

INSTRUCTOR COMPETENCIES NEEDED TO DEVELOP INSTRUCTIONAL
STRATEGIES FOR MOBILE LEARNING IN FIELDS OF AGRICULTURAL
EDUCATION

A Dissertation

by

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ABSTRACT

Mobile learning is a fast growing form of technology-based learning. The novelty of mobile learning means educators are trying to understand how to develop instruction for this technological medium. A Delphi study was conducted using a panel comprised of 30 members with expert knowledge across 20 states to determine the competencies needed to develop instructional strategies for mobile learning. The panelists were given a definition of mobile learning developed from a literature review. In the first round, they were asked to list six competencies needed to develop instructional strategies for mobile learning from this definition. In the second round, the panelists were asked to rate 108 statements on a six-point scale. After a three round Delphi, the expert panel reached consensus on 48 competencies needed to develop instructional strategies for mobile learning. The competencies were grouped into seven areas: Communication, Technology, Learning, Course Management and Policies, Course Content, Assessment and Evaluation, and Instructor Skills. Further development of these skills through professional development is recommended, as well as research into creating a framework for mobile learning instruction using these competencies.

DEDICATION

This doctoral dissertation is dedicated to my wife Jennifer Salazar. Without her support, understanding, and love, I would not have even considered pursuing a doctorate. My success is her success and we are truly partners. I appreciate the sacrifices my wife has made since 2010 and I hope this document will serve as a positive reminder of her efforts.

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CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

Introduction

Mobile technology is changing the way people across the world communicate and conduct their daily lives. Mobile technology includes any portable device, such as a smartphone or tablet device that allows users to exchange data wirelessly with other users and access multimedia content (Lee, Kim, & Hong, 2010). The growing influence of this technology is presenting a paradigm shift in terms of how society conducts itself professionally as well as personally. Varnali and Toker (2010) suggested the pervasive presence of mobile technology has created an anytime, anywhere marketplace for users. Mobile technologies like smartphones have become the communication tool of choice for Americans. Nearly half of all American adults have a smartphone and outnumber users of more basic phones (Pew Research Center's Internet & American Life Project, 2012).

Tasks once regimented by time and space are now free from such constraints due to the asynchronous and portable nature of mobile technology. Around the globe, 77% of people have mobile phones, with 73% of the developing world using mobile phones to create a level playing field via communication (The Elearning Guild Research, 2011). Mobile technology has saturated most of human civilization at this point. Our culture and society is being shaped by mobile technology, as 90% of the world's population is served by a mobile network, including 80% of people living in rural areas (UNESCO, 2011). Mobile devices are used for a variety of purposes. López-Nicolás, Molina-

Castillo, and Bouwman (2008) found users' mobile devices are providing services ranging from commerce to entertainment and information.

The youngest segments of the adult population have embraced the use of mobile technologies. Eighty-seven percent of college students own a laptop (portable) computer and 55% own a smartphone (Huang, Hood, & Yoo, 2013). Mobile devices have become an important and vital part of college students' everyday lives. Chen and Katz (2009) suggested mobile communication technologies are not only ubiquitous on college campuses but students are dependent on these devices to conduct relationships with family and friends. The current generation of college students provides a diverse group of mobile users with different needs and wants. A number of different factors may determine a student's technology experiences and preferences, and require comprehensive knowledge about the use of technology in these students' lives (Kennedy, Judd, Dalgarnot, & Waycott, 2010). A student's technology knowledge is shaped by learning experiences at home and in school, and reinforced by experiences at the university level (Goode, 2010).

The use of information communication technologies to deliver educational material over any distances at any time is known as e-learning. E-learning is a digital approach to instruction employing information communication technologies (ICTs) to allow learning to occur with little location or scheduling restraint (Wu & Lin, 2012). Schools are using e-learning methods to increase access to educational opportunities. E-learning systems contain multiple parts to meet the instructional needs of individual students (van Seters, Ossevoort, Tramper, & Goedhart, 2012). This tool allows students

to participate in educational processes otherwise unavailable to them due to geography or time limitations. The use of e-learning technologies for distance education allows instructors and students to bridge geographic and time gaps (Boubsil, Carabajal, & Vidal, 2011).

Online Instruction

The development of online content is an extremely important part of the process of delivering online instruction. Driscoll (1998) suggested successful use of online instruction requires careful planning across any organization and designers must understand how learners, instructors, and materials interact and the relationships between these factors. Online courses offer instructors different options for delivering instruction. Rice (2006) found the traditional constraint of classroom space has little to no impact in an e-learning environment. Instruction should be learner-centered and responsive to learner's needs, along with well-organized planning that present clarity in course content for learners (Dooley, Lindner, & Dooley, 2005).

Instructional design for e-learning still depends on traditional instructional design practices. An instructor must still develop lessons and assessment tools as in the classroom (Sharpe, Benfield, & Francis, 2006). Bloom (1956) created Bloom's Taxonomy of Learning Domains to describe levels of learning from low order thinking skills to high order thinking skills in various domains of learning. The taxonomy has three domains, cognitive, affective, and psychomotor. For the purpose of delivering online content, the cognitive domain will be examined. This domain has six levels in order from lowest to highest order: knowledge, comprehension, application, analysis,

synthesis, and evaluation. Gagné (1965) contributed to the systematic approach of instructional design with his nine conditions of learning: gain attention; inform learners of objectives; stimulate recall of prior learning; present the content; provided learning guidance; elicit practice; provide feedback; assess performance; and enhancing retention and transfer. Rosenshine and Furst (1971) developed five factors that influence learning: clarity, task orientation, student opportunity, variety, and teacher enthusiasm.

Kirkpatrick (1994) developed a model for summative evaluation with four levels: reaction, learning, behavior, and results. The model allows for evaluation to occur at various levels of interaction and difficulty.

The evolution of e-learning has presented a change for educational roles in general. Different factors may influence students' acceptance of e-learning technologies but the technology must always have a positive impact for the learner (Šumak, Heričko, & Pušnik, 2011). Information technology's influence on education has led to new roles for learners and educators, creating a promising future in terms of educational practices (Trebbi, 2011). Effective utilization of e-learning provides a challenge for educators. E-learning presents a significant task for both students and educators, in terms of transitioning from a traditional classroom, as well as assessing efficiency and achievement (Lin, 2011). A pedagogical change is required for educators in e-learning environments as they must not merely adopt e-learning technology but incorporate an awareness of learners' skills and values (McLoughlin & Lee, 2010).

E-learning offers a way for agricultural educators to use technology to further disseminate information to students. Many agricultural education students view the

Internet as an everyday tool and rely on the Internet to complete assignments because it is easy for them to understand and access the Internet (Rhoades, Irani, Telg, & Myers, 2008). Agricultural educators also take advantage of the Internet to increase knowledge in non-student populations. Cooper-Jennett, Akers, Doerfert, and Chambers (2010) found users valued an online resource guide designed to increase agricultural understanding of cotton. Some students are already immersed in agricultural education classes in an e-learning environment. Strong, Irby, Wynn, and McClure (2012) found while agricultural education students appreciated the autonomy offered by online courses; they still sought a more personal education experience, via face-to-face settings.

Agricultural education departments are utilizing instructional technology and e-learning more frequently to engage today's agricultural education students. Online learning environments must be designed to promote active and interactive learning in order to be successful in meeting student needs (Shroeder-Moreno, 2010). The effective use of online tools can add to the agricultural education classroom. Leggette, Rutherford, Sudduth, and Murphrey (2012) indicated an online environment like Second Life can be used in many facets of agricultural education and the utilization of such technology could lead to valuable classroom experiences. The tools available in e-learning environments can help promote positive learning outcomes. Rhoades et al. (2009) found the use of multimedia materials in an online, virtual horticulture class led to increased course competencies while satisfying students in terms of course content and delivery.

Continuous examination of agricultural education classes in e-learning environments is needed to further improve and enhance the student experiences and

results in these situations. Peterson and Keeley (2012) found students enrolled in an online turfgrass did no worse than students in a traditional turfgrass class if provided with live samples. Agricultural educators are exploring the mixture of traditional and e-learning classes. Hoch and Dougher (2011) suggested students with previous online experience preferred a course with a mixture of online and traditional elements than a traditional face-to-face course. Traditional classroom techniques such as group work can be supported in an online course. Online group projects can be utilized for effective teaching and learning in an e-learning environment, with the proper instructor support and instructional strategies (Williams, Cameron, & Morgan, 2012).

Literature Review

Mobile learning is a natural progression of technology-based learning occurring at any time or location through the use of mobile technology accessing wireless or satellite networks (Cavus & Ibrahim, 2009; Laouris & Laouri, 2008; Marin & Mohan, 2009; Sha, Looi, Chen, & Zhang, 2012; Yau & Joy, 2011). As mobile technology becomes ever more ubiquitous, the technology is becoming a common medium for e-learning. Mobile learning is a growing trend for e-learning as it allows access to course materials adapted for the smaller screens of mobile devices at any place or time (Georgieva, Smirkarov, & Georgiev, 2011). The culmination of these two factors is creating a form of e-learning called mobile learning. The ubiquitous nature of mobile devices has given many educational researchers and practitioners the opportunity to use the technology in instructional environments (Park, 2011). Mobile technology is changing traditional educational practices, by freeing students from a dependence on

instructor access to educational information and allowing students to take learning technology outside the classroom (Ng & Nicholas, 2009). Students using mobile devices, such as a smartphone or tablet device, to engage in educational activities are engaging in mobile learning. Mobile learning, also referred to as m-Learning, is the use of mobile technologies such as smartphones, PDAs, and other handheld devices to accomplish educational tasks (Liaw, Hatala, & Huang, 2010).

Mobile learning needs its own designated research into usage and instructional practice as it becomes more prevalent as a learning mode. Frohberg, Göth, and Schwabe (2009) found despite increased attention from conferences and publications, mobile learning still lacks common understanding to the point there is still no consensus on what the term means. College and university campuses are already relying on e-learning to deliver instructional content but still trying to understand its place. Many higher education institutions are relatively new to the adoption of e-learning and m-learning technologies and face challenges in developing and integrating these technologies into existing campus information systems (Lu, 2012). Mobile learning offers benefits to higher education institutions despite its relative novelty as an educational medium. Mohammad, Mamat, and Isa (2012) suggested mobile learning is a credible and cost effective means for an educational institution to adapt to its benefit.

Mobile learning means new concepts for e-learning. Mobile devices demolish boundaries by becoming part of the learner, rendering the concept of learning here or there meaningless (Idrus & Ismail, 2010). Researchers need to create a framework for mobile learning. Most theories of learning are based on the idea of learning occurring in

a traditional classroom but mobile learning circumvents the idea of a traditional classroom meaning a new theory for mobile learning is needed (Nordin, Embi, & Yunus, 2010). Educators need to develop instructional models to inform and improve mobile learning for learners. More satisfying educational experiences need to be designed for mobile learning, especially as education becomes a lifelong learning process facilitated by mobile learning (Wang & Shen, 2012).

