learning into their curriculum.

Mobile learning is in its infancy and the concepts and instructional issues of mobile learning are evolving quickly (Donaldson, 2010; Wicks, 2010). There are several notable mobile learning projects that have been conducted in general education courses. Project K-Nect was a two year program that provided Smartphones with data packages to 100 ninth grade students in four North Carolina schools who were identified as inadequate in math or did not have internet access at home (Wicks, 2010). Teachers used curriculum designed for supplementary m-learning instruction and found students participating in the project scored higher on the state Algebra I exam than those who were not (Wicks, 2010). Similar to the present study every 5^{th} grade student at Cimarron Elementary School in Katy, Texas was provided a mobile device that was required to be used 50% of the time in their academic classes during the 2009-2010 school year (Wicks, 2010). The students in this school scored significantly higher in the state's required exams in math and science compared to the previous year (Wicks, 2010).

Attewell's (2009) overview of MoLeNET, "the world's largest and most diverse implementation of mobile learning" represents one of the most comprehensive studies in m-learning. MoLeNET included 20,000 learners and 4,000 staff in 115 different colleges in the United Kingdom. In all, over £12 million was invested in the initiative during 2007-2009. Thirty-two different projects were run during that time investigating the impact of mobile learning on teachers and learning. Notable findings in from the MoLeNET initiative were improvement in student retention (8%) and achievement (9.7%) (Attewell, 2009). Student's (n=900) perceptions of m-learning were assessed by a survey; key findings were (1) 91% agreed m-learning helped them learn (2) 93% believed the devices made learning more interesting (3) 84% wanted to do more mobile learning in the future (Attewell, 2009). The comprehensive national evaluation was able to identify the benefits, barriers, and falsehoods associated with m-learning.

The effective use of mobile devices and online education in enhancing teaching and learning has proven successful in a variety a cases as the ones described above (Attewell, 2009; Wicks, 2010). Research conducted on mobile learning within the context of OLPE has been limited. OLPE presents a unique challenge for teacher instruction and assessment of student's physical activity. Integration of mobile technologies in OLPE has the potential of providing students and teachers with an effective vehicle to deliver and access content.

Mobile learning in OLPE. Wellness for life and similar courses at the university level focus on fitness education, which encourages personal awareness and responsibility for the maintenance of health and physical well-being through physical activity. Student enrolled in these courses are expected to be active during weekly assignments that

include general fitness, aerobic and muscular fitness, flexibility and back health, exercise related injuries, wellness diet, body composition and weight management. Due to the characteristics of university physical education, the application of m-learning in OLPE has the ability to satisfy the needs of modern students (Wei & Liqiang, 2011). Attributes of effective uses of mobile learning include strong pedagogical designs, cognizance of learning environment, and an active role for the students (Kukulska-Hulme, 2013). M-learning has proved to be effective in informal learning situations where mobility and movement were crucial, but research on effectively using m-learning in an OLPE environment is limited (Kukulska-Hulme, 2013). Studies centered on m-learning in OLPE will be crucial in determining how to best incorporate the potential benefits mobile devices possess.

Mobile learning has been used in physical education teacher education to develop methods of teaching and learning through mobile devices. Forrest (2009) studied undergraduate physical education majors' (N=119) use of an iPod device and its effect on students' perceptions of their analyses, questioning, and development of dialogue in lessons taught using the game centered approach (GCA). The GCA is a pedagogical method in physical education that uses games as the focal point for learning (Forrest, 2009). The students used the iPod's video capture to record the lessons they taught, which included, hockey, soccer, volleyball, badminton, squash, and tennis. After which, the students used the footage to reflect on the lessons and analyze the positive and negative aspects. Forrest (2009) concluded that, "the mobile device here is giving students the capacity to enhance their pedagogical skills and allowing them to be active in ways to improve their pedagogical skills in a manner that is non-intrusive and easy to

use" (p. 148). The researcher was able to integrate mobile devices to enhance preservice teachers understanding of a pedagogical concept in a meaningful and significant manner that could potentially be applied in other pedagogies.

M-leaning has the ability to alleviate OLPE instructors' concerns about physical activity being completed. Activity tracking peripherals such as Fitbit, Jawbone Up, Map-my-fitness, MOVband, Nike+ Fuelband, Polar Loop, Omron Activity Monitor, and Moves app can be paired with mobile devices to track students' level of activity (Mosier, 2014). These activity tracking peripherals record and measure several different dimension of fitness such as; sleep patterns, energy expenditure, nutrition habits, mood, and movement (i.e., steps, distance, and speed) (Mosier, 2014). Paired with a mobile device, the activity trackers can display fitness data to the students instantly via tables, charts, and graphs that can be shared with other users. Currently many of the fitness trackers have a mobile application component integrated in them (Mosier, 2014). Although limited research on these activity monitors has been conducted most of the devices and apps studied to date have been shown to be accurate when it comes to step count (Mosier, 2014).

Mosier (2014) suggested that physical education teacher education faculty need to investigate the usability of the products they are integrating into their courses. Furthermore, the author outlines strategies for implementing fitness tracking technology with mobile devices. The plan first has students participating in fitness assessments to set fitness goals for individualized programs. The instructor can then designate a health/fitness app that the students will use to record and monitor progress on their own device. By designating a single app for all students to use for a unit/lesson, the instructor

is able to monitor workouts, make comments, provide feedback, share workouts, and assess progress directly to their personal devices. This strategy to enhance student learning with implementing fitness tracking technology paired with a mobile device is an example how to effectively utilize technology in physical education that adheres to the NASPE guidelines.

The studies described above adhere to the best practices suggested by m-learning researchers to use mobile devices to supplement existing instruction, instead of creating lessons to fit a particular type of technology (Mosier, 2014; NASPE, 2009). Similarly, appropriate practices integrating technology in physical education should be aligned with learning objectives that fit students' development level and content aligned with standards (NASPE, 2009). The National Association for Sport and Physical Education (2009) issued a position statement outlining guidelines (Table. 3) for appropriate use of technology. Developing programs in OLPE that adhere to these guidelines and selecting the appropriate technology to facilitate student learning is an area in need of research (Daum & Buschner, 2012; Mohnsen, 2012; Mosier, 2014; NASPE, 2007).

Online learning presents a unique set of challenges and like any new technology, m-learning offers advantages and disadvantages that must be assessed. Successful integration of mobile learning into OLPE requires an understanding of the potential barriers, benefits, and uses for students. For example, students in OLPE may report a higher level of behavioral intention to use mobile devices due to the plethora of health and fitness apps available to them (Mosier, 2014).

Barriers. The cost of mobile devices and access to internet services could possibly be prohibitive for some students and institutions. Also concerns are raised about

Table 3

NASPE: Appropriate Use of Instructional Technology in Physical Education

Guidelines
1.The use of instructional technology in physical education is designed to provide a tool for increasing instructional effectiveness
2. The use of instructional technology in physical education is designed to supplement, not substitute for, effective instruction.
3. The use of instructional technology in physical education should provide opportunities for all students, versus opportunities for few
4. The use of instructional technology in physical education can prove to be an effective tool for maintaining student data related to standards-based curriculum objectives.

potential loss of investment for institutions if devices are damaged, lost, or stolen (Attewell, 2009). Bring your own devices (BYOD) polices alleviate the financial burden from the institution, but in doing so pass the cost to students. BYOD policies also present the need to consider applications and devices being brought to class. Students who have Smartphones potentially have different operating systems (e.g., Android, iOS, or Windows). Not all mobile applications are cross platform; meaning that apps on one device may not have versions available to operate on another system (Mosier, 2014).

In comparison to desktop and laptop computers, mobile devices are lower in cost and more conducive to physical activity (Fanning, Mullen, & McAuley, 2012). This notion is supported by Attewell's (2009) MoLeNET initiative that found mobile devices to be cost effective and less than 2% of the devices in the study were lost or damaged. These findings indicate that investment in mobile learning is sustainable. MoLeNET also brought to light the potential for BYOD initiatives finding that many students own a mobile phone or other mobile device (e.g. iPod). A comparison between students issued an iPod Touch and students using their own device found that the students work best using their own device (Attewell, 2009). The comparison project found that students issued a device became more focused on device itself than the lessons presented.

Prior experience with projects or assignments students perceive as unimportant or of little value to them can have a negative effect on future technology adoption. Daum's (2012) study on instructors' perceptions of OLPE found that many of the participants interviewed felt that a lack of technology background prevented the students from completing the course and/or becoming frustrated with technology difficulties. The research has also found, through interviews with OLPE instructors, that many of them

were new to online education and required more training. The reliance on technology in mobile learning presents unique challenges for the instructor. Appropriate technology products need to be selected to support specific program outcomes. As suggested by Ransdell (2008) and supported by NASPE (2009) initial OLPE guidelines, a technology competency test may be warranted before students are permitted to enroll in an online course.

Mobile learning management systems (LMS) are becoming available to students and instructors by mean of mobile apps. While mobile LMS may be simpler than complex web based LMS, technology is quickly advancing such that mobile access to data is being integrated into larger, more complex academic learning management systems (Donaldson, 2010; Maniar & Bennett, 2007). Mobile LMS require specific considerations for each platform and do not offer all of the same functionality as their desktop counterparts. Restrictions of mobile devises include: (1) small screen size and poor resolution, (2) lack of data input capability, (3) low storage, (4) low bandwidth, (5) limited processor speed, (6) short battery life, (7) software issues and interoperability, and (8) lack of standardization, (Maniar & Bennett, 2007).

The limitations of mobile devices are rapidly diminishing as each new device released boasts improvements in mobile processors, screen resolution, storage capacity, battery life, and connectivity. The benefits of mobile devices have the potential to quell concerns in the practice of OLPE on lacking academic rigor, social interaction, effective instruction, and high student attrition (Ransdell, Rice, Snelson, & Decola, 2008). In doing so, m-learning can improve the effectiveness, quality, and delivery method of

OLPE. Identifying the possible barriers and benefits of m-learning is the first step in finding effective uses of mobile devices in OLPE.