Mobile learning is beginning to compete directly with face-to-face learning and even traditional e-learning. Mobile learning is becoming increasingly distinct in relation to e-learning as it creates an environment where learning, interaction, and the recording of such actions can be done in dynamic fashion with no concern about location and time (Obisat & Hattab, 2009). The utilization of mobile learning is moving rapidly due to users' demand but also the technologies seemingly boundless potential. The use of mobile learning offers a rich learning design implementing collaborative opportunities without limit and can move students to engage in transactions with other students (Laurillard, 2009).

The line between mobile learning and traditional e-learning is blurring. Mobile learning offers incredible technical abilities for learners but the distinction between mobile learning and e-learning is unclear in research terms (Peng, Su, Chou, & Tsai, 2009). The demand for learner-centered opportunities to meet the needs of today's learners is fueling the growth of mobile learning. Matias and Wolf (2013) found the majority of Internet users will soon be getting online through the use of mobile devices, and instructors should recognize the chance to enhance student learning outcomes by

effectively using mobile technology in educational settings. Students can use mobile learning to engage in student-centered, authentic learning if given access and time to use mobile devices (Cochrane & Bateman, 2010).

Mobile learning can create a limitless learning stream to enable accessible educational opportunities throughout a learner's life. Mobile learning can support lifelong learning if proper instructional design principles are utilized to create applicable content for learners (Gu, Gu, & Laffey, 2011). Any emerging instructional technology offers both positive and negative possibilities for learners. Elias (2011) found mobile learning offers distinctive opportunities but faces challenges due to device variability and proper educational adaptation. The advantages of mobile learning are apparent but it needs thoughtful design to avoid the technology from inhibiting or distracting from learning (Koszalka & Ntloedibe-Kuswani, 2010).

Instruction within mobile learning environments needs to be evaluated in terms of traditional instructional design methods and the affordances offered by mobile technology. Careful observation, repeated testing, and systematic evaluation are necessary to ensure the appropriate use of the technology in a lifelong learning environment (Shen, Wang, Gao, Novak, & Tang, 2009). Mobile technology is often viewed as a tool for communication and entertainment, rather than one of learning. The growing acceptance of mobile technology tools will further distort the relationship between work and leisure in our society, increasing pressure when it comes to the use of the technology as a learning tool (Dale & Pymm, 2009). Educators and developers must recognize the unique characteristics of mobile learning. Chuang found (2009) mobile

learning should be a connective and lasting learner-centered experience, and instructors and technology developers must work to ensure mobile learning meets this goal.

Mobile learning is being utilized for instructional purposes but researchers are still grappling with its implications. Wang, Shen, Novak, and Pan (2009) suggested research should examine existing mobile learning programs to determine potential obstacles and capitalize on strengths in order to improve new mobile learning programs. Researchers need to expand the study of mobile learning acceptance in the classroom. Mobile learning has become more popular as the number of students with mobile devices has grown but little research has been conducted on how these students adopt mobile learning compared to e-learning (Park, Nam, & Cha, 2012). Many studies have examined mobile learning acceptance from the student perspective. Martín and Carro (2009) examined case studies that provided data on students' acceptance of mobile learning environments. Yadegaridehkordhi and Iahad (2012) indicated experienced e-learners are more likely to find mobile learning more helpful and easier to use than those without e-learning experience.

Mobile learning can be used to take advantage of the various e-learning environments available to students and instructors. The content from e-learning environments like Massive Open Online Course (MOOCs) is being leveraged by the use of mobile devices. Many participants in MOOCs are using mobile devices due to the technology's ability to access information independent from location (Rodriguez, 2012). Mobile learning is an important emerging technology for the further utilization of MOOCs (de Waard et al., 2011). Blended learning environments also can benefit from

the addition of mobile learning. Chu, Hwang, Tsai, and Tseng (2010) suggested mobile learning can further the idea of blended learning by mixing real and digital world experiences. Mobile learning furthers the idea of seamless learning. Wong and Looi (2011) recommended mobile learning as a means to create truly seamless learning, which allows students to bridge learning experiences across location and time. Mobile learning can also lead to an increase in individualized or personalized learning approaches. Su, Tseng, Lin, and Chen (2011) suggested mobile learning can be utilized to help meet individualized learning needs.

Post-secondary institutions may serve as key means to take advantage of the mobile learning platform. Mobile technology like smart phones are very popular on college campuses and while not widely utilized for educational outcomes yet, many predict the technology will soon become an essential learning tool (Shin, Shin, Choo, & Beom, 2011). College and university campuses have populations particularly open to the use of mobile learning. Cheon, Lee, Crooks, and Song (2012) suggested mobile learning adoption in a higher education setting could provide a challenge for institutions but higher education students' greater use of mobile technology compared to primary and secondary students may lead to faster adoption in this setting. The infrastructure required for successful mobile learning needs to be in place. McContha, Praul, and Lynch (2008) found the growth of wireless networks in cities and across college campuses has created the necessary backbone for mobile learning to be adopted by instructional personnel and organizations.

Scholarly literature on the needed knowledge and skills for instructors to successfully implement mobile learning in educational contexts is lacking. Keskin and Metcalf (2011) indicated the field of mobile learning will be easier for researchers and educators to comprehend if a framework encompassing definitions, approaches, and theories is established to inform mobile learning practices. Mobile learning provides a challenge for educators as the technology itself creates a focus on learning over teaching, meaning educators must understand students' needs in much better and expansive way (Kukulska-Hulme, 2010). Educators will benefit from research based-policy towards mobile learning and teaching (Mohamad, Maringe, & Woollard, 2012). Mobile learning needs an understanding of the principles shaping its effectiveness. Iqbal and Qureshi (2012) indicated mobile learning stakeholders, like educators and developers, need to understand and incorporate student acceptance factors into mobile learning design.

Instructors can become facilitators for mobile learning use and acceptance among students. Mobile learning has the ability to transform educator learning and offer new opportunities for observation, sharing, and teaching in the classroom (Aubusson, Schuck, & Burden, 2009). The use of mobile technologies can provide novel methods for educators to present information to students. Multiple forms of a graphical representation like graphs, tables, and numerical data, provided through mobile devices can allow students to integrate knowledge in a more potent manner (Rogers, Connelly, Hazlewood, & Tedesco, 2010). Mobile devices can be used to improve teacher performance. Kearney and Maher (2013) found teacher productivity and evidence of learning increased with the use of iPads.

Enhancing educator attitudes of mobile learning is paramount to its successful utilization in educational settings. Teacher perception of mobile learning must be determined in order to effectively implement in instructional environments (Uzunboylu & Ozdamli, 2011). The increasing presence of mobile devices in educational settings has created an important need to examine educators' attitudes and behaviors towards the use of mobile technology for learning purposes (Demirbilek, 2010). Educators must have outlets where they can further their knowledge of mobile learning. Mobile learning can enhance teaching, and professional learning communities would benefit from the understanding and use of mobile technologies within instructional environments (Schuck, Aubusson, Kearney, & Burden, 2012).

Agricultural education fields can benefit from the use of instructional technologies like mobile learning. Murphrey, Miller, and Roberts (2009) found agricultural science and technology educators had a positive interest in using forms of mobile technology, such as iPods and mp3 players, and this technology could provide novel ways to enhance student interest. Instructors in areas of agriculture education have knowledge of mobile technology but are still learning about its effectiveness in students' learning outcomes. Agricultural science and technology educators are comfortable with educational technology but are less likely to have the technology, like an iPod, in their possession compared to their students (Murphrey, Miller, & Roberts, 2009). Agricultural educators must continue to master emerging learning technologies to improve their programs. Kotrlik and Redmann (2009) recommended agriscience educators use peers as

a source for instructional technology knowledge and school cultures should be examined to determine the viability of using instructional technologies.

Mobile learning applications in agricultural education need continued research and development to fully take advantage of its technological potential. Yaghoubi, Khosravipour, and Foroosshani (2010) found agricultural experts and managers to have positive attitudes toward the implementation of mobile learning in agricultural education and related services. Extension offers opportunities for mobile learning to occur. Lessons learned from developing an extension oriented application can improve future mobile content development and offer information to share with extension groups across the nation (LaBelle, 2011). More research is needed to understand how mobile technology is used in global agricultural learning situations. Carter and Hightower (2009) suggested further study should be pursued on the utilization of mobile technology in other extension programs, as the use of the technology will continue to expand in extension programs around the world. The use of information communication technologies, such as mobile phones, in agricultural extension offer a unique opportunity for agriculture information to be dispersed through various channels to various segments of the population with reduced communication and information cost (Aker, 2011).

Research is needed to determine and clarify the competencies needed for the development of instructional strategies for the emerging technology of mobile learning. New technology is often different in user acceptance rates, as users approach new technology with varying degrees of enthusiasm, skills, and expectations (Stockwell, 2008). There is a lack of research addressing the competencies needed to develop

instructional strategies for new and emerging technologies like mobile learning. This study addressed recommendations from the National Research Agenda of AAAE (Doerfert, 2011) and the existing body of literature to determine the competencies needed for developing instructional strategies for new and emerging technologies. The study objectives related directly to research priority 2, “New Technologies, Practices, and Product Adoption Decisions” (Doerfert, p. 8, 2011). Mobile learning represents a new educational technology and its practices and adoption must be examined. Research priority 4 “Meaningful, Engaged Learning in All environments” (Doerfert, p. 9, 2011) was also addressed in this study. Mobile learning presents educators with a learning environment where student engagement must occur. The advent of mobile learning offers new opportunities for agricultural education departments and it is important to determine the competencies needed to develop instruction for these learning tools.

CHAPTER II

CONCEPTUAL FRAMEWORK

The conceptual framework for this study will encompass the theory of reasoned action, technology acceptance, unified theory of acceptance and use of technology, uses and gratifications theory, self-efficacy, and self-directed learning (see Figure 1).

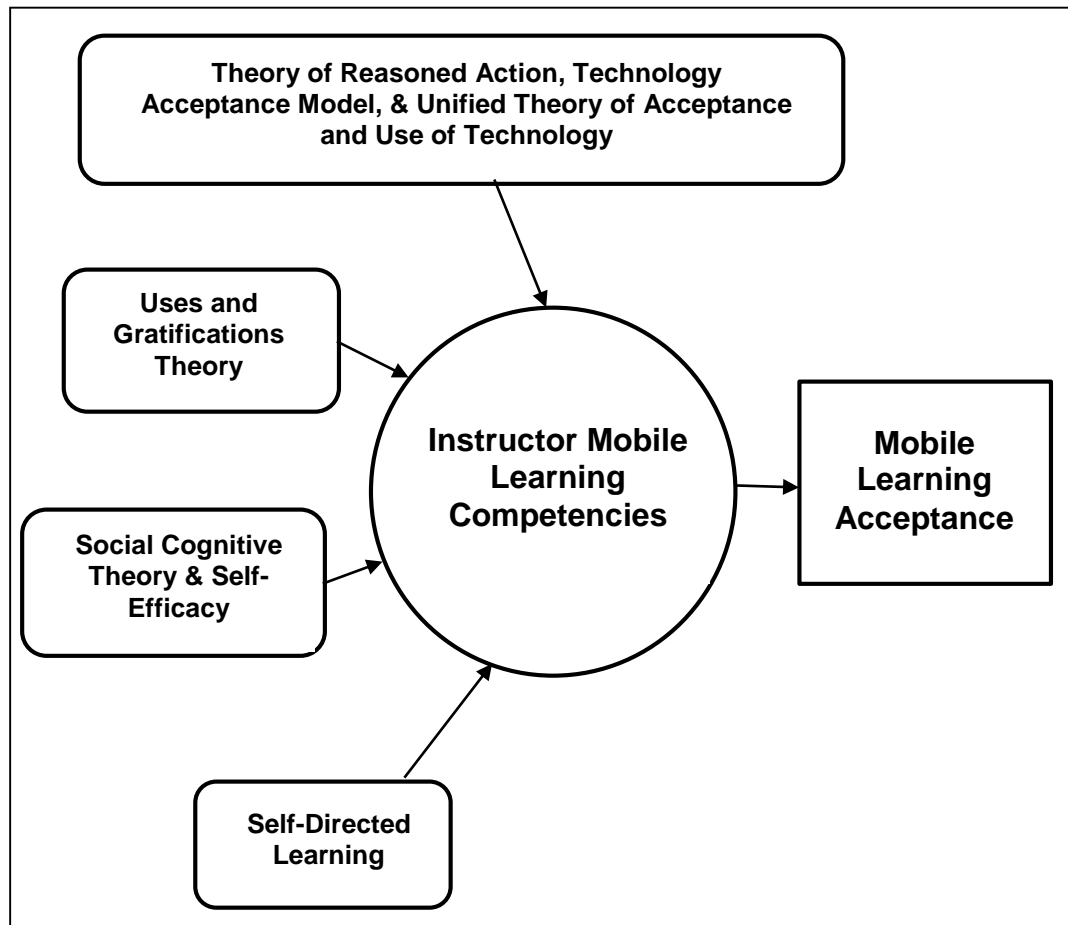


Figure 1. Framework of Instructor Mobile Learning Competencies.

Ajzen and Fishbein (1980) created the Theory of Reasoned Action (TRA) as a model to predict behavioral intention, covering predictions of attitudes and behavior. Individual behavior is determined by behavioral intentions where the intentions are a function of an individual's attitude toward the behavior and the subjective norms surrounding the behavioral act. The main constructs for the theory are the attitude toward behavior and subjective norm. Ajzen and Fishbein (1980) suggested the attitude toward the behavior is the individual's feelings about performing a behavior, while the subjective norm is the individual's perception of other individuals' importance of feelings towards a behavior. TRA has provided a foundation for models looking at technology adoption and usage. Liang and Yeh (2011) used TRA as part of a model to investigate gaming usage through mobile technologies.

Davis (1989) built upon TRA and created the Technology Acceptance Model (TAM) as an information systems model indicating how users accept and use technology. Two important components of the model are perceived usefulness (PU) and perceived ease of use (PEU). Perceived usefulness is how a person believes a particular technology system would increase his or her job performance. Perceived ease of use is how a person thinks about the amount of effort required to use a particular technology system. Davis (1989) found these two constructs help determine a user's intent to use technology.

TAM has been used to examine the technology usage in educational settings. Teo, Lee, Chai, and Wong (2009) indicated the PU and PEU constructs of TAM were key determinants of behavioral intention in terms of computer use among the group. The use of TAM is not just applicable to a single technology like computers but to a

technological system like e-learning covering multiple technologies. Yuen and Ma (2008) found TAM can be used to examine teacher acceptance of e-learning technology. TAM has been utilized to examine mobile systems usage. Gao, Krogstie, and Siau (2011) created an instrument to measure mobile services adoption using an extended version of TAM. Chen, Chiu, Huang, and Chang (2011) framed a study on learner attitudes in a mobile learning environment with TAM.

Venkatesh, Morris, Davis, and Davis (2003) expanded on Davis's technology acceptance model and created the Unified Theory of Acceptance and Use of Technology (UTAUT). The theory was not only built upon TAM but other theories and models including TRA, Azjen's (1991) Theory of Planned Behavior (TPB), Bandura's (1986) Social Cognitive Theory (SCT), and Rogers's (2003) Innovation Diffusion Theory (IDT). Other studies have utilized UTAUT to examine mobile technology acceptance and usage. Zhou (2013) examined UTAUT in relation to users' continuance with mobile providers. Zhou (2011) framed a study on Internet usage through mobile devices using UTAUT. Lowenthal's (2010) study used a version of Venkatesh et al.'s (2003) UTAUT to examine mobile learning behavioral intention.

UTAUT explains user intentions to use an information system and the subsequent usage behavior through four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). Performance expectancy is the extent to which the user believes using an information system will help him or her attain gains in job performance and effort expectancy is the measure of ease associated with the use of an information system. Social influence is the

extent to which the user perceives the importance of using the system from others and facilitating conditions are the extent to which the user believes the necessary infrastructure is in place to use an information system. Venkatesh et al. (2003) found UTAUT can explain as much as 70% of the variance in user intention towards an information system.

Blumler and Katz (1974) created the Uses and Gratifications Theory (UGT) to describe how users choose media to fulfill their needs. Users do not have one way to choose media and there are many different users, as well as media choices. Blumler and Katz (1974) found the influence media has on a user is determined by the user and the form of media is purposefully picked to meet user goals. UGT has been used to explore technology usage. Luo, Chea, and Chen (2011) compared UGT and TAM in looking at how users adopted online information services. UGT is being utilized to examine mobile devices usage among certain demographic groups. Kim and Hahn (2012) framed a study using UGT and TAM to research college students' attitudes towards mobile devices for communication and commerce.

Social cognitive theory facilitates understanding, predicting, and changing human behavior. The theory postulates human behavior as an interaction of personal traits, attitudes, practices, and the environment (Bandura, 1986). Self-efficacy is a major component of how an individual handles various endeavors. Bandura (1977) defined self-efficacy as one's belief in one's capability to succeed in different situations. Self-efficacy has been a part of studies researching the usage of mobile technologies. Yang (2010) examined mobile data service usage by American and Korean services with a

model based on self-efficacy and TAM. Islam, Khan, Ramayah, and Hossain (2011) found self-efficacy was a moderator on the adoption of mobile commerce services. Yang (2012) used self-efficacy to frame a study about students' attitudes toward mobile learning.

Self-directed learning (SDL) is an educational strategy focusing on individual growth and responsibility in the process of learning. Knowles (1975) found SDL to be a learning mode where learners take individual responsibility in pursuit of their educational needs and objectives. Candy (1991) found SDL techniques and environments furthered a stronger understanding of educational content when compared to rote memorization methods. Candy (2004) suggested SDL could be appropriate and fit well with online environments, and also a means for learners to successfully keep up with rapid technological changes around the world.

Researchers have examined SDL and technological learning contexts and environments. Teo et al. (2010) used Candy's SDL concepts to develop a SDL and Technology Scale (SDLTS) for young students in order to measure their self-direction with technology. Li, Pow, Wong, and Fung (2010) used SDL as part of a framework to study student learning through the use of tablet PCs. Väljataga and Fiedler (2009) utilized to SDL to frame a course covering different learning methods through the use of social media.

Grow (1991) created the Staged Self-Directed Learning (SSDL) model to explain how learners go through stages of self-direction and the stages of teaching for educators. The model has four stages for both learners and educators with stage one learners being

the most dependent and stage four learners being the most self-directed, while stage one educators are more authoritarian and stage four educators act more as delegators. Grow (1991) found stage one learners are considered dependent, stage two learners are considered interested, stage three learners are considered involved, and stage four learners are considered self-directed .

Grow (1991) developed traits for each stage of learning and teaching. Stage one learners are dependent and need a teacher to act as a teacher or coach using drilling techniques and immediate feedback. Stage two learners are interested in the learning process and need a motivator or guide to help set goals and guide discussions. Stage three learners are involved and need facilitation with discussions and group projects. Stage four learners are considered self-directed and need the teacher to act as a consultant or delegator with self-directed work occurring. The key is to have a learner at particular stage matched with the correct stage of teacher, so further self-directed learning can occur. (Grow, 1991).

Theories including TRA, TAM, UTAUT, UGT, self-efficacy, and self-directed learning were utilized to establish the theoretical framework of this Delphi study. These theories formed the foundation upon which the competencies were derived from the Delphi panel. Competencies to develop instructional strategies for new and emerging technologies such as mobile learning draw upon the ideas presented in these theories.

The theories have been used to explore the ideas of the relationship between the use and acceptance of technology systems and ideas like self-efficacy and self-directedness. Many studies have been used these theories to explore instructional

technology. The theories are also suitable to frame this Delphi study to determine the competencies instructors need to develop instructional strategies for mobile learning. Knowledge in the area of the competencies needed to design instruction for mobile learning was enhanced through the review of suggested competencies in the context of the theoretical framework.

CHAPTER III

METHODS

The purpose of the study was to determine the Instructor competencies needed for the development of instructional strategies for new and emerging technologies such as mobile learning. The objective of the study was to utilize expert knowledge to increase understanding and further develop a framework for the development of instructional strategies for new and emerging technologies.

The Delphi Method

A Delphi study examining the competencies needed for Instructors to develop instructional strategies for new and emerging technologies such as mobile learning was conducted. The Delphi method is a research tool utilizing a panel of experts to generate decisions on a particular topic of interest. Turoff and Linstone (1975) found the Delphi method to be a cost effective tool in terms of policy analysis and offers structured decisions of higher accuracy than unstructured decision-making processes.

The Delphi method typically consists of two or more rounds where the expert panels answer questionnaires each round. Delphi procedures mainly utilize three features; anonymity, controlled feedback, and statistical group response (Dalkey, 1969). The researchers act as facilitators providing a summary of the experts' answers from the previous round of questionnaires. The process is designed to encourage the experts to revise and reduce the range of the previous answers. The Delphi process is complete after a previously determined number of rounds and the results are determined

from agreement among panel members in the final rounds. The main goal of the Delphi method is to create an expert consensus on the answers (Turoff & Linstone, 1975).

The Delphi sample consists of creating a panel of expert knowledge from noted thinkers in a specific knowledge domain. The selection of subjects in a Delphi method is dependent on the areas of knowledge required by the issue of study (Hsu & Sandford, 2007). The Delphi method is usually qualitative in nature. Okoli and Pawloski (2004) indicated the sample for a Delphi study is not dependent on statistical means to arrive at conclusions but uses group dynamics to create an expert consensus. Dalkey, Rourke, Lewis, and Snyder (1972) found a panel of 13 engaged knowledge experts would have a reliability coefficient of .90. A Delphi study's validity is determined by the expertise of the Delphi panel rather than the number of participants (Ludwig & Starr, 2005).