Benefits. Mobile devices have proven to be a compelling tool in educational technology with many successful applications recorded (Kukulska-Hulme, 2013). In OLPE, mobile devices have the capability of linking content to authentic assessments with the use of the devices mobility, multimedia, applications, and wireless connectivity. Kukulska-Hulme (2013) stated the pedagogical potential of mobile learning offers, "the unprecedented opportunity to experiment with any number of free and inexpensive mobile apps means that teachers and learners can now participate more actively in the quest to crystallize what is actually need for effective learning" (p.16). The advantages that mobile learning possess presents an opportunity to enhance the quality and effectiveness of student learning in OLPE.

The mobility of the devices allow for students in an OLPE environment a great deal of flexibility in completing their assignments. The inherent nature of OLPE activity assignments pair well with the unique mobility presented by m-learnings ability to facilitate location-specific learning (Kukulska-Hulme, 2013). Hundreds of free health and fitness apps provide students with a large variety of content to choose from to individualize their learning (Mosier, 2014). Mohnsen (2012) noted that students surveyed in an OLPE class responded positively to the flexibility the course offered selecting activities to in which to participate.

Different mobile applications can provide visual demonstrations of physical skills that students can model. This allows the student to break down the higher level skills into small segments at their own pace (Wei & Liqiang, 2011). The multimedia

capabilities current mobile devices possess provide OLPE students visual demonstration that are a viable substitute of the visual cues that are normally teacher centered in a traditional course. These m-learning tools combined with mobile video analysis apps (e.g., CoachMyVideo, Coach's Eye, Ubersense) provide the student with immediate visual feedback and self-assurance that assignments are being completed correctly (Daum, 2012).

Mobile devices have the ability to wirelessly connect to the internet by cellular networks or wireless fidelity (WiFi) which is supported by most modern operating systems and devices (Kukulska-Hulme, 2013). Wireless access allows the user to connect with content anytime and anywhere. Paired with certain mobile apps' ability to create, share, and discuss allows for students to collaborate in any learning environment. This enables students in OLPE the ability to communicate instantly with other students or instructors with built-in features such as discussion boards, journals, wikis, or text message. Applied to OLPE, this can facilitate content inspired creation; for example a student using a health and fitness app can create a personalized workout from the catalog of exercises built in the app and then share it instantly with others.

Mobile devices now can support native apps which do not have to rely on Internet access to deliver content that resides on the web from the developer. Native apps are developed for specific mobile operating systems and are stored on the solid state drive. If data is needed to be uploaded it can either be shared locally or via the internet once access is available. Important to OLPE, native apps allow a greater degree of flexibility for the instructor and the student by allowing for a wider variety of options for delivering content (Fanning et. al., 2012).

Many mobile devices have built-in activity sensors (e.g., accelerometer, gyroscope, GPS) and a wide variety of physical activity trackers that pair with health and fitness apps (Fanning et. al., 2012; Mosier, 2014). Whether the most referenced criticism of OLPE is the instructor's inability to objectively assess the students completed the required physical activity assignments. Wu, Dasgupta, Ramirez, Peterson, & Norman (2012) studied the reliability of using only an iPod Touch to measure movement in the physical activities; walking, jogging, sitting and walking up/down stairs. Subjects (n=16) in the study participated in 13 activities at different paces found the iPod accurately measured jogging (91.7%) and walking (90.1-94.1%). The study found that the iPod did not as accurately predict walking up and down stairs (52.3-79.4%) (Wu et. al., 2012).

The ability of mobile devices to accurately measure movement gives instructors in OLPE the capability of objectively assessing the physical activity required in the course. Furthermore, accurate devices enable OLPE teachers to give students personalized feedback. Mobile devices capable of measuring activity and support physical activity trackers have the potential to improve the quality and credibility of OLPE.

The rapid development in the capabilities of mobile devices and apps combined with addition of activity sensors make mobile devices an appealing method of delivery for OLPE. Online physical activity courses equipped with this technology allow students to tailor OLPE content to their own fitness/health goals. The present study utilized a modified technology acceptance model to identify the factors influencing student's acceptance of mobile devices in an online wellness for life course. Identifying determinants of acceptance will guide and support future mobile interventions in OLPE.

Technology Acceptance Model

The Technology Acceptance Model (TAM) was designed to address the acceptance of information systems (IS) technology (Davis, 1989). The TAM is an adaptation of Fishbein and Ajzen (1975) Theory of Reasoned Action (TRA) altered to be specific to IS. The objective of the TRA is to understand and predict human behavior (Fishbein & Ajzen, 1975). The key constructs of TRA; attitude, behavioral intention, and subjective norm where influential in the creation of the TAM and UTAUT model (Davis, 1989; Venkatesh, Morris, Davis, & Davis, 2003).

The foundation of the TAM (see in Figure 1) is comprised of two main constructs; perceived usefulness (PU) and perceived ease of use (PEOU). These two constructs replaced the attitude measures of the TRA. Davis (1989) defined PU as, "the degree to which a person believes that using a particular system would enhance his or her job performance" (p.320) and PEOU as the "degree to which a person believes that using a particular system would be free of effort" (p. 320). These two constructs are considered by Davis to individually be key factors in a user's acceptance of an IS (Davis, Bagozzi, & Warshaw, 1989). Davis et. al. (1989) went on to theorize that that these two constructs in combination with attitude toward using technology (ATUT) effect BI, which in turn determines system use.

The premise of the model is set in understanding factors that influence users' acceptance and usage of a system. Studies supporting the TAM observe that it regularly explains approximately 40% variance in individuals' behavioral intention and usage (Meister & Compeau, 2002; Taylor & Todd, 1995; Venkatesh et al., 2003). Limitations to the model are the absences of external factors such as system design, support, training,

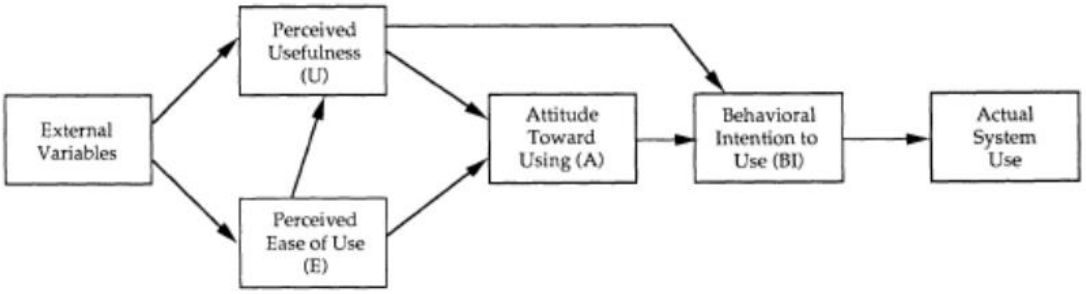

Figure 1 Technology Acceptance Model (Davis et al., 1989) p. 985

voluntariness of use, and output quality (Venkatesh et al., 2003). Also criticized is that TAM fails to factor in individual differences such as age, gender, and experience that could influence a person's acceptance of technology (Taylor & Todd, 1995; Venkatesh et al., 2003). For these reasons, multiple modifications of the TAM have been presented that have increased the capabilities of predicting user acceptance and eventually led to the development of a unified model.

The unified theory of acceptance and use of technology model. The Unified Theory of Acceptance and Use of Technology (UTAUT) model is a result of the research conducted by Venkatesh, Morris, Davis, and Davis (2003) unifying eight models of technology acceptance supported in information systems (IS) literature. The purpose of the UTAUT model is to predict user acceptance of technology by incorporating external factors to better predict behavioral intention to use informational technologies. The dependent variable used to predict user acceptance is behavioral intention (BI) which is defined as, "The degree to which a person has formulated conscious plans to perform or not perform some specified future behavior" (Davis, 1989, p. 320). In theory BI represents how hard a person is willing to try and perform the measured behavior in the future (Fishbein & Ajzen, 1975).

Venkatesh et al. (2003) used historical data from previous research done with Davis's (1989) TAM to validate the UTAUT model. Two new studies were also conducted using both models to compare each abilities to predict behavior intent. The results of the research indicate the UTAUT model predicted 70% of technology adoption success compared to 30-40% by the extended TAM (Meister & Compeau, 2002; Venkatesh et al., 2003).

The UTAUT model is comprised of three constructs that influence behavioral intention and use; performance expectance (PE), effort expectance (EE), social influence (SI), and facilitating conditions (FC) that are determinants in behavioral intent to adopt technology. Table 4 describes the four constructs; Table 5 outlines the four moderating factors that Venkatesh et al. (2003) predicted would have influence on the primary constructs. Figure 2 illustrates how the UTAUT model construct variables and determinants interrelate.

Mobile learning and the UTAUT model. Mobile learning and technology acceptance research using the UTAUT model as a framework has been limited in higher education (Donaldson, 2010; Moran, 2006). Moran (2006) used the model to assess college students' acceptance of tablet computers. The students who participated in the survey where enrolled in computer information system class (N=263) and had access to the tablet devices in those courses. At the time of the study, the UTAUT model was relativity new. Due to this fact Moran (2006) opted to add three constructs from the Davis et al. (1989) original TAM. The added constructs from the TAM were self-efficacy (SE), attitude toward using technology (ATT), and anxiety. The modified UTAUT model in this context (seen in Figure 3) was able to account for 55% of the variance in intention to use tablet computers. Moran's (2006) study, investigating the integration of tablet personal computers in higher education, found SE influential in students behavioral intention and suggested that a reconsideration of the decision to remove this construct from the UTAUT. These results were in line with the Wang & Wang (2010) investigation that found SE plays a critical role in predicting mobile device acceptance. Additionally, Wang & Wang (2010) suggested "This finding can help m-

Table 4

UTAUT Constructs

Construct	Description
Performance Expectancy (PE)	Degree to which an individual believes that using the system will help attain gains in job performance (Venkatesh et al., 2003, p. 447).
Effort Expectancy (EE)	The degree of ease associated with the use of the system (Venkatesh et al., 2003, p. 450)
Social Influence (SI)	The degree to which an individual perceives that important others believe he or she should use the new system (Venkatesh et al., 2003, p. 451)
Facilitating Conditions (FC)	The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system (Venkatesh et al., 2003, p. 453).