The use of the Delphi method in social sciences is beneficial due to ever mutable nature of the research environment. The Delphi Method is a valid social science research method in the context of a setting where change is constant and the future depends more on the knowledge of the present than past (Landeta, 2006). Social science research often covers areas with a multitude of views and variables. The Delphi method offers researchers the ability to study a topic with many viewpoints and cultural variables (Grisham, 2009).

The Delphi method provides agricultural education researchers with the means to employ expert knowledge in the field to further develop awareness and understanding of important issues in agricultural education. Buriak and Shinn (1989) found the Delphi method provided agricultural education research experts' perspectives on issues such as

missions goals, research initiatives, and obstacles. Shinn, Briers, and Baker (2008) used the Delphi method to produce a definition for agricultural education in 2010 based on the input of engaged scholars in the United States. A Delphi panel of international scholars with expertise in international agricultural and extension education reached a consensus on 126 knowledge objects and 12 knowledge domains critical for agricultural and extension education doctoral-level professionals (Shinn, Wingenbach, Briers, Lindner, & Baker, 2009). An expert panel identified nineteen core competencies for extension education curriculum through a Delphi study (Harder, Place, & Scheer, 2010).

Dalkey (1969) recommended Delphi procedures have three attributes, anonymous response, iteration and controlled feedback, and statistical group response. A formal survey tool is used to gather panel member opinions through anonymous response. Iteration and feedback has the interaction of panel ideas coordinated through multiple iterations of organized actions, while feedback is conducted between rounds. The panel opinion is developed through consensus in the final round and is handled through statistical group response (Dalkey, 1969).

The Delphi Panel

The population was composed of agricultural education faculty across the U.S. The sample ($n = 30$) was derived from a content analysis of articles from a ten-year period of the Journal for Agricultural Education. Content analysis is the examination of the content of documents for recurring patterns (Merriam, 2009). The ten-year period examined was from 2004-2013. Faculty with expert knowledge in the area of developing instruction for new and emerging technologies were targeted and identified through

published works dealing with this area. Faculty were contacted about participating in the study once identified.

The faculty were initially recruited through a phone call. Some faculty preferred contact through email and that method was used in those cases. The faculty members gleaned from the content analysis were told of the study and its importance to the field. They were informed of why they were chosen and their importance to the study. The faculty were also told of the subject the panel would be examining and approximate time frames for the start of round one and the following rounds.

A total of 30 expert panelists from 20 states covering every time zone of the continental U.S. agreed to participate. The panel members were all faculty with research and teaching experience in the areas of agricultural education, instructional technologies, and distance education. The panel was composed of $n = 13$ females and $n = 17$ males. The expert panel consisted of $n = 9$ Professors, $n = 11$ Associate Professors, and $n = 10$ Assistant Professors.

A modified version of the Delphi methods utilized by Shinn, Wingenbach, Lindner, Briers, and Baker (2009) to create a new definition for agricultural and extension education and Harder et al. (2010) to determine competencies needed by entry-level extension professionals were used to conduct the study. The panel was provided a definition of mobile learning derived from the literature review instead of the panel developing a definition of mobile learning in round one in order to appropriately direct the study.

Delphi Rounds

Three rounds were used to determine competencies needed until a consensus was reached. The first round provided each faculty member a definition of mobile learning derived from the literature review. The participants were asked to identify six competencies needed to develop instructional strategies for mobile learning. The number of six competencies was chosen due to the desire to have faculty generate numerous knowledge objects based on the given definition.

Survey research was used to explore the competencies developed in round two. The Delphi panel consensus was set a priori and defined when two-thirds of panel members rated a statement as a 5 (“*agree*”) or a 6 (“*strongly agree*”) on a six-point scale. The instrument will measure competencies ratings on a six-point summated scale: 1 = *strongly disagree*, 2 = *disagree*, 3 = *somewhat disagree*, 4 = *somewhat agree*, 5 = *agree*, and 6 = *strongly agree*. The round two instrument was assessed for internal consistency and a reliability coefficient of $\alpha = .96$. The validity of the instrument was determined by the pooled expertise of the panel participating in its creation.

The third round sought confirmation of the competencies from round two. The rounds continued until a consensus was reached regarding the competencies. Consensus was reached when two-thirds of the panel rated a statement as a 5 (“*agree*”) or a 6 (“*strongly agree*”) on a six-point scale. The round three instrument was assessed for internal consistency and a reliability coefficient of $\alpha = .94$ was revealed. The validity of the instrument was determined by the pooled expertise of the panel participating in its creation.

Qualtrics™ was used to create and distribute the web-based questionnaires for each round. The Tailored Design Method for creating and disseminating an electronic survey was utilized by the researchers (Dillman, Smyth, & Christian, 2009). For each round, the participants were sent a link to the survey for that round and two reminders three days apart. Round one had a 93% response rate, while rounds two and three had a 100% response rate.

CHAPTER IV

FINDINGS

Three rounds were conducted with the Delphi method to determine the competencies needed for competencies needed for faculty to develop instructional strategies for mobile learning. The findings have been presented for each round. A total of 30 expert panelists from 20 states covering every time zone of the continental U.S. agreed to participate. Panel participation for each round is reported in Table 1. Only 28 panel members participated in round one compared to participation from all 30 panel members in rounds two and three. (see Table 1).

Table 1
Participation of the Delphi Panel by Round

Round	Number in Panel	Number Participating in Round
1	30	28
2	30	30
3	30	30

Round One

The first round sought to identify the needed competencies by presenting panelists with a definition of mobile learning and then asking the panelist to generate six competencies needed for faculty to develop instructional strategies for mobile learning. The responses from twenty-eight panelists were used to create 108 original statements on the needed competencies in round one (see Table 2). Round one began on August 26th and had seven responses. August 27th had three responses. Ten responses occurred on August 29th and two responses occurred on August 30th. September 1st and 2nd had

only one response on each of those days. September 3rd was the final day of the first round and generated 4 responses.

Table 2

Round 1 Knowledge Objects Generated by Delphi Panel

1. Instructors need instructional design skills.
2. Instructors need HTML skills.
3. Instructors need to understand motivation theory.
4. Instructors need to understand student demographics.
5. Instructors need to understand color psychology.
6. Instructors need a sense of humor.
7. Instructors need expert content knowledge.
8. Instructors need to access web-based content.
9. Instructors need to understand technology.
10. Instructors need to understand andragogy.
11. Instructors need to understand pedagogy.
12. Instructors need to understand how instructional technology is delivered.
13. Instructors need to know student learning styles.
14. Instructors need to know teaching styles.
15. Instructors need to understand student engagement.
16. Instructors need effective written communication skills.
17. Instructors need effective oral communication skills.
18. Instructors need effective visual communication skills.
19. Instructors need to create user-friendly interfaces.
20. Instructors need to have current knowledge of technology tools.
21. Instructors need to facilitate learning.
22. Instructors need to be able to manage a course.
23. Instructors need to encourage student interaction.
24. Instructors need to develop accessible technologies.
25. Instructors need to develop interactive teaching components.
26. Instructors need to assess learning outcomes.
27. Instructors need to motivate students.
28. Instructors need to code or develop programs.
29. Instructors need program evaluation skills.
30. Instructors need usability assessment skills.
31. Instructors need to use active learning.
32. Instructors need to use social media for learning.
33. Instructors need to use blogging for learning.
34. Instructors need to use wikis for learning.

Table 2 (continued)

35. Instructors need to understand distance education.
36. Instructors need to use presentation tools.
37. Instructors need an understanding of Prezi.
38. Instructors need to use wireless technology across platforms.
39. Instructors need to create synchronous learning experiences.
41. Instructors need to use effective communication strategies for distance learners.
42. Instructors need to be organized.
43. Instructors need to be clear.
44. Instructors need to integrate technologies.
45. Instructors need to be personal.
46. Instructors need to have a constant presence.
47. Instructors need to develop leadership skills.
48. Instructors need to manage interdisciplinary teams.
49. Instructors need to be able to translate language.
50. Instructors need to develop effective delivery methods for illiterate populations.
51. Instructors need to create mobile learning environments.
52. Instructors need to use mobile technology.
53. Instructors need to adapt face-to-face instruction for online delivery.
54. Instructors need to use learner-centered teaching strategies.
55. Instructors need to use basic software and hardware.
56. Instructors need to communicate online.
57. Instructors need to remember mobile learning is still learning.
58. Instructors need several years of teaching experience.
59. Instructors need to be able to utilize apps for learning.
60. Instructors need efficacy in using computers.
61. Instructors need efficacy in using mobile devices.
62. Instructors need efficacy in using software.
63. Instructors need to design new technology applications.
64. Instructors need to promote collaborative learning.
65. Instructors need to manage instruction across time zones.
66. Instructors need to use inquiry-based learning.
67. Instructors need to troubleshoot internet problems.
68. Instructors need to be able to use video.
69. Instructors need to be able to use photography.
70. Instructors need to use digital communication tools.
71. Instructors need to be flexible.
72. Instructors need to develop curriculum.
73. Instructors need to understand learning theory.

Table 2 (continued)

74. Instructors need to teach adults regardless of instructional delivery medium.
75. Instructors need to teach younger students regardless of instructional delivery medium.
76. Instructors need to troubleshoot mobile technology issues.
77. Instructors need to ensure academic integrity.
78. Instructors need to be able to sustain a learning community.
79. Instructors need to use mobile technology to meet course objectives.
80. Instructors need to problem solve technology issues.
81. Instructors need to understand security issues.
82. Instructors need to identify mobile devices that will support learning.
83. Instructors need knowledge of communication theories.
84. Instructors need to decide between synchronous and asynchronous delivery.
85. Instructors need to be creative.
86. Instructors need to be patient.
87. Instructors need to blend mobile learning with face-to-face learning.
88. Instructors need to understand the strengths and weaknesses of mobile learning.
89. Instructors need to understand social systems.
90. Instructors need to understand structural systems.
91. Instructors need to be able to define mobile learning.
92. Instructors need to adapt available mobile technology for learning.
93. Instructors need self-directedness.
94. Instructors need non-linear thinking.
95. Instructors need to understand risk.
96. Instructors need to understand university specific content management systems.
97. Instructors need to organize content.
98. Instructors need to capture lectures.
99. Instructors need to establish evaluation systems.
100. Instructors need critical thinking skills.
101. Instructors need identify when to use technology.
102. Instructors need to identify how to use technology.
103. Instructors need to establish purpose of identified technology.
104. Instructors need to identify learning content.
105. Instructors need to identify an online site.
106. Instructors need to understand usability standards.
107. Instructors need to understand the difference between full and part-time students.
108. Instructors need to understand ADA policies.