Table 5

UTAUT Moderators

Moderators	Description
Age	Age has an effect on attitudes. Moderates behavioral intention in relation to four primary constructs (Venkatesh et al., 2003, p. 450).
Gender	Gender roles have strong psychological basis. Moderates behavioral intention in relation to PE, EE, and SI (Venkatesh et al., 2003, p. 450).
Experience	Significant during early stages of adoption. Moderates behavioral intention in relation to EE, SI, and FC (Venkatesh el al., 2003, p. 451).
Voluntariness of Use	Required or mandatory usage of technology. Moderates behavioral intention in relation to SI (Venkatesh et al., 2003, p.450).

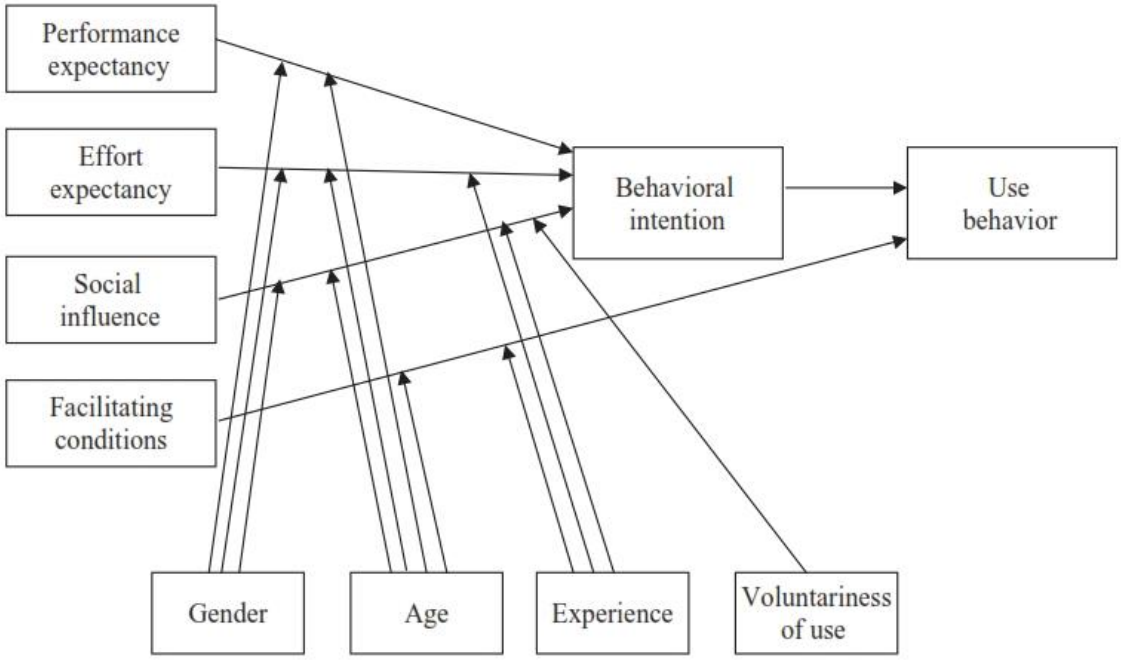

Figure 2 UTAUT Model (Venkatesh et al., 2003, p.447)

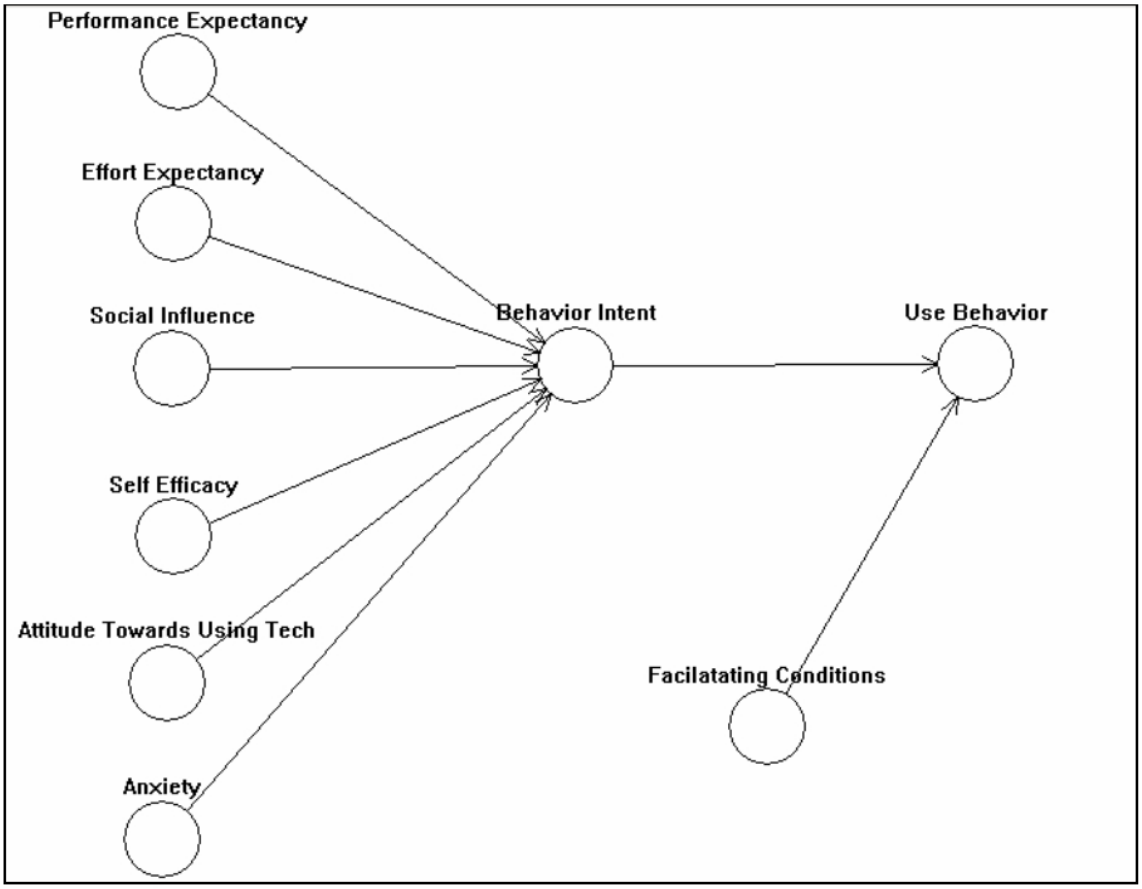

Figure 3 College Students Acceptance of Tablet Personal Computers a Modification of the UTAUT Model (Moran, 2006, p. 30)

internet practitioners target the early adopters of m-internet systems and promote the advanced technology to them" (p. 423). Moreover, this study found that the construct attitude toward using technology contributed 47% towards behavioral intent; more than all of the original UTAUT constructs.

Wang, Wu, and Wang (2009) suggested that the UTAUT model be adjusted for mobile devices on the premise that the fundamental constructs of the model do not fully account for the factors that may affect users' acceptance of m-Learning. To account for these potential influences the study added the constructs perceived playfulness and self-management of learning; the constructs facilitating conditions and voluntariness of use were omitted (seen in Figure 4). The focus of the study was examining if age and gender differences affected the acceptance of m-learning. Data were collected from 330 Taiwanese students at five different universities who volunteered to participate in the survey. The results of their study found moderate effects in age difference in relation to effort expectancy and social influence. Moderate effects were also found in gender difference in relation to SI and self-management of learning. Significant factors in determining behavioral intention use m-learning were found in perceived playfulness (β.21), performance expectancy (β.26), effort expectancy (β.21), social influence (β.12), and self-management of learning (β.2). The strongest predictor of behavioral intention to use m-learning was performance expectancy. Wang et al. (2009) believed that this was a result of students with high expectations for performance being more likely to embrace m-learning than those with lower expectations. On these findings Wang et al. (2009) suggested, "m-learning systems should enable users to choose what they want to learn,

control their learning progress, and record their learning progress and performance" (p. 110).

Donaldson (2010) looked to extend UTAUT model for mobile learning by adding additional constructs. The modifications made to the original UTAUT model were based on the recommendation from Wang et al. (2009) that future research using the UTAUT model examining mobile devices include the constructs perceived playfulness and self-management of learning. Donaldson (2010) also added the original moderating factors facilitating conditions and voluntariness of use from the UTAUT model as constructs for the modified model (seen in Figure 5). A 7-point Likert scale survey intended to measure students' intention to use mobile learning was sent out to North Florida community college students' emails and was completed on a voluntary bases (N=330). The results of the study indicated that the constructs performance expectancy (β.37), social influence (β.13), perceived playfulness (β.12), and voluntariness of use (β-.17) were all significant determents of students' intention to use mobile learning. Unlike the Wang et al. (2008) study, the constructs effort expectancy (β.04) and self-management of learning (β.05) were not found to be significant predictors. Donaldson (2010) attributed this to the student's familiarity with the mobile devices.

Rational for study

As of the fall 2011 term, online education was the method of instruction for over 6.7 million college students, an increase of 570,000 enrolled the previous year (Allen & Seaman, 2012). Accordingly, many physical education programs are placing courses online, most notably fitness for life courses (Brewer, 2001; Cardinal, 2012; Daum & Buschner, 2012; Futrell, 2009; Hager et al., 2012; Mohnsen, 2012). As more physical

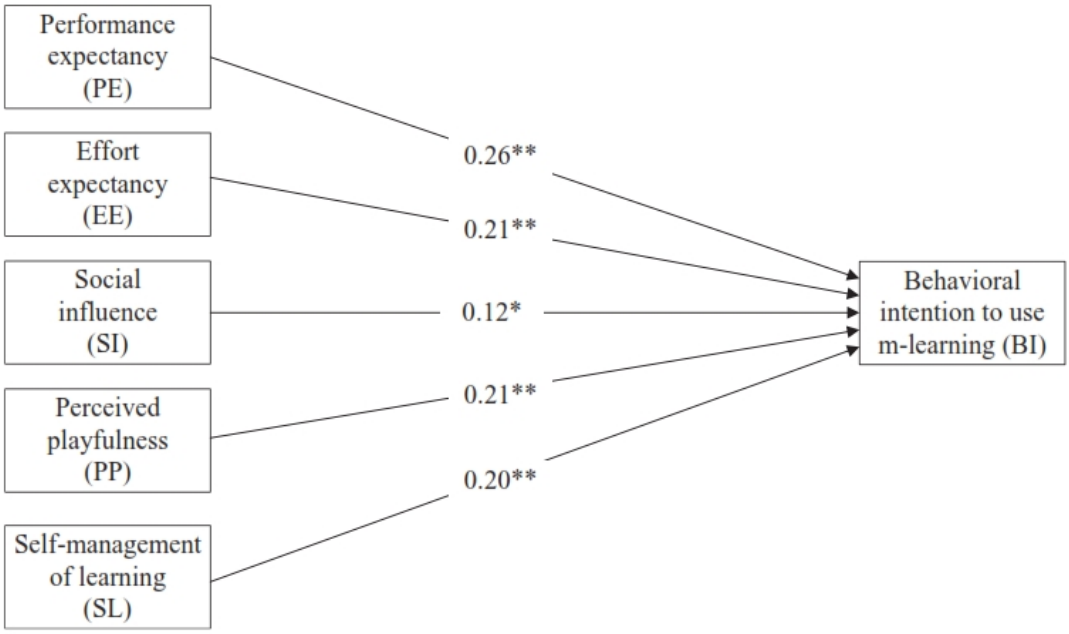

Figure 4 Modified UTAUT Model for M-learning (Wang et al., 2009, p. 94)

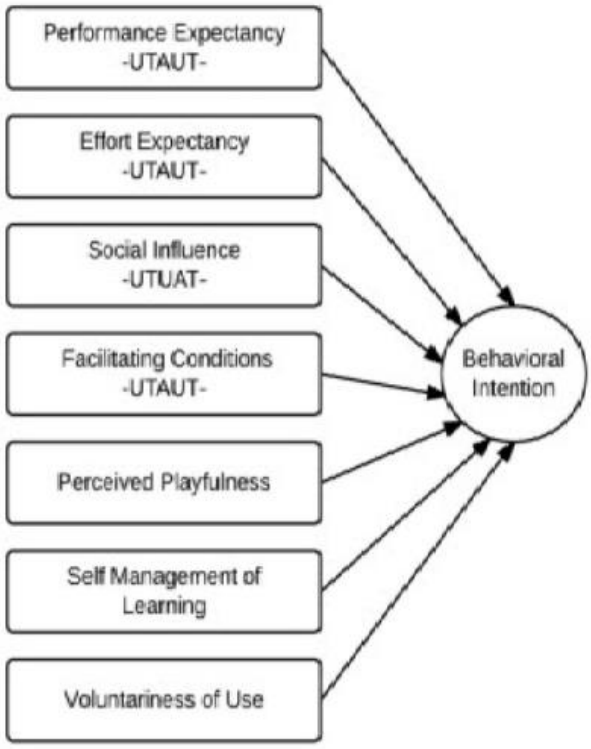

Figure 5 Students Acceptance of Mobile Learning (Donaldson, 2010, p. 46)

education courses go online, questions arise as to the quality, effectiveness, and delivery method of these courses (Daum & Buschner, 2012; Mohnsen, 2012; Mosier, 2012). Studies of online physical education (OLPE) courses have been limited (Daum & Buschner, 2012; Mohnsen, 2012; NASPE, 2007). Most studies that focused on online delivery compared to traditional face-to-face instruction in relation to wellness knowledge/fitness gains and student/teacher perceptions of OLPE (Daum & Buschner, 2012; Mohnsen, 2012).

The delivery of wellness for life and similar OLPE courses has been met with some skepticism (Daum & Buschner, 2012; Mohnsen, 2012; NASPE, 2007). Most notably questions arise about the quality of the courses and the ability to verify that student participation in activity (Daum & Buschner, 2012; Mohnsen, 2012; NASPE, 2007). OLPE programs must be equipped to meet the demands of the modern student with sound and contemporary product.

Consequently, the rapid growth of online education has brought with it many different instructional methods and tools. Despite the limited research and conflicting results about its effectiveness to produce student learning, mobile learning is one of many instructional practices that has found its way into online education.

It is evident from the number of people using mobile devices to access the web that daily routine is becoming increasingly digital and connected; from the way we communicate, collaborate, share photos, video, and music (Wicks, 2010). At this point in time, OLPE is an under-researched field that presents many questions about delivery method, guidelines, and standards (Daum & Buschner, 2012; Mohnsen, 2012; Mosier, 2012; NASPE, 2007).

Thus, further research investigating how students perceive new methods of content delivery, such as m-learning, is warranted. This information is essential in determining the student's perceived acceptance in utilizing mobile devices to deliver academic content, instruction, and assessment in online physical education. By collecting data on student's perceived acceptance and use of mobile learning, this project aims to benefit universities considering the adoption of mobile learning within their distance education plan. Constructs found to be significant predictors of acceptance and use can be better addressed in online education plans once identified.

Purpose of study

The current investigation sought to gain a better understanding of students' acceptance and use of mobile technology in higher education, specifically with the use of an iOS device as a platform, using a modified version of the UTAUT model. The purpose of the present study was to examine the determinants that lead to acceptance of mobile learning in an online fitness for life course.

Hypotheses

The following hypotheses were developed to examine the factors that influence student's acceptance and use mobile learning in an online activity course:

Hypothesis One: The independent variable performance expectancy will be a significant predictor of behavioral intention to use mobile learning in an online wellness for life course.

Hypothesis Two: The independent variable effort expectancy will be a significant predictor of behavioral intention to use mobile learning in an online wellness for life course.

Hypothesis Three: The independent variable facilitating conditions will be a significant predictor of behavioral intention to use mobile learning in an online wellness for life course.

Hypothesis Four: The independent variable perceived playfulness will be a significant predictor of behavioral intention to use mobile learning in an online wellness for life course.

Hypothesis Five: The independent variable attitude toward using technology will be a significant predictor of behavioral intention to use mobile learning in an online wellness for life course.

Hypothesis Six: The independent variable self-efficacy will be a significant predictor of behavioral intention to use mobile learning in an online wellness for life course.

CHAPTER 2

METHODS

Participants

Students enrolled in the PE: 100 Active Living course at Emporia State University served as the participants in the present study. Of the 16 students who completed the course, data were collected from 15 (N=15). Participants in the present study age ranged from 21-40 (M=25) years. The gender make up of the present study consisted of 12 females and 3 males.

Measures

The UTAUT, formulated by Venkatesh et al., (2003), served as the theoretical framework to investigate students' behavior intention to use mobile devices. The UTAUT model consists of 4 key constructs; performance expectancy, effort expectancy, social influence, and facilitating conditions. The model theorizes these 4 constructs significantly influence behavioral intention to use technology.

Questions in the student survey were developed from Donaldson's (2010) study on Community College student's acceptance of mobile learning and Moran's (2006) dissertation on college students' acceptance of tablet personal computers. The survey utilized a Likert scale (1-7) with anchors ranging from "strongly disagree" to "strongly agree." To make the questions relevant to the context of the present study and the participants, the word "mobile learning" was replaced with "iPod." Similar research has made comparable modifications to the UTAUT (Donaldson, 2010; Moran & Hawkes, 2010; Wang et al., 2009).

Several constructs where subtracted and replaced with more applicable categories based off of research conducted by Donaldson (2010) and Moran (2006) that utilized the UTAUT model to examine the acceptance of mobile learning using different IT devices. It has been suggested that the UTAUT model be modified for specific mobile systems (Donaldson, 2010; Y. S. Wang et al., 2009). The moderating effect of gender, age, experience, and voluntariness were not considered in the current study. The participants were all college undergraduate students. Thus, some alterations to the research model were made. The construct, "self-management of learning" and "social influences" from Donaldson's (2010) *Acceptance & Use of Mobile Learning Survey* was taken out due to data suggesting it was not a significant predictor of behavioral intention to use (Moran, 2006). Furthermore, Moran (2006) stated that, "In a mandatory adoption setting social influence appears to be significant only in the early stages with its effects eroding over time" (p. 32). In the present investigation, the students were provided with a device for the duration of the course reducing the effect of social influences on student acceptance of mobile learning.

In place of those constructs, "attitude toward using technology" and "self-efficacy" were added from Moran's (2006) mobile learning, study which found these to be significant predictors of behavioral intention to use. The construct "perceived playfulness" was added from research from Wang, Wu, and Wang (2009) that indicated it as a significant determinant of user adoption of mobile leaning, later supported by Donaldson's (2010) study. The present study also found that in the context of mobile learning "perceived playfulness" had a stronger influence on behavioral intention than the traditional UTAUT construct of "social influence" (Wang et al., 2009). Their rational

was, "target user group consists of a large number of people with much diversified backgrounds, making an m-learning system playful and enjoyable to interact with is crucial for attracting more users to the m-learning system. (Wang et al., 2009, p. 19)."

The present investigation modified and utilized a survey that consisted of 6 constructs; performance expectancy, effort expectancy, perceived playfulness, attitude towards using technology, facilitating conditions, and self-efficacy. These constructs were originally used to evaluate students' behavior intention to use mobile devices in an online wellness for life course. Figure 6 displays the relationship between the variables in the present study. Additional detail regarding the modifications made to the survey, as well as the survey questions themselves are located in Appendix A.