Round Two

Round two had the panelists rate their agreement with the 108 statements on a six-point summated scale: 1 = *strongly disagree*, 2 = *disagree*, 3 = *somewhat disagree*, 4 = *somewhat agree*, 5 = *agree*, and 6 = *strongly agree* (see Table 3). Round two began on September 4th and had thirteen responses. Three responses were generated on September 6th. One response occurred on September 7th. September 9th had six responses. September 10th generated one response. September 11th had four responses, while Sept 12th and 14th each had one response.

“Instructors need to be organized” ($M = 5.70, SD = .53$), “Instructors need effective written communication skills” ($M = 5.63, SD = .49$), “Instructors need effective visual communication skills” ($M = 5.63, SD = .49$), and “Instructors need to assess learning outcomes” ($M = 5.57, SD = .63$) were the highest scoring statements. The lowest scoring items were “Instructors need to code or develop programs” ($M = 2.33, SD = 1.09$) and “Instructors need to be able translate language” ($M = 2.47, SD = 1.07$).

Table 3
Descriptive Statistics for Round 2 Competency Statements (N = 30)

Statements	<i>N</i>	<i>M</i>	<i>SD</i>
Instructors need to be organized.	30	5.70	0.53
Instructors need effective written communication skills.	30	5.63	0.49
Instructors need effective visual communication skills.	30	5.63	0.49
Instructors need to assess learning outcomes.	30	5.57	0.63
Instructors need to be able to manage a course.	30	5.53	0.73
Instructors need to be clear.	30	5.53	0.57
Instructors need to organize content.	30	5.53	0.57
Instructors need to use effective communication strategies for distance learners.	30	5.50	0.68

Table 3 (continued)

Statements	<i>N</i>	<i>M</i>	<i>SD</i>
Instructors need instructional design skills.	30	5.47	0.63
Instructors need expert content knowledge.	30	5.47	0.68
Instructors need to understand student engagement.	30	5.47	0.68
Instructors need critical thinking skills.	30	5.47	0.78
Instructors need identify when to use technology.	30	5.47	0.57
Instructors need to use learner-centered teaching strategies.	30	5.43	0.82
Instructors need to facilitate learning.	30	5.40	0.97
Instructors need to understand learning theory.	30	5.40	0.62
Instructors need to ensure academic integrity.	30	5.40	0.77
Instructors need to identify how to use technology.	30	5.40	0.62
Instructors need to identify learning content.	30	5.37	1.00
Instructors need effective oral communication skills.	30	5.33	0.76
Instructors need to be patient.	30	5.30	0.79
Instructors need to create user-friendly interfaces.	30	5.27	0.91
Instructors need to communicate online.	30	5.27	0.58
Instructors need to access web-based content.	30	5.23	0.77
Instructors need to encourage student interaction.	30	5.23	1.04
Instructors need to be creative.	30	5.23	0.86
Instructors need to understand technology.	30	5.20	0.81
Instructors need to establish purpose of identified technology.	30	5.20	0.81
Instructors need to understand pedagogy.	30	5.17	0.65
Instructors need efficacy in using computers.	30	5.13	0.90
Instructors need to have current knowledge of technology tools.	30	5.10	0.96
Instructors need to develop interactive teaching components.	29	5.10	0.86
Instructors need to motivate students.	30	5.10	0.76
Instructors need to use active learning.	30	5.10	0.71
Instructors need to be flexible.	30	5.10	0.96
Instructors need self-directedness.	30	5.07	0.78
Instructors need to understand how instructional technology is delivered.	30	5.03	0.85
Instructors need to understand distance education.	30	5.03	0.93
Instructors need to understand andragogy.	30	5.00	0.98
Instructors need to be able to sustain a learning community.	30	5.00	1.02

Table 3 (continued)

Statements	<i>N</i>	<i>M</i>	<i>SD</i>
Instructors need to understand university specific content management systems.	30	5.00	1.14
Instructors need to develop curriculum.	30	4.97	1.03
Instructors need to remember mobile learning is still learning.	29	4.93	1.13
Instructors need to promote collaborative learning.	30	4.93	1.05
Instructors need to establish evaluation systems.	30	4.93	0.94
Instructors need to understand ADA policies.	30	4.93	0.98
Instructors need to be personal.	30	4.90	0.80
Instructors need to use basic software and hardware.	30	4.90	0.80
Instructors need to understand the strengths and weaknesses of mobile learning.	30	4.87	1.01
Instructors need to integrate technologies.	30	4.83	0.95
Instructors need to use inquiry-based learning.	30	4.80	0.89
Instructors need to understand student demographics.	30	4.77	0.67
Instructors need to understand motivation theory.	30	4.73	0.78
Instructors need to use digital communication tools.	30	4.73	1.20
Instructors need to know teaching styles.	30	4.63	1.07
Instructors need to use presentation tools.	30	4.63	1.16
Instructors need knowledge of communication theories.	28	4.61	0.99
Instructors need efficacy in using software.	30	4.60	1.07
Instructors need to teach adults regardless of instructional delivery medium.	30	4.60	0.97
Instructors need to develop reusable learning objects for asynchronous delivery.	30	4.53	1.01
Instructors need to manage instruction across time zones.	30	4.48	1.18
Instructors need to know student learning styles.	30	4.47	0.97
Instructors need to be able to use video.	30	4.43	0.97
Instructors need a sense of humor.	30	4.40	1.30
Instructors need to have a constant presence.	30	4.40	1.13
Instructors need to teach younger students regardless of instructional delivery medium.	30	4.40	1.00
Instructors need to understand usability standards.	30	4.37	1.13
Instructors need efficacy in using mobile devices.	30	4.33	0.92

Table 3 (continued)

Statements	<i>N</i>	<i>M</i>	<i>SD</i>
Instructors need non-linear thinking.	30	4.33	1.30
Instructors need to develop accessible technologies.	30	4.30	1.47
Instructors need to use mobile technology.	30	4.28	1.19
Instructors need to understand security issues.	30	4.27	1.44
Instructors need to capture lectures.	30	4.27	1.20
Instructors need to adapt available mobile technology for learning.	30	4.23	1.07
Instructors need program evaluation skills.	30	4.20	0.85
Instructors need to be able to use photography.	30	4.17	1.15
Instructors need to understand social systems.	30	4.14	1.25
Instructors need to develop leadership skills.	30	4.07	1.14
Instructors need to adapt face-to-face instruction for online delivery.	30	4.07	1.53
Instructors need to be able to define mobile learning.	30	4.07	1.26
Instructors need to identify mobile devices that will support learning.	30	4.03	1.27
Instructors need to identify an online site.	30	4.03	1.33
Instructors need to use wireless technology across platforms.	30	4.00	1.11
Instructors need to use mobile technology to meet course objectives.	30	4.00	1.39
Instructors need to decide between synchronous and asynchronous delivery.	30	4.00	1.46
Instructors need usability assessment skills.	30	3.97	1.07
Instructors need to use social media for learning.	30	3.93	1.17
Instructors need to manage interdisciplinary teams.	30	3.90	1.18
Instructors need to be able to utilize apps for learning.	30	3.90	1.09
Instructors need to create mobile learning environments.	30	3.87	1.25
Instructors need to understand risk.	30	3.83	1.53
Instructors need to create synchronous learning experiences.	30	3.80	1.40
Instructors need to understand the difference between full and part-time students.	30	3.80	1.47
Instructors need to understand structural systems.	30	3.70	1.34

Table 3 (continued)

Statements	<i>N</i>	<i>M</i>	<i>SD</i>
Instructors need to problem solve technology issues.	29	3.62	1.29
Instructors need to blend mobile learning with face-to-face learning.	30	3.57	1.57
Instructors need to troubleshoot internet problems.	30	3.50	1.33
Instructors need to use blogging for learning.	30	3.47	1.07
Instructors need to troubleshoot mobile technology issues.	30	3.43	1.00
Instructors need to understand color psychology.	30	3.33	1.15
Instructors need several years of teaching experience.	30	3.33	1.47
Instructors need to use wikis for learning.	30	3.27	0.98
Instructors need an understanding of Prezi.	30	3.13	1.14
Instructors need HTML skills.	30	3.00	1.08
Instructors need to design new technology applications.	30	2.83	1.34
Instructors need to develop effective delivery methods for illiterate populations.	30	2.60	1.04
Instructors need to be able to translate language.	30	2.47	1.07
Instructors need to code or develop programs.	30	2.33	1.09

Note. Overall $M = 4.56$, $SD = 1.01$. Scale: 6 = *strongly agree*, 5 = *agree*, 4 = *somewhat agree*, 3 = *somewhat disagree*, 2 = *disagree*, 1 = *strongly disagree*.

The panelists reach consensus on 48 statements with at least two-thirds of panel members rating these statements as a 5 (“*agree*”) or a 6 (“*strongly agree*”). The competencies that two-thirds of the panel agreed or strongly agreed on were kept for round three (see Table 4).

Table 4

Round 2 Retained Competencies Needed for Instructors to Develop Instructional Strategies for Mobile Learning Based on Delphi Panel Consensus

1. Instructors need instructional design skills.
2. Instructors need to understand student demographics.
3. Instructors need expert content knowledge.
4. Instructors need to access web-based content.
5. Instructors need to understand technology.
6. Instructors need to understand andragogy.
7. Instructors need to understand pedagogy.
8. Instructors need to understand how instructional technology is delivered.
9. Instructors need to understand student engagement.
10. Instructors need effective written communication skills.
11. Instructors need effective oral communication skills.
12. Instructors need effective visual communication skills.
13. Instructors need to create user-friendly interfaces.
14. Instructors need to have current knowledge of technology tools.
15. Instructors need to facilitate learning.
16. Instructors need to be able to manage a course.
17. Instructors need to encourage student interaction.
18. Instructors need to develop interactive teaching components.
19. Instructors need to assess learning outcomes.
20. Instructors need to motivate students.
21. Instructors need to use active learning.
22. Instructors need to understand distance education.
23. Instructors need to use effective communication strategies for distance learners.
24. Instructors need to be organized.
25. Instructors need to be clear.
26. Instructors need to integrate technologies.
27. Instructors need to use learner-centered teaching strategies.
28. Instructors need to use basic software and hardware.
29. Instructors need to communicate online.
30. Instructors need efficacy in using computers.
31. Instructors need to promote collaborative learning.
32. Instructors need to be flexible.
33. Instructors need to develop curriculum.
34. Instructors need to understand learning theory.
35. Instructors need to ensure academic integrity.
36. Instructors need to be able to sustain a learning community.
37. Instructors need to be creative.

Table 4 (continued)

38. Instructors need to be patient.
39. Instructors need self-directedness.
40. Instructors need to understand university specific content management systems.
41. Instructors need to organize content.
42. Instructors need to establish evaluation systems.
43. Instructors need critical thinking skills.
44. Instructors need identify when to use technology.
45. Instructors need to identify how to use technology.
46. Instructors need to establish purpose of identified technology.
47. Instructors need to identify learning content.
48. Instructors need to understand ADA policies.