Procedure

Approval to conduct the present study was granted by Emporia State University's Institution Review Board (Appendix B). Six weeks before the start of the course students were contacted and asked to fill out equipment checkout and informed consent documents explaining the purpose of the study and that the information collected at the conclusion of the course would be kept confidential (Appendix C). After the signed documents were returned, students were shipped the following equipment and material: iPod Touch, USB adapter, exercise armband, copy of equipment contract/informed consent, Blackboard Mobile instructions, and an introduction letter.

Per NASPE (2009) guidelines for instructing OLPE, the students' first assignment was a technology competency test. The students were tested over the basic functions of the iPod touch and mobile LMS. This assessment addressed hardware as well as

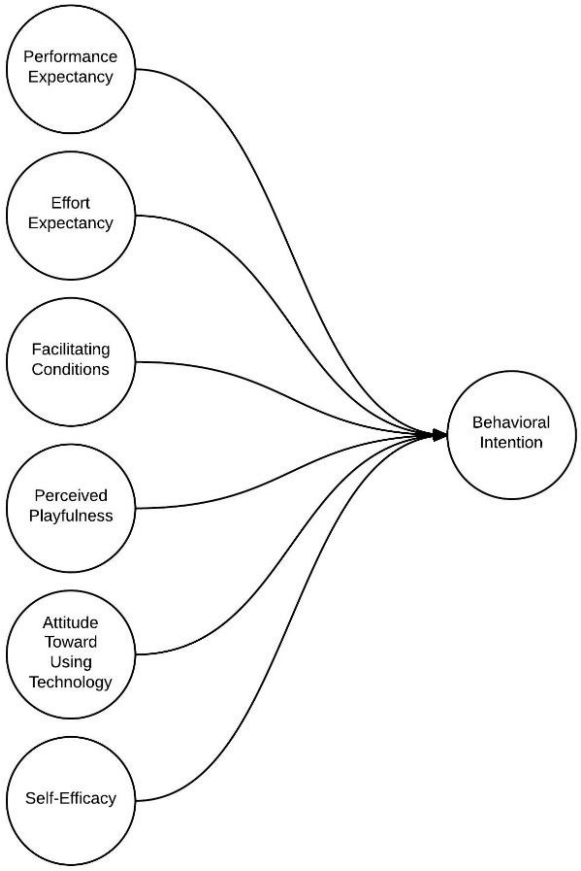

Figure 6. Present Study Research Model

pertinent interface functions that would be used in the course. After successful completion of the assessment, students were allowed to move onto course content.

Two weeks before the conclusion of the course an online survey (SurveyMonkey.com) was distributed to students by Emporia State University's IT department. The students received an email containing a Hyperlink to the survey, an explanation of the way the results where to be used, assurance of anonymity, and the importance of the study. The Survey Monkey portal was available to the students for two weeks and only available to those enrolled in the course. Students were sent a reminder after seven days if the survey had not been completed. Data were collected from December 1st-15th (2014).

Program Description

PE: 100 Active Living is a required undergraduate course at Emporia State University and is offered to distance education students. Students enrolled in the online course were shipped an iPod touch and peripherals. The course was designed to have the capability of being completed solely through the iPod device. Students used the mobile version of the Blackboard learning management system to access content, collaborate, complete assignments, and log activity.

The course was designed to encourage personal awareness and responsibility for the maintenance of health and physical well-being through physical activity. The class was interactive in nature and students were expected to be active during weekly assignments. Students were responsible for validating completion of physical activity assignments with screenshots or pictures using the devices built in camera.

Specific topics of instruction over the eight weeks included an introduction to wellness and fitness, aerobic and muscular fitness, flexibility and back health, exercise related injuries, wellness diet, body composition and weight management. Mobile applications related to health and fitness were used in an attempt to expand students' knowledge of health and wellness. Practical implementation and behavior change exercises are presented to assist students in applying course information to their life. The guided discovery instruction style was the predominant method of teaching utilized for the course. This allowed for the students to explore the device, applications, and content related to the courses. This also allowed for students to gain experience in self-assessment and personal program development.

Construct Definitions

The present investigation evaluated the association between behavioral intention and three independent variables from the Venkatesh et al. (2003) original UTAUT model; performance expectancy, effort expectancy, and facilitating conditions. Three additional constructs; perceived playfulness, attitude toward using technology, and self-efficacy were added to the present study from previous research that utilized the UTAUT model in investigating the acceptance of mobile technologies. The researcher postulated that including these constructs, which are better suited for determining the factors influencing the adoption of mobile devices in the context of OLPE, the study would be strengthened. The following were modified definitions for the context of the present study.

Behavioral intention. Behavioral intention is defined as the measure of a student's intention to adopt mobile learning into their academic studies after completing an online wellness for life course (Venkatesh et al., 2003). Five UTAUT behavioral

intention statements (seen in Appendix A) have been modified from Donaldson's (2010) survey to address the specific mobile learning device:

Performance expectancy. Performance expectancy is defined as the degree to which the student believes that using an iPod will help him or her complete course work in an online wellness for life course (Venkatesh et al., 2003). Five UTAUT performance expectancy statements (seen in Appendix A) have been modified from Donaldson's (2010) survey to address the specific mobile learning device.

Effort expectancy. Effort expectancy is defined as the degree of ease the student associates with the use of an iPod in an online physical education course (Venkatesh et al., 2003). Four UTAUT effort expectancy statements (seen in Appendix A) have been modified from Donaldson's (2010) survey to address the specific mobile learning device.

Facilitating conditions. Facilitating conditions are defined as the degree to which a student believes that the university and technical infrastructure exists to support use of an iPod in an online wellness for life course. Three UTAUT facilitating condition statements (seen in Appendix A) have been modified from Donaldson's (2010) survey to address the specific mobile learning device.

Perceived playfulness. Wang, et al. (2009) defined predictive playfulness as, "the extent to which the individual (1) perceives that his or her attention is focused on the interaction with the m-learning (i.e., concentration); (2) is curious during the interaction (i.e., curiosity); and (3) finds the interaction intrinsically enjoyable or interesting (i.e., enjoyment)" (p. 8). The questions for the survey used by Donaldson (2010) were adapted from Wang, et al., (2009). These measures were derived from previous research on

technology acceptance using the UTAUT model. Five perceived playfulness statements (seen in Appendix A) address the specific mobile device.

Attitude towards using technology. Attitude towards using technology is defined as the degree to which a student is confident that use of an iPod in an online wellness for life course is practical (Davis, 1989). Six UTAUT attitude toward using technology statements (seen in Appendix A) were modified from Moran's (2006) study to address the specific mobile learning device.

Self-efficacy. Self-Efficacy is defined as the extent to which a students feel confident in their own abilities to use iPod in an online wellness for life course (H. Y. Wang & Wang, 2010). Moran's (2006) study examining the integration of tablet personal computers in higher education found SE to be a significant determinant in students' behavioral intention. Wang & Wang (2010) suggested that SE was an influential factor in extending the UTAUT model for mobile devices and that this is especially significant for early adopters of mobile information systems. Five UTAUT self-efficacy statements (seen in Appendix A) have been modified from Moran's (2006) study to address the specific mobile learning device.

Design and Data Analysis

A stepwise multiple regression was conducted to evaluate whether performance expectancy, effort expectancy, facilitating conditions, perceived playfulness, attitudes towards technology, or self-efficacy were significant predictors of behavioral intention.

CHAPTER THREE

RESULTS

The purpose of the current investigation was to investigate the determinants effecting students acceptance of mobile learning in the context of an online wellness for life course. The participants were students enrolled in an online section of a fitness for life course (PE100 Active Living). This chapter presents an analysis of the data obtained from the results of the survey. Data collected from the participants was analyzed using a stepwise multiple regression with an alpha level of .05. The results displayed in this chapter focus on the each of the six independent variables; performance expectancy, effort expectancy, facilitating conditions, perceived playfulness, attitudes towards technology, and self-efficacy's level of significance in determining student's behavioral intention.

Participant Demographics

Of the original 19 students enrolled 16 completed the course. Complete data were obtained an analyzed from a total of fifteen (N=15) students, eleven (n=11) of which were female, and four (n=4) were male. The age of the participants ranged from 21-40 years (M=25).

Survey Results

Descriptive statistics for the stepwise predictors are listed in Table 6 Cronbach's alphas were calculated to assess the level of internal consistency reliability of the seven constructs. Cronbach's alpha is based upon the average correlation among the items in a

scale. The reliability coefficients (Table 7) reveals all constructs that demonstrate sufficient levels (alpha $\leq$ .70) of internal consistency reliability.

A multiple linear regression was calculated to predict determinants of student's behavioral intention to use mobile devices in an online fitness for life course. A significant regression equation was found F (1,13) = 11.331, $p < .05$. The multiple correlation coefficient was .68, indicating approximately 46.6% of the variance of behavioral intention could be accounted for by self-efficacy. The constructs performance expectancy (t = 1.129, $p > .05$), effort expectancy (t = 1.596, $p > .05$), facilitating conditions (t = -.591, $p > .05$), perceived playfulness (t = .337, $p > .05$) and attitudes towards technology (t = .712, $p > .05$) did enhance the significance of the equation at step 2 of the analysis. Accordingly, the regression equation (Table 8) for predicting behavioral intention was:

Behavioral Intention = .835 * self-efficacy + 4.852

Table 6

Descriptive Stats for Stepwise Predictors

Variable	N	M	SD
Behavioral Intention	15	6.026	1.44
Performance Expectancy	15	4.852	1.127
Effort Expectancy	15	5.92	1.163
Facilitating Condition	15	6.15	.899
Perceived Playfulness	15	4.68	1.191
Attitude Toward Technology	15	5.29	1.09
Self-Efficacy	15	6.05	1.12

Table 7

Internal Consistency Reliability for Mobile Learning Constructs

Subscales	N of items	Cronbach's Alpha
Behavioral Intention	5	.909
Performance Expectancy	5	.860
Effort Expectancy	4	.860
Facilitating Condition	3	.893
Perceived Playfulness	5	.818
Attitude Toward Technology	6	.913
Self-Efficacy	5	.941

Table 8

Stepwise Analysis

Predictor Variable	Beta	P
Self-Efficacy	.682	P <0.005

(PE, EE, PP, ATT, & FC excluded at step 2 of stepwise analysis)

Summary of Results Regarding Hypotheses

Hypothesis One used a stepwise regression to determine if performance expectancy would be a significant predictor of behavioral intention to use mobile learning in an online wellness for life course. The results of the study indicated performance expectancy did not enhance the researchers model for determining student's behavioral intention ($t = 1.129$, $p > .05$).

Hypothesis Two used a stepwise regression to determine if effort expectancy would be a significant predictor of behavioral intention to use mobile learning in an online wellness for life course. The results of the study indicated effort expectancy did not enhance the researchers model for determining student's behavioral intention ($t = 1.596$, $p > .05$).

Hypothesis Three used a stepwise regression to determine if facilitating conditions would be a significant predictor of behavioral intention to use mobile learning in an online wellness for life course. The results of the study indicated facilitating conditions did not enhance the researchers model for determining student's behavioral intention ($t = -.591$, $p > .05$).

Hypothesis Four used a stepwise regression to determine if perceived playfulness would be a significant predictor of behavioral intention to use mobile learning in an online wellness for life course. The results of the study indicated perceived did not enhance the researchers model for determining student's behavioral intention ($t = .337$, $p > .05$).

Hypothesis Five used a stepwise regression to determine if attitude toward using technology would be a significant predictor of behavioral intention to use mobile learning

in an online wellness for life course. The results of the study indicated attitude toward using technology did not enhance the researchers model for determining student's behavioral intention (t = .712, p > .05).

Hypothesis Six used a stepwise regression to determine if self-efficacy would be a significant predictor of behavioral intention to use mobile learning in an online wellness for life course. The results of the study indicated self-efficacy is significant in determining student's behavioral intention (F (1,13) = 11.331, p < .05).

Behavioral Intention = .835 * self-efficacy + 4.852

CHAPTER FOUR

DISCUSSION

The current study examined students' perception of mobile learning in the context of an online activity course. It set out to identify factors affecting acceptance of mobile learning in online physical education courses. Previous research highlighted the importance of understanding the determinants of acceptance of mobile learning. Due to the limited research on the acceptance of mobile learning in higher education, prior researchers recommended that further investigation using technology acceptance models was warranted (Moran, 2006; Y. S. Wang et al., 2009). The objective of Unified Theory of Acceptance and Use of Technology is to explain users' intentions to adopt an information system. It has been suggested the UTAUT model be modified for mobile devise and future studies focus on measuring the acceptance in specific disciplines of higher education (Iqbal & Qureshi, 2012; Y. S. Wang et al., 2009).

The current investigation measured mobile learning acceptance using a modified UTAUT model. The constructs perceived playfulness, attitude toward technology, and self-efficacy were added to account for previous researchers finding on mobile devises and online physical education (Daum & Buschner, 2012; Ransdell et al., 2008; Y. S. Wang et al., 2009).

Students enrolled in an online wellness for life courses were surveyed on 31 items pertaining to the seven constructs adapted for the current investigation. The survey was measured by Likert scales with anchors ranging from strongly disagree (1) to strongly agree (7). To make the questions relevant to the context of the present study and the participants, the word "mobile learning" was replaced with "iPod." Similar research has

made comparable modifications to the UTAUT. The data was analyzed using a stepwise regression assess the addition of the three constructs and their influence on behavioral intention.

Findings Regarding the Hypotheses

It was hypothesized that each of the six constructs (independent variables) would significantly influence behavioral intention to use mobile learning. Hypotheses 1-5 were rejected as they were not found to be significant. Hypotheses 6 pertaining to the construct self-efficacy was found to be a significant predictor of behavioral intention in the current investigation. This is inconsistent with similar studies utilizing modified UTAUT models investigating mobile learning in higher education (Donaldson, 2010; Moran, 2006).

Hypotheses one - Performance expectancy. Mobile learning has the potential to facilitate students' performance in OLPE. In the context of the online fitness for life course performance expectancy suggest that students will find m-learning beneficial by utilizing capabilities such as; wireless connectivity, mobility, movement tracking, health/fitness apps, and the ability to record audio/video.

The hypothesis for the present study was rejected as it did not enhance the research models ability to determine behavioral intention. This finding is contrary to Donaldson's (2010) study that found this construct to be the most significant predictor of behavioral intention investigating the acceptance of mobile learning in a Florida community college. Conceivably the mobile Blackboard LMS used to facilitate this course influenced students' performance expectancy. In week two of the course the mobile quiz feature unexpectedly crashed and was not reported until an update was

released midway through week three. An alternative application for submission was used during that time period to account for this issue. Donaldson (2010) suggested that the mobile LMS and the device interrelate and could potentially influence the acceptance of one another. Additions of moderating factor accounting for specific variables affecting mobile technologies in education may be warranted.

Hypothesis two - Effort expectancy. By integrating mobile devices into an online fitness for life course the current investigation aimed to decreases the effort in accessing necessary information to complete fitness assignments by providing on location learning through the mobile devices. Providing an effective, real life vehicle for delivering content, has the potential to improve the quality of OLPE (Ransdell et al., 2008). Mobile devices in the context of an online fitness for life course sought to alleviate the problems reported by similar OLPE courses such as; lack of interaction with peers/teachers, feedback on fitness activities, ability to determine success, and motivation. Mobile devices possess unique characteristics conducive to delivering, demonstrating, and assessing fitness education content on location. Effort expectancy in the use of mobile devices was suspected to be a determining factor in student's behavioral intention.

A stepwise regression analyzing the data rejected the hypothesis due to the finding that effort expectancy did not enhance the research models ability to predict behavioral intention. Davis (1989) suggested that effort oriented constructs are more prominent in early stages of user adoption. Therefore using the mobile device may be routine and students perceived using it for academics as similar to other tasks.

The current results were contrary to Moran's (2006) study that found effort expectancy to be a significant predictor of behavioral intention. Moreover, effort expectancy was found to be the most significant predictor of behavioral intention to use mobile devices for the group of students who received initial training on the devices. The researcher in the present study contributed this to the high values for facilitating conditions that were a direct result from the initial support and training the received.

In the current investigation, an optional "how to" session was held for any student enrolled in the course to receive basic training on the functions of the device and how it was to be used in the course. Only two of the nineteen originally enrolled in the course attended. Future mobile learning initiatives should consider mandatory technology training sessions for students enrolled on m-learning courses.

This construct was also potentially affected by the mobile LMS used in the current investigation. Errors resulting from software could have made students interactions with the mobile devices frustrating and inefficient.

Hypothesis three – Facilitating conditions. Hypothesis three was rejected as it did not enhance the research models ability to determine behavioral intention. Similar to both Donaldson's (2010) and Wang & Wang (2010) study facilitating conditions was examined as a variable for behavior intention rather than usage. NASPE (2007) states, "Overcoming technical difficulties can be an important factor in students' success and satisfaction with online programs" (p. 4). Simply making a mobile device available to the students does not guarantee acceptance. Infrastructure that demonstrates institutional support of m-learning needs to be established and the students made aware of it (Donaldson, 2010; H. Y. Wang & Wang, 2010). The quality of the infrastructure (e.g.,

IT support, initial training, and troubleshooting forum) and services delivered (e.g., mobile LMS, apps, and course content) affect the perceived quality of m-learning and in turn, student acceptance.

Moran's (2006) study supports this notion as a result of increased student acceptance and use of m-learning in higher education when assisted by initial training. As a result, Moran (2006) suggested the training be mandatory and focus on the advantages and functionality of the mobile device in the course. It appears that in the current investigation, the infrastructure to support student learning was inadequate

Hypothesis four – Perceived playfulness. Mobile applications are developed specifically for mobile operating systems (Fanning et al., 2012). Currently there are thousands of health and fitness mobile apps available that allow a great deal of flexibility for the user (Mosier, 2014). The current investigation predicted that the use of these will enhance the users experience and lead to a greater degree of acceptance.

Hypothesis four was rejected as it did not enhance the research model's ability to determine behavioral intention. This finding conflicts with both Wang & Wang's (2010) and Donaldson's (2010) studies that found mobile devises have the potential to present novel, interesting, and challenging learning opportunities to students. The more enjoyable learning becomes the more apt students are to adopt the use of m-learning.

The results of the present study suggest that perceived playfulness did not influence behavioral intention. A possible negative influence on this construct not accounted for in the study was voluntariness of use. Voluntariness of use was found to be a negatively predictor of participant's behavioral intention to use mobile technologies in higher education in both Donaldson's (2010) and Moran's (2006) research. Some of

the required assignments during the fitness for life course could only be completed through the provided iPod Touch. The requirement to use the iPod Touch possibly altered student's perception. Also the students who were initially unfamiliar with the iPod touch and iOS operating system could have a negatively affect their perception of the devices benefit and usefulness.

Hypothesis five - Attitude toward using technology. OLPE has been referred to as an oxymoron and inferior to traditional face-to-face courses by physical educators, administrators, and students (Mohnsen, 2012; Ransdell et al., 2008). In the context of an online fitness for life course the integration of m-learning is predicated on students acceptance of the technology used to facilitate learning. Investigating students' perceptions of the mobile devices as a new delivery method in an OLPE setting is the first component in improving the quality and effectiveness of the pedagogy.

A stepwise regression analyzing the data rejected the hypothesis that attitude toward using technology is a significant predictor of behavioral intention. Perceived usefulness and perceived effort that predicted attitude towards using technology in the original TAM model potentially affected the construct in the current investigation by proxy. Part of Moran's (2006) research examined the differences in acceptance between students who were mandated to use a mobile device (tablet PC) and those who used them voluntarily. Moran (2006) indicated that the group of students who used mobile devices at their own discretion had a positive disposition toward the use of mobile devices than the group required to use a mobile device. The researcher based this conclusion from the voluntary group's positive response in attitude toward using technology in combination

with a moderate response in the influence of performance expectancy and facilitating conditions.