The panelists failed to reach consensus on 60 statements. These competences were discarded at the end of Round two (See Table 5).

Table 5

Round 2 Discarded Competencies for Instructors to Develop Instructional Strategies for Mobile Learning

1. Instructors need HTML skills.
2. Instructors need to understand motivation theory.
3. Instructors need to understand color psychology.
4. Instructors need a sense of humor.
5. Instructors need to know student learning styles.
6. Instructors need to know teaching styles.
7. Instructors need to develop accessible technologies.
8. Instructors need to code or develop programs.
9. Instructors need program evaluation skills.
10. Instructors need usability assessment skills.
11. Instructors need to use social media for learning.
12. Instructors need to use blogging for learning.
13. Instructors need to use wikis for learning.
14. Instructors need to use presentation tools.
15. Instructors need an understanding of Prezi.
16. Instructors need to use wireless technology across platforms.
17. Instructors need to create synchronous learning experiences.

Table 5 (continued)

18. Instructors need to develop reusable learning objects for asynchronous delivery.
19. Instructors need to be personal.
20. Instructors need to have a constant presence.
21. Instructors need to develop leadership skills.
22. Instructors need to manage interdisciplinary teams.
23. Instructors need to be able to translate language.
24. Instructors need to develop effective delivery methods for illiterate populations.
25. Instructors need to create mobile learning environments.
26. Instructors need to use mobile technology.
27. Instructors need to adapt face-to-face instruction for online delivery.
28. Instructors need to remember mobile learning is still learning.
29. Instructors need several years of teaching experience.
30. Instructors need to be able to utilize apps for learning.
31. Instructors need efficacy in using mobile devices.
32. Instructors need efficacy in using software.
33. Instructors need to design new technology applications.
34. Instructors need to manage instruction across time zones.
35. Instructors need to use inquiry-based learning.
36. Instructors need to troubleshoot internet problems.
37. Instructors need to be able to use video.
38. Instructors need to be able to use photography.
39. Instructors need to use digital communication tools.
40. Instructors need to teach adults regardless of instructional delivery medium.
41. Instructors need to teach younger students regardless of instructional delivery medium.
42. Instructors need to troubleshoot mobile technology issues.
43. Instructors need to use mobile technology to meet course objectives.
44. Instructors need to problem solve technology issues.
45. Instructors need to understand security issues.
46. Instructors need to identify mobile devices that will support learning.
47. Instructors need knowledge of communication theories.
48. Instructors need to decide between synchronous and asynchronous delivery.
49. Instructors need to blend mobile learning with face-to-face learning.
50. Instructors need to understand the strengths and weaknesses of mobile learning.
51. Instructors need to understand social systems.
52. Instructors need to understand structural systems.
53. Instructors need to be able to define mobile learning.

Table 5 (continued)

- 54. Instructors need to adapt available mobile technology for learning.
- 55. Instructors need non-linear thinking.
- 56. Instructors need to understand risk.
- 57. Instructors need to capture lectures.
- 58. Instructors need to identify an online site.
- 59. Instructors need to understand usability standards.
- 60. Instructors need to understand the difference between full and part-time students.

Round Three

Round three had the panelists confirm their agreement on the 48 consensus competency statements (see Table 6). The highest scoring items were “Instructors need to facilitate learning” ($M = 5.80, SD = .41$), Instructors need to be able to manage a course” ($M = 5.67, SD = .55$), “Instructors need to be clear” ($M = 5.67, SD = 0.55$), “Instructors need expert content knowledge” ($M = 5.63, SD = 0.61$), and “Instructors need to assess learning outcomes” ($M = 5.60, SD = 0.56$). The lowest scoring items were “Instructors need to use basic software and hardware ($M = 4.80, SD = 1.06$) and “Instructors need to understand ADA policies” ($M = 4.87, SD = 1.01$).

Table 6
Descriptive Statistics for Round 3 Consensus Competency Statements Generated by Delphi Panel

Statements	<i>N</i>	<i>M</i>	<i>SD</i>
Instructors need to facilitate learning.	30	5.80	0.41
Instructors need to be able to manage a course.	30	5.67	0.55
Instructors need to be clear.	30	5.67	0.55
Instructors need expert content knowledge.	30	5.63	0.61
Instructors need to assess learning outcomes.	30	5.60	0.56
Instructors need to be organized.	30	5.60	0.62
Instructors need to organize content.	30	5.60	0.50

Table 6 (continued)

Statements	<i>N</i>	<i>M</i>	<i>SD</i>
Instructors need to ensure academic integrity.	29	5.52	0.63
Instructors need effective written communication skills.	30	5.53	0.63
Instructors need critical thinking skills.	30	5.53	0.68
Instructors need to use learner-centered teaching strategies.	30	5.47	0.63
Instructors need to establish evaluation systems.	30	5.47	0.63
Instructors need self-directedness.	28	5.46	0.64
Instructors need to be flexible.	30	5.43	0.68
Instructors need to communicate online.	30	5.40	0.67
Instructors need to use active learning.	30	5.33	0.84
Instructors need to identify learning content.	30	5.33	0.61
Instructors need to be patient.	29	5.31	0.85
Instructors need instructional design skills.	30	5.30	0.75
Instructors need effective visual communication skills.	30	5.30	0.79
Instructors need to facilitate learning.	30	5.80	0.41
Instructors need to be able to manage a course.	30	5.67	0.55
Instructors need to be clear.	30	5.67	0.55
Instructors need expert content knowledge.	30	5.63	0.61
Instructors need to assess learning outcomes.	30	5.60	0.56
Instructors need to be organized.	30	5.60	0.62
Instructors need to organize content.	30	5.60	0.50
Instructors need effective written communication skills.	30	5.53	0.63
Instructors need critical thinking skills.	30	5.53	0.68
Instructors need to ensure academic integrity.	29	5.52	0.63
Instructors need to use effective communication strategies for distance learners.	30	5.50	0.78
Instructors need to understand student engagement.	30	5.47	0.57
Instructors need to use learner-centered teaching strategies.	30	5.47	0.63
Instructors need efficacy in using computers.	29	5.28	0.53
Instructors need effective oral communication skills.	30	5.27	0.83
Instructors need to motivate students.	30	5.27	0.94
Instructors need identify when to use technology.	30	5.27	0.69
Instructors need to understand learning theory.	29	5.24	0.79

Table 6 (continued)

Statements	<i>N</i>	<i>M</i>	<i>SD</i>
Instructors need to access web-based content.	30	5.23	0.73
Instructors need to be creative.	29	5.21	0.77
Instructors need to understand university specific content management systems.	29	5.21	0.90
Instructors need to understand technology.	30	5.20	0.66
Instructors need to encourage student interaction.	30	5.20	0.76
Instructors need to understand pedagogy.	30	5.17	0.75
Instructors need to identify how to use technology.	30	5.17	0.70
Instructors need to develop interactive teaching components.	30	5.13	0.82
Instructors need to understand how instructional technology is delivered.	30	5.10	0.76
Instructors need to understand andragogy.	30	5.07	0.74
Instructors need to be able to sustain a learning community.	29	5.07	0.70
Instructors need to have current knowledge of technology tools.	30	5.00	0.69
Instructors need to integrate technologies.	30	5.00	0.74
Instructors need to establish purpose of identified technology.	30	5.00	0.87
Instructors need to develop curriculum.	29	4.97	0.98
Instructors need to understand distance education.	30	4.93	0.87
Instructors need to promote collaborative learning.	30	4.93	1.05
Instructors need to understand student demographics.	30	4.90	0.76
Instructors need to create user-friendly interfaces.	30	4.87	0.97
Instructors need to understand ADA policies.	30	4.87	1.01
Instructors need to use basic software and hardware.	30	4.80	1.06

Note. Overall $M = 5.28$, $SD = .73$. Scale: 6 = *strongly agree*, 5 = *agree*, 4 = *somewhat agree*, 3 = *somewhat disagree*, 2 = *disagree*, 1 = *strongly disagree*.

The panelists reconfirmed their consensus on all 48 competency statements with at least two-thirds of panel members rating these statements as a 5 (“agree”) or a 6 (“strongly agree”) (see Table 7).

Table 7

Round 3 Confirmed Consensus Competency Statements Generated by Delphi Panel

1. Instructors need instructional design skills.
2. Instructors need to understand student demographics.
3. Instructors need expert content knowledge.
4. Instructors need to access web-based content.
5. Instructors need to understand technology.
6. Instructors need to understand andragogy.
7. Instructors need to understand pedagogy.
8. Instructors need to understand how instructional technology is delivered.
9. Instructors need to understand student engagement.
10. Instructors need effective written communication skills.
11. Instructors need effective oral communication skills.
12. Instructors need effective visual communication skills.
13. Instructors need to create user-friendly interfaces.
14. Instructors need to have current knowledge of technology tools.
15. Instructors need to facilitate learning.
16. Instructors need to be able to manage a course.
17. Instructors need to encourage student interaction.
18. Instructors need to develop interactive teaching components.
19. Instructors need to assess learning outcomes.
20. Instructors need to motivate students.
21. Instructors need to use active learning.
22. Instructors need to understand distance education.
23. Instructors need to use effective communication strategies for distance learners.
24. Instructors need to be organized.
25. Instructors need to be clear.
26. Instructors need to integrate technologies.
27. Instructors need to use learner-centered teaching strategies.
28. Instructors need to use basic software and hardware.
29. Instructors need to communicate online.
30. Instructors need efficacy in using computers.
31. Instructors need to promote collaborative learning.
32. Instructors need to be flexible.

Table 7 (Continued)

33. Instructors need to develop curriculum.
34. Instructors need to understand learning theory.
35. Instructors need to ensure academic integrity.
36. Instructors need to be able to sustain a learning community.
37. Instructors need to be creative.
38. Instructors need to be patient.
39. Instructors need self-directedness.
40. Instructors need to understand university specific content management systems.
41. Instructors need to organize content.
42. Instructors need to establish evaluation systems.
43. Instructors need critical thinking skills.
44. Instructors need identify when to use technology.
45. Instructors need to identify how to use technology.
46. Instructors need to establish purpose of identified technology.
47. Instructors need to identify learning content.
48. Instructors need to understand ADA policies.

Round Two and Three Consensus Analysis

Two-thirds of respondents had to rate a statement as a “*agree*” or “*strongly agree*” for the statement to move from Round 2 to Round 3. For confirmation on the statements in round 3, two-thirds of respondents had to again rate a statement as “*agree*” or “*strongly agree*.”

In Round 2, “Instructors need effective written communication skills” and “Instructors need effective visual communication skills” had the next highest levels of agreement, with 37% choosing “*agree*” and 63% choosing “*strongly agree*” for both statements agreement (see Table 8).

In Round 3, “Instructors need to facilitate learning,” with 20% choosing “*agree*” and 80% choosing “*strongly agree*”, and “Instructors need to organize

content, with 40% choosing “*agree*” and 60% choosing “*strongly agree*”, were the statements with the highest level of agreement (see Table 8).