It is likely that the mandated use of the iPod Touch in conjunction with the temporary breakdown of the mobile LMS negatively affected student's attitudes towards technology by influencing student's perceptions on the iPods performance and increased effort to complete assignments. Moran (2006) attributed student's acceptance and the successful implementation of m-learning within an introduction to computers course to the requirement of student participation in training sessions on basic functions, software, and benefit of using the mobile device. Students not receiving prior training on the use and benefit of mobile devices recorded significantly lower scores in the attitude toward using technology construct.

Hypothesis six - Self-efficacy. A stepwise regression analyzing the data supported the hypothesis that self-efficacy was a significant predictor of behavioral intention. This supports Moran's (2006) study that utilized this construct from the original TAM model and found it to be influential in student's behavioral intention. Wang and Wang (2010) also found self-efficacy to play a critical role in predicting mobile technology acceptance and suggested, "This finding can help m-internet practitioners target the early adopter of m-internet systems and promote the advance technology to them" (p. 423).

Studies indicate that 95% of college students (ages 18-25) own a mobile phone (Fanning et al., 2012). Similar statistics have been found at the high school level. Project Tomorrow's annual national report surveyed 9,005 school that include 325,279 students found that 89% of 9-12 grade students indicated that they have personal access to a

Smartphone (Evans, 2014). The report also highlighted student's ideas for improving technology use in schools and 51% of 9-12 grade students responded that using their own device would be the most beneficial. Additionally, 21% of the same demographic responded that if unable to use their own mobile device that they would like to be provided with one by the school. This indicates the potential to provide effective solution for individual learning needs and preferences by utilizing student's personal mobile devices in higher education.

Limitations

The current study possessed several limitation that should be acknowledged. The study was primarily limited by its small sample size. The pool from which the study drew and poor retention rates created a small sample size (n=15) limiting the method in which the data could be analyzed. Additionally, the results of the m-learning acceptance survey were self-reported and the validity of the results are based on those self-perceptions. Collection of data occurred at a single point in time and the study would benefit from a longitudinal study assessing multiple online fitness for life courses.

Another limiting factor of the study was the malfunction of the mobile LMS during week two of the eight week course. As a result of the mobile LMS software being an essential component of the course, the temporary failure of the system may have affected student perception of m-learning. As Donaldson (2010) suggested, the mobile device and LMS are intertwined in an academic setting. The quality of and effectiveness of one will directly affect the perceived usefulness of the other. Student's perceptions may have been better assessed if a stable version of the mobile LMS would have been available for the entire duration of the study.

A qualitative method of research could have been added to the study in order to supply context to the data collected. Interviews with students from the course potentially could of added relevant details not revealed by the data alone specific to OLPE courses. Lastly, the results of the study were unique to the context of an online physical activity course and the determinants found not to be significant in the current investigation study could prove otherwise in another study.

Study Implication for Future Research

As Donaldson (2010) pointed out, the mobile LMS could potentially be a variable outside of the UTAUT that needs to be accounted for when assessing mobile learning. Mobile learning management systems are relatively new and their features are constantly updating as more sophisticated devices come on the market. Research comparing the acceptance of mobile learning using the same course content, but different mobile LMS could determine how significant of a role they have in influencing adoption. Institutions or course instructors planning to implement m-learning initiatives need to strongly consider the quality of mobile support offered by their LMS provider. Adequate course design planning that caters to mobile LMS strength and accounts for potential deficiencies in the system is a key factor in student's acceptance of mobile learning in higher education.

Furthermore, research in the acceptance and use of m-learning in higher education that incorporated mobile applications as an additional construct or moderating factor within the UTAUT framework could prove beneficial in adapting the acceptance model for m-learning. Further research using similar tools is needed to identify the determinants of mobile learning in specific disciplines in higher education.

In the context of OLPE it appears that further research is needed comparing the integration of m-learning and the mobile applications that facilitate lessons. Research comparing m-learning initiatives in different e-learning classifications such as; web facilitated, blended/hybrid, and online. It may be necessary to apply different constructs to assess their value in student's acceptance of m-learning in OLPE in order to identify the aspects of the environment that most contribute to the adoption process. Constructs that specifically account for the mobile applications and fitness trackers.

Conclusion

The primary purpose of this research was to identify structural and contextual factors that facilitate the adoption of mobile devices in an online fitness for life course. The widespread use of mobile technologies alone does not guarantee m-learning adoption. Each discipline in higher education presents unique challenges for m-learning. Identifying the concerns and determinates relevant to specific disciplines in m-learning adoption is key for effectively utilizing mobile devices in online education.

In the context of an online fitness for life class, the present study found the construct self-efficacy to be a significant determinant of students' behavioral intention to use mobile devices for learning. In order to enhance students' sense of self-efficacy it appears students should participate in an initial technology training that emphasizes the functions of the mobile device and the software used specific in the course. This is also supported by previous research and NASPE (2009) initial guidelines for OLPE (M. J. Moran, 2006). Contrary to previous research the constructs; performance expectancy, effort expectancy, facilitating conditions, predictive playfulness, and attitude towards using technology did not significantly predict students participating in an online fitness

for life course behavioral intent(Donaldson, 2010; Moran, 2006; Y. S. Wang et al., 2009). The current investigation study does not rule out these constructs as predictors for behavioral intent in the context of online activity courses. More research in m-learning initiatives specific to OLPE are needed to determine constructs conducive to the disciplines inherently unique characteristics. However, the current investigation does offer initial insight and information for institutions offering online fitness for life courses and online physical educators designing m-learning curriculum.

REFERENCES

Allen, E., & Seaman, J. (2012). Changing course ten years of tracking online education in the united states. MA: Sloan Center for Online Education.

Allen, E., Seaman, J., & Garrett, R. (2007). *Blending in the extent and promise of blended education in the United States* (pp. 35).

Attewell, J., Savill-Smith, C. and Douch, R. (2009). *The impact of mobile learning: Examining what it means for teaching and learning*

Brewer, J. D. (2001). *The impact of a web-based versus face-to-face instructional format of a lifetime fitness course on students' wellness knowledge, attitudes and behaviors and levels of health-related physical fitness.* (Doctoral Dissertation), Kansas State University, Manhattan, KS. Retrieved from http://www.whitelib.emporia.edu/docview/304695850?accountid=27180

Cardinal, B. J. (2012). How can we help college and university students stay active and healthy for life? *JOPERD: The Journal of Physical Education, Recreation & Dance, 83*(8), 53-53.

Christensen, C., Horn, M., & Johnson, M. (2008). *Disrupting class: How disruptive innovation will change the way the world learns*. New York: McGraw-Hill.

Daum, D. N. (2012). *Physical education teacher educator's attitudes toward and understanding of online physical education.* (Doctoral Dissertation), University of Illinois at Urbana-Champaign, Champaign, IL. Retrieved from http://www.whitelib.emporia.edu/docview/1420355006?accountid=27180

Daum, D. N., & Buschner, C. (2012). The status of high School online physical education in the United States. *Journal of Teaching in Physical Education, 31*(1), 86-100.

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

Davis, F., Bagozzi, R., & Warshaw, P. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982-1003.

Donaldson, R. L. (2010). *Student acceptance of mobile learning.* (Doctoral Dissertation), The Florida State University, Tallahassee, FL. Retrieved from http://www.whitelib.emporia.edu/docview/902631958?accountid=27180

Evans, J. (2014). The new digital learning playbook: Understanding the spectrum of students' activities and aspirations. *Speak Up*. Irvine, CA: Project Tomorrow

Fanning, J., Mullen, P. S., & McAuley, E. (2012). Increasing physical activity with mobile devices: A meta-analysis. *J Med Internet Res, 14*(6), e161. doi: 10.2196/jmir.2171

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research* Retrieved from http://people.umass.edu/aizen/f&a1975.html

Florida Virtual School. (2014). Retrieved 23 Feb. 2014, from http://www.flvs.net

Forrest, G. (2009). Using iPods to enhance the teaching of games in physical education. In J. Herrington, A. Herrington, A. Mantei, I. Olney & B. Ferry (Eds.), New Technologies, New Pedagogies: Mobile Learning in Higher Education (pp. 138): University of Wollongong. Retrieved from http://ro.uow.edu.au/cgi/viewcontent.cgi?article=1085&context=edupapers.

Futrell, J. (2009). *A comparative study of virtual high school instruction versus traditional instruction of high school student outcomes and attitudes in physical*

education. (Doctoral Dissertation), Capella University, Minneapolis, MN. Retrieved from http://www.whitelib.emporia.edu/docview/305166271?accountid=27180

Hager, R., George, J. D., LeCheminant, J. D., Bailey, B. W., & Vincent, W. J. (2012). Evaluation of a university general education health and wellness course delivered by lecture or online. *American Journal of Health Promotion, 26*(5), 263-269.

Iqbal, S., & Qureshi, I. (2012). M-learning adoption: A perspective from a developing country. *The International Review of Research in Open and Distance Learning, 13*(3).

Kukulska-Hulme, A. (2013). Limelight on mobile learning: Integrating education and innovation. *Harvard International Review, 34*(4), 12-20.

Maniar, N., & Bennett, E. (2007). *Media influence on m-learning*. Paper presented at the VideoFunet Conference, Tampere, Finland.

McNamara, J. M., Swalm, R. L., Stearne, D. J., & Covassin, T. M. (2008). Online weight training. *Journal of Strength & Conditioning Research (Lippincott Williams & Wilkins), 22*(4), 1164-1168.

Meister, D. B., & Compeau, D. R. (2002). *Infusion of innovation adoption: An individual perspective.* . Paper presented at the ASAC, Winnipeg, Manitoba. http://www.academia.edu/3598063/Infusion_of_innovation_adoption_An_individual_perspective

Mohnsen, B. (2012). Implementing online physical education. *Journal of Physical Education, Recreation & Dance, 83*(2), 42-47.

Moran, M. J. (2006). College student's acceptance of tablet personal computers: A modification of the Unified Theory of Acceptance and Use of Technology model. (Doctoral Dissertation), Capella University, Minneapolis, MN. Retrieved from http://www.whitelib.emporia.edu/docview/304910593?accountid=27180

Moran, M. J., & Hawkes, M. (2010). Tablet personal computer integration in higher education: applying the unified theory of acceptance and use technology model to understand supporting factors. *Journal of Educational Computing Research, 42*(1), 79-101. doi: 10.2190/EC.42.1.d

Mosier, B. (2012). Virtual physical education: A call for action. *JOPERD: The Journal of Physical Education, Recreation & Dance, 83*(3), 6-10.

Mosier, B. (2014). Meeting PETE students in their world: Tracking physical activity through technology. *JOPERD: The Journal of Physical Education, Recreation & Dance, 85*(3), 46-49.

NASPE. (2007). Initial guidelines for online physical education.

NASPE. (2009). Appropriate use of instructional technology in physical education *Position Statement*. Reston, VA.

Perlman, D., Miao, H., Karp, G. G., & Woods, M. L. (2008). Physical educators' technology competencies. *Physical Educator: A Magazine for the Profession, 65*(2), 82-99.

Ransdell, L. B., Rice, K., Snelson, C., & Decola, J. (2008). Online health-related fitness courses. *JOPERD: The Journal of Physical Education, Recreation & Dance, 79*(1), 45-52.

Taylor, S., & Todd, P. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research, 6*(2), 144-176.

USDE. (2008). Evaluation online learning: Challenges and strategies for success.

Vavoula, G. (2005). A study of mobile learning practices. *Mobilearn, 4*(4), 1-20.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425-478.

Wang, H. Y., & Wang, S. H. (2010). User acceptance of mobile internet based on the unified theory of acceptance and use of technology: Investigating the determinants and gender differences. *Social Behavior & Personality: An International Journal, 38*(3), 415-426.

Wang, Y. S., Wu, M. C., & Wang, H. Y. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British Journal of Educational Technology, 40*(1), 92-118. doi: 10.1111/j.1467-8535.2007.00809.x

Wei, Z., & Liqiang, S. (2011). *Mobile-learing (m-learning) apply to physical education in colleges.* Paper presented at the IEEE Conference on Circuits, Communications and System, Wuhan, China.

Wicks, M. (2010). A national primer on K-12 online learning version 2 (pp. 50). Vienna, VA: International Association for K-12 Learning.

Williams, R. V. (2011). *Library mobile web design: tips, tricks, and resources*. Paper presented at the Texas Library Association District 8 Fall Conference. http://www.slideshare.net/vacekrae/library-mobile-web-design-tips-tricks-and-resources?nomobile=true

Wu, W., Dasgupta, S., Ramirez, E. E., Peterson, C., & Norman, J. G. (2012). Classification accuracies of physical activities using smartphone motion sensors. *J-Med Internet Res, 14*(5), e130. doi: 10.2196/jmir.2208

APPENDIX A

ACCEPTANCE & USE OF MOBILE LEARNING SURVEY

Behavioral Intent Questions

Question Items
I intend to use an iPod or similar mobile device in the next 12 months
I predict I would use an iPod or similar mobile device in the next 12 months
I plan to use an iPod or similar mobile device in the next 12 months.
To the extent possible, I would use an iPod or similar mobile device to do different things (school or not school) related.
To the extent possible, I would use an iPod or similar mobile device in my studies frequently.

Performance Expectancy Questions

Question Items
I would find iPod useful in my learning.
Using iPod enables me to accomplish learning activities more quickly.
Using iPod increases my learning productivity.
If I use iPod, I will increase my chances of getting a better grade.
Using the iPod in my classes would make it easier to do my homework

Effort Expectancy Questions

Question Items
My interaction with the iPod was clear and understandable
It is easy for me to become skillful at using the iPod
I find the iPod easy to use
Learning to operate the iPod is easy for me.

Facilitating Conditions Questions

Question Items
I have the resources necessary to use the iPod
I have the knowledge necessary to use the iPod.
The help desk or instructor is available for assistance with iPod difficulties.

Predictive Playfulness Questions

Question Items
When using the iPod, I will not realize the time elapsed.
When using the iPod, I will forget the work I must do.
Using the iPod makes learning more enjoyable.
Using the iPod stimulates my curiosity.
Using the iPod leads to my exploration of course content.

Attitude Toward Technology Questions

Question Items
Using the iPod is a good idea
Using the iPod is pleasant
The iPod makes schoolwork more interesting
Using the iPod is fun
I like working with the iPod
Using the iPod fits into my work style.

Self-Efficacy Questions

Question Items
I could complete a task using the iPod if there was no one around to tell me what to do as I go.
I could complete a task using the iPod if I had seen someone else demonstrate how it could be used
I could complete a task using the iPod if I could call someone to help if I got stuck
I could complete a task using the iPod if I had a lot of time to complete the job.
I could complete a task using the iPod if I had just the built in help facility for assistance

APPENDIX B
INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

EMPORIA STATE UNIVERSITY

1200 Commercial
Emporia, Kansas
66801-5087

620-341-5351
620-341-5909 fax
www.emporia.edu

GRADUATE STUDIES AND RESEARCH
RESEARCH AND GRANTS CENTER
Campus Box 4003

October 4, 2013

Tyler Goad
HPER Department
Campus Box 4013
Emporia, KS 66801

Dear Mr. Goad:

Your application for approval to use human subjects has been reviewed. I am pleased to inform you that your application was approved and you may begin your research as outlined in your application materials. Please reference the protocol number below when corresponding about this research study.

Title:	The Perceived Usefulness of Mobile Learning in an Online Activity Course
Protocol ID Number:	14022
Type of Review:	Expedited
Time Period:	10/14/2013 - 12/20/2013

If it is necessary to conduct research with subjects past this expiration date, it will be necessary to submit a request for a time extension. If the time period is longer than one year, you must submit an annual update. If there are any modifications to the original approved protocol, such as changes in survey instruments, changes in procedures, or changes to possible risks to subjects, you must submit a request for approval for modifications. The above requests should be submitted on the form Request for Time Extension, Annual Update, or Modification to Research Protocol. This form is available at www.emporia.edu/research/irb.html.

Requests for extensions should be submitted at least 30 days before the expiration date. Annual updates should be submitted within 30 days after each 12-month period. Modifications should be submitted as soon as it becomes evident that changes have occurred or will need to be made.

On behalf of the Institutional Review Board, I wish you success with your research project. If I can help you in any way, do not hesitate to contact me.

Sincerely,

Dr. Pamelyn MacDonald
Chair, Institutional Review Board

pf

cc: Dr. Paul Luebbers

APPENDIX C
INFORMED CONSENT FORM

INFORMED CONSENT DOCUMENT

The Department of Health Physical Education and Recreation at Emporia State University supports the practice of protection for human subjects participating in research and related activities. The following information is provided so that you can decide whether you wish to participate in the present study. You should be aware that even if you agree to participate, you are free to withdraw at any time, and that if you do withdraw from the study, you will not be subjected to reprimand or any other form of reproach. Likewise, if you choose not to participate, you will not be subjected to reprimand or any other form of reproach.

You are invited to be in a research study of mobile learning. You were selected as a possible participant because you are currently enrolled in PE100ZA: Active Living at Emporia State University. We ask that you read this form and ask any questions you may have before agreeing to be in the study and signing this form. This study is being conducted by Tyler Goad, HPER, Emporia State University.

Purpose: The purpose of this study is to examine what factors influence college student's to use mobile learning, specifically iOS devices. Mobile learning is the wireless delivery of learning content to students through the use of handheld devices (cell phones, tablets, iPods, or PDA). You will be asked to fill out a survey over your experience with mobile learning at the conclusion of the course. The survey should take approximately 15-30 minutes. The goal of my research is to understand what motivates students to use mobile learning and determine the readiness of students to adopt mobile technology in distance education.

Risk/Discomfort: There are no foreseeable risks or discomforts if you agree to participate in this study.

Benefit: Although there may be no direct benefit to you, the possible benefit of you participation is the anticipated improvement of mobile learning services or programs in higher education.

Compensation: You will receive no compensation for participating in this study.

Confidentiality: The records of this study will be kept private and confidential to the extent permitted by law. Any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records.

Contacts and Questions: The researcher conducting this study is Tyler Goad. You may ask any question you have now. If you have any questions concerning this research study after the session has concluded please contact me at 620-342-5950 or email tgoad@emporia.edu.

"I have read the above statement and have been fully advised of the procedures to be used in this project. I have been given sufficient opportunity to ask any questions I had concerning the procedures and possible risks involved. I understand the potential risks involved and I assume them voluntarily. I likewise understand that I can withdraw from the study at any time without being subjected to reproach."

_____ _____

Subject Date

_____ _____

Parent or Guardian (if subject is a minor) Date

APPENDIX D
PERMISSION TO COPY STATEMENT

I, Tyler Goad, hereby submit this thesis/report to Emporia State University as partial fulfillment of the requirements for an advanced degree. I agree that the Library of the University may make it available to use in accordance with its regulations governing materials of this type. I further agree that quoting, photocopying, digitizing or other reproduction of this document is allowed for private study, scholarship (including teaching) and research purposes of a nonprofit nature. No copying which involves potential financial gain will be allowed without written permission of the author. I also agree to permit the Graduate School at Emporia State University to digitize and place this thesis in the ESU institutional repository.

_____

Signature of Author

_____

Date

Identifying the Determinants of Behavioral Intention in a Mobile Fitness for Life Course

Title of Thesis

_____

Signature of Graduate School Staff

_____

Date Received