Table 8
Delphi Panel Responses for Rounds 2 and 3 Consensus Competency Statements by Percentage

Statement	Response Options (%)			
	Round 2		Round 3	
	agree	strongly agree	agree	strongly agree
Instructors need instructional design skills.	40%	53%	37%	47%
Instructors need to understand student demographics.	50%	17%	43%	23%
Instructors need expert content knowledge.	33%	57%	23%	70%
Instructors need to access web-based content.	37%	43%	43%	40%
Instructors need to understand technology.	43%	40%	53%	33%
Instructors need to understand andragogy.	43%	33%	47%	30%
Instructors need to understand pedagogy.	57%	30%	43%	37%
Instructors need to understand how instructional technology is delivered.	40%	33%	43%	33%
Instructors need to understand student engagement.	33%	57%	47%	50%
Instructors need effective written communication skills.	37%	63%	33%	60%
Instructors need effective oral communication skills.	43%	47%	37%	47%
Instructors need effective visual communication skills.	37%	63%	40%	47%
Instructors need to create user-friendly interfaces.	33%	50%	43%	27%
Instructors need to use active learning.	50%	30%	40%	50%

Table 8 (Continued)

Statement	Response Options (%)			
	Round 2		Round 3	
	agree	strongly agree	agree	strongly agree
Instructors need to have current knowledge of technology tools.	30%	43%	63%	20%
Instructors need to facilitate learning.	30%	60%	20%	80%
Instructors need to be able to manage a course.	20%	67%	27%	70%
Instructors need to encourage student interaction.	50%	43%	40%	40%
Instructors need to develop interactive teaching components.	55%	31%	43%	37%
Instructors need to assess learning outcomes.	30%	63%	33%	63%
Instructors need to motivate students.	53%	30%	33%	50%
Instructors need to be organized.	23%	73%	27%	67%
Instructors need to be clear.	40%	57%	27%	70%
Instructors need to integrate technologies.	47%	23%	57%	23%
Instructors need to use learner-centered teaching strategies.	27%	60%	40%	53%
Instructors need to use basic software and hardware.	47%	23%	43%	27%
Instructors need to communicate online.	60%	33%	40%	50%
Instructors need efficacy in using computers.	40%	40%	66%	31%
Instructors need to promote collaborative learning.	30%	37%	40%	33%
Instructors need to develop curriculum.	33%	37%	45%	31%
Instructors need to understand learning theory.	47%	47%	35%	45%
Instructors need to ensure academic integrity.	27%	57%	35%	59%
Instructors need to understand university specific content management systems.	33%	40%	17%	52%

Table 8 (Continued)

Statement	Response Options (%)			
	Round 2		Round 3	
	agree	strongly agree	agree	strongly agree
Instructors need to be able to sustain a learning community.	37%	37%	52%	28%
Instructors need to develop curriculum.	33%	37%	45%	31%
Instructors need to be able to sustain a learning community.	37%	37%	52%	28%
Instructors need to be creative.	33%	47%	38%	41%
Instructors need to be patient.	30%	50%	21%	55%
Instructors need self-directedness.	40%	33%	39%	54%
Instructors need to organize content.	40%	57%	40%	60%
Instructors need to establish evaluation systems.	33%	33%	40%	53%
Instructors need critical thinking skills.	20%	63%	27%	63%
Instructors need identify when to use technology.	47%	50%	47%	40%
Instructors need to identify how to use technology.	47%	47%	50%	33%
Instructors need to establish purpose of identified technology.	33%	43%	47%	30%
Instructors need to identify learning content.	27%	60%	53%	40%
Instructors need to be flexible.	47%	37%	37%	53%
Instructors need to understand ADA policies.	37%	33%	47%	27%

Note. At least two-thirds of the respondents had to rate a statement as “agree” or “strongly agree” in order for the statement to progress from Round 2 to Round 3.

CHAPTER V

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Conclusions

Conclusions are based upon the data obtained during the Delphi study conducted during August-September 2013. The expert panel reached a consensus on a broad range of 48 competencies needed to develop instructional strategies for mobile learning. The data suggested the 48 competencies should be grouped into seven areas:

Communication, Technology, Learning, Course Management, Course Content, Assessment and Evaluation, and Instructor Skills (see Figure 2).

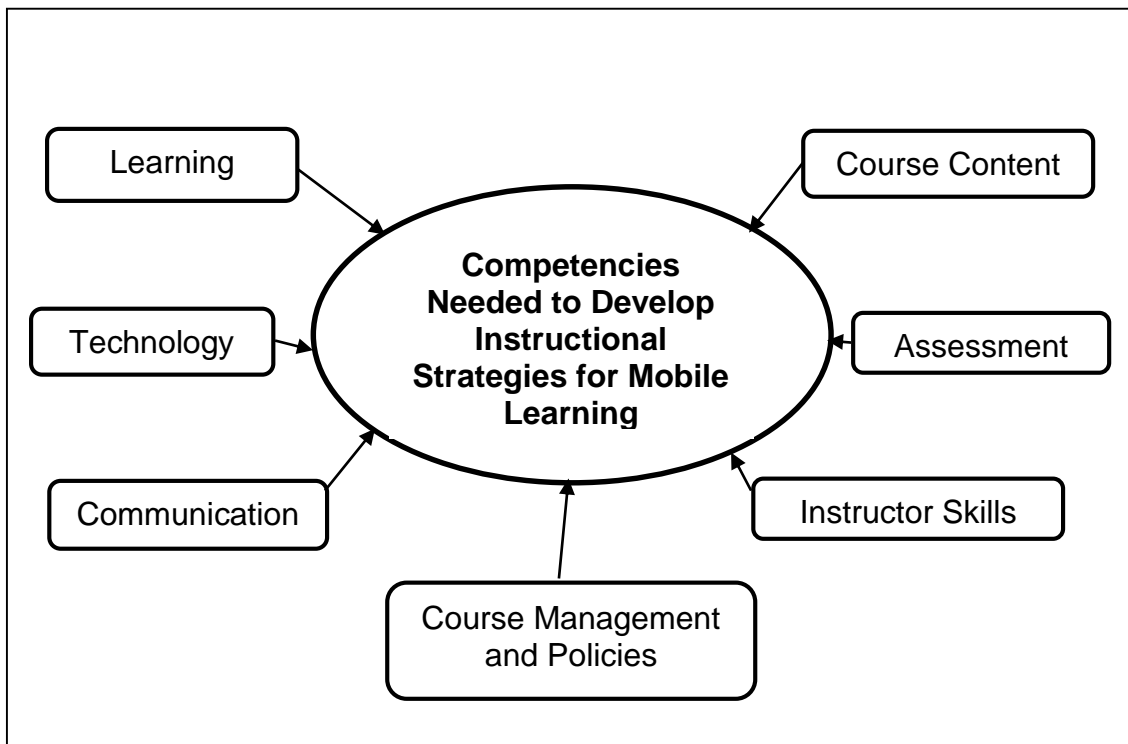


Figure 2. Mobile Learning Instructional Competencies.

The competencies were sorted into these groups based on what areas the competencies covered. Course management and policies competencies covered eight competencies related to managing a course including developing teaching components and managing distance education environments. Course policy issues like ADA knowledge and ensuring academic integrity also were grouped into this area.

Learning was a fairly large grouping with ten competencies. Learning competencies such as an understanding of andragogy and pedagogy were organized into this area. Motivating students was another competency. The use of active learning was included in this grouping.

The technology grouping contained nine competences related to technology use. A general understanding of technology was a key competency of this group. An understanding of hardware, software, and technology delivery were among the competencies sorted into this grouping.

The communication group covered areas related to communication. This was one of the smaller groupings in terms of number of competencies. A total of five competencies made up this grouping. Communication skills in various areas went into this group. Communication in online environments was also a competency in this group.

The course content grouping contained eight competencies. These competencies covered instructor skills in identifying, developing, and organizing course content. Instructional design skills were a competency in this grouping. Competency in accessing web-based content was also included in this group.

The assessment group was the smallest group with only two competencies. These competencies dealt with instructors' ability to assess learning outcomes and establish evaluation systems. These competencies were unique compared to others and therefore grouped in this area despite the small number of competences.

The instructor skills grouping contained eight competencies. This grouping focused primarily on instructor skills. The skills were very general in nature. Competencies related to instructors' ability to be clear, patient, self-efficacious, organized, and creative were part of this grouping. An understanding of student demographics also was a competency covered in instructor skills area.

Participants indicated that critical competencies were related to communication skills, course management, and assessment in the second round. In the third round, participants indicated competencies related to content knowledge were needed as well as the competencies from round two. The data revealed some of the most important competencies needed for instructors developing instructional strategies for mobile learning include: oral, written, and visual communication skills; expert content knowledge; the ability to establish guidelines, policies, and procedures for courses; and the ability to assess learning outcomes. It was concluded that instructors need to understand educational policies like the Americans with Disabilities Act (ADA).

Written and visual communication skills received 100% agreement (panelists chose either "*agree*" or "*strongly agree*") from the panel. These results indicate communication skills in multiple areas are of great importance when developing

instructional strategies for mobile learning. Instructors must be able to communicate both visually and textually to achieve effective instructional design for mobile learning.

The need for instructors to facilitate learning and organize content also received 100% agreement from the panel. The results indicate that facilitating learning and content organization are important competencies. The ability of instructors to organize content in a manner to facilitate learning is necessary to develop instructional strategies for mobile learning.

The consensus competencies as determined by the panel provide a clear direction for developing instructional strategies for mobile learning. Of the 108 competencies originally developed by the panel, 48 were kept as the needed competencies through consensus. These competencies were similar to competencies needed to develop instructional strategies in general regardless of learning environment. The 60 competencies that failed to gain consensus offer other possible competencies that could also be useful in developing instructional strategies for mobile learning.

The 60 discarded competencies tended to be very specific compared to the retained competencies. Specific knowledge, skills, and tools were mentioned in the discarded competencies whereas the competencies that reached consensus tended to focus on more general instructional competencies. The discarded competencies represented skills specifically related to various target areas. Skills related to specific software and hardware were among the discarded competencies. Skills related to communication tools like blogs and wikis were also among the discarded competencies.

Non-technical skills like language translation and color psychology accounted some other discarded competencies.

Study limitations include the selection of the expert panel. The expert panel members were chosen from U.S. universities and had a publishing and research background in educational technology and agricultural education. Due to disparate geographic locations of participants, physical meetings among panel members also limited the exchange of ideas. Limitations associated with the data collection methods and online instruments should also be considered. The accuracy of responses in the study was subject to the willingness of panel members to: participate, complete surveys, and answer survey questions completely. Also, panel participants might have underestimated the time associated with the Delphi.

In conclusion, the data revealed for instructors a framework for developing instructional strategies for mobile learning from the perspective of faculty. The consensus competencies as well as those that failed to reach consensus offer educators potential methods to take full advantage of the mobile learning's impact on college students. Instructors should look these competencies when developing their instruction for mobile learning.

Implications

The findings of the study support the following implications. The results of the study provide a focus and understanding for the instructional use of new and emerging technologies like mobile learning. The data in this study supported the determined competencies needed to develop instructional strategies for mobile learning. The expert

knowledge and opinions of the Delphi panel reached consensus on competencies that supported the conceptual framework of the study. The competencies were consistent with the framework theory.

The implications of this study relate to the identification of the core competencies needed for the development of instructional strategies that utilize mobile learning. Instructors working with today's students must recognize the evolution of mobile learning and develop competencies to meet the needs of students. Several competencies dealt with instructors' technology skills and usage. The expert panel selected instructor engagement with technology as part of the needed competencies to develop instructional strategies for mobile learning. These competencies suggest the ideas of the acceptance and use of technology, as well as self-efficacy and self-directedness in regard to technology, tie-in with the competencies that focus on the instructor use and understanding of technology related to mobile learning, and development of skills for mobile learning.

Azjen and Fishbein (1980) found individual's behavior intentions are influenced by their attitudes toward the behavior and the subjective norms of the behavior. Instructors should encourage student interaction mobile learning through a demonstration of a positive attitude towards the use of the technology for learning. Instructors should understand mobile learning and how to facilitate interaction with it, in order to create a norm where mobile learning is commonplace as an educational tool.

Davis (1989) found the perceived usefulness and perceived ease of use influenced how individuals accepted technology. Instructors should know how to use

and when to use mobile learning to increase the perception of perceived ease of use. They need establish the purpose of the technology in order for perception of perceived usefulness to be increased.

Venkatesh et al. (2003) found the expected benefit and effort associated with a new technology affected the behavioral intention to use the technology. Mobile learning is a relatively new technology and instructors may not be aware of the technological differences between computers and mobile devices. Instructors must be aware of the benefits and effort needed to use mobile learning in order to take advantage of the technology's benefits.

Instructors should determine mobile learning tools and organize mobile learning content to meet their goals. Blumler and Katz (1974) found the user determines the amount of influence media has on the user and the user picks the media to meet certain goals. Instructors working with mobile learning should be able to determine necessary media and skills associated with the media to use it to meet goals in a mobile learning environment.

Instructors also need to utilize the concept of self-efficacy when working with technology. Bandura (1977) found self-efficacy was an individual's desire to attempt activities perceived to be difficult. Instructors need self-efficacy when developing instructional strategies for mobile learning. They must be willing to engage in the development of novel learning through the use of mobile devices which in turn enable mobile learning. Creativity and the encouragement and support to act on creativity will be crucial.

Self-directedness is a trait needed by instructors as they develop instruction for mobile learning. Candy (2004) found technological environments meshed well with self-directedness. Instructors working with mobile learning need to be self-directed to develop the necessary instructional strategies for this technological environment and also encourage students to be self-directed in the learning process. Self-directedness for instructors working with mobile learning must be developed if it is lacking. Grow (1991) suggested matching learners with a certain level self-directedness with the appropriate teaching style. Based on findings, instructors lacking self-directedness with technology must be matched with an appropriate mentor to increase their self-directedness. As the number of instructors using mobile learning increase, the ability to match instructors lacking self-direction in regards to mobile learning with those demonstrating self-directedness with mobile learning will also increase.

The competencies determined from the data support the theoretical framework by calling upon the ideas of TRA, TAM, UTAUT, UGT, self-efficacy, and self-directed learning. Many of the competencies draw on these theories and support the use of these theories to further explore the needed competencies to develop instructional strategies for mobile learning. Instructors must be willing to accept and use mobile learning, as well as demonstrate self-efficacy and self-directed in relation to understanding mobile learning in order to have the competencies needed to develop instructional strategies for this new and emerging technology.

Practice Recommendations

Mobile learning is an increasingly common educational technology tool. The need to develop mobile learning instructional competencies is supported by Research Priorities 2 “New Technologies, Practices, and Product Adoption Decisions” (Doerfert, p. 8, 2011) and 4 “Meaningful, Engaged Learning in All Environments” (Doerfert, p. 9, 2011) in the National Research Agenda of AAAE (Doerfert, 2011). Agricultural educators should develop the competencies necessary to create instruction and enhance learning for this medium. A lack of these competencies could lead to reduced effectiveness in terms of learning.

Recommendations for practice involve increasing instructor knowledge and skills in areas of the communication, learning, technology, course management, content, assessment, and instructional skills. Increasing instructor capacity in these areas will help develop the competencies needed for instructors to develop instructional strategies for mobile learning. The majority of college students are accessing online content through their mobile devices and instructors need to use this technology in educational settings (Matias & Wolf, 2013). Instructors must develop and gain the skills needed for the effective use of mobile learning in order to take advantage of its benefits. Aubusson et al. (2009) found mobile learning could enhance educator knowledge and teaching practices.

The data supported the inclusion of communication skills in the needed competencies to develop instructional strategies for mobile learning. Due to the data, it is suggested that instructors increase their communication skills in online, written, oral,

and visual mediums. Instructors should create mobile learning that connects with and centers on the learner (Chuang, 2009). Instructors need to understand the role mobile technology plays in terms of college students' communication practices. Mobile technology is used by college students to provide the necessary communication to maintain relationships with their peers (Chen & Katz, 2009).

Instructors could enhance these skills by practicing communication through each of these mediums. Instructors who develop all these communication skills should be able to combine communication skills in these areas to develop effective communication skills for communicating with online learners. Instructors could benefit from agricultural communications workshops focusing on developing communication skills in online environments with an emphasis on mobile environments. Instructors should communicate enthusiasm towards mobile learning as teacher enthusiasm is an important factor for influencing learning (Rosenshine & Furst, 1971).

The instructor skills grouping of competencies from the data suggests that instructors should have a solid foundation in learning theory and practice. Mobile learning as a practice could improve from the establishment of approaches, definitions, and theories within its framework (Keskin & Metcalf, 2011). Mobile learning can be used to promote lifelong learning (Wang & Shen, 2012). Mobile learning can allow students authentic, student-centered learning experiences (Cochrane & Bateman, 2010).

It is recommended that Instructors understand the concepts of pedagogy and andragogy. They need to be able to promote student engagement and motivation. Instructors should develop learner-center teaching methods, active learning methods, and

foster learning communities. Professional development could be used by Instructors to enhance their instruction by incorporating different teaching styles to better engage students in learning.

The data supported the inclusion of competencies in a technology grouping for the needed competencies to develop instructional strategies for mobile learning. The data suggests instructors should become familiar with technology. Murphrey et al. (2009) found agricultural educators are not likely to possess the same mobile technology or skills as their students. They should to identify how and when to use technology for the classroom. Instructors need to understand the purpose of instructional technologies and technological tools. They should be able deliver and integrate technology in instruction. Instructors should be self-efficacious in terms of using software and hardware. Distance Education and Career Technical Education (CTE) centers in universities could be used to train instructors and increase their knowledge and skill with technology. Agricultural educators can use colleagues and peers to increase instructional technology knowledge awareness and understanding (Kotrlik & Redmann, 2009).

The grouping of course management and polices grouping was developed through the data. The data from this grouping suggests instructors should develop their course management skills in regards to all aspects of a course. Mohamad et al. (2012) suggested mobile learning instruction will improve with researched-based policies. This includes ensuring academic integrity and understanding educational laws and policies like ADA. Instructors who should also take into account other policies like Family Educational Rights and Privacy Act (FERPA). It is recommended that instructors be

familiar with distance education practices and course management systems. Shroeder-Moreno (2010) found online learning tools must emphasize successful student outcomes and be designed to promote those outcomes. A condition of learning is informing learners of objectives (Gagne, 1965). Good course management will have objectives for mobile learning clearly stated to learners.

Instructors should understand how to create interactive and user-friendly tools in these systems. Instructors should investigate the use of online systems to meet student needs. Leggette et al. (2012) online tools like Second Life could provide worthy agricultural education experiences. Multimedia materials can lead successful learning outcomes in courses with an agricultural emphasis like horticulture (Rhoades et al., 2009). It is recommended that instructors practice techniques to increase student interaction in these environments. Professional development committees could provide instructors with training designed to inform them of the necessary policies and procedures needed when managing course.

The data supported the grouping of certain competencies into a course content grouping. The data in this grouping suggests instructors should be able to develop course content for mobile learning environments by identifying and organizing content. Shen et al. (2009) suggested evaluation, observation, and testing are the key components for developing mobile learning environments. It is recommended instructors become content experts and have access to web-based content. They should to develop instructional design skills in order to create their own learning content.

Instructors should establish learning outcomes and the evaluation systems needed to assess outcomes. The use of summative evaluation should have four levels covering reaction, learning, behavior, and results (Kirkpatrick, 1994.) Workshops could be conducted to teach instructors how to design and assess learning outcomes in a mobile environment.

Designing online learning environments that are responsive to mobile devices is important. Programming languages allow for more dynamic website development for mobile learning. Mobile learning will not take hold if e-learning is not designed to take advantage of the technological environment.

The grouping of competencies into the instructor skills area was supported by the data. The data suggests instructors should develop a wide range of skills to foster the competencies needed for instructors to develop instructional strategies for mobile learning. Demirbilek (2010) found it is important to understand instructor perceptions and practices in regards to mobile learning technology. Understanding all aspects of mobile learning will enhance teaching and learning (Schuck et al., 2012). Instructors should also develop their own self-directedness when working with mobile learning.

It is recommended that instructors be organized and clear when it comes to instructional strategies, as well as creative and flexible. Patience is needed when it comes to developing instructional strategies for an emerging technology like mobile learning. Critical thinking skills need to be developed by instructors. Instructors can rely on professional development and other instructors when trying to further enhance these skills.

Various types of learning benefit from the use of mobile technology. The technology can be used to increase the potential of student outcomes with these learning modes. Seamless learning is a learning method served by mobile learning. Mobile learning with its ability to render the limitations of time and location moot meshes well with the idea of seamless learning. Mobile technology can assist in creating truly seamless mobile learning (Wong & Looi, 2011).

Individualized or personalized learning is another potential area where mobile learning can flourish and enhance existing practice. A student's mobile devices are increasingly personalized and in-tune with their personalities. These devices can be used to deliver individualized learning to students helping to better meet their educational objectives. Mobile learning can be used to create individualized learning opportunities due to these factors (Su et al., 2011).

Students could be utilized to further develop these competencies for instructors. Undergraduate peer advisors could be used to expose students to mobile learning. Increasing the number of students familiar with and willing to use mobile learning could allow instructors to further develop the competencies needed to develop instructional strategies for mobile learning.

Research Recommendations

Further research should use these competencies to develop frameworks for developing instruction for mobile learning. Koszalka and Ntloedibe-Kuswani (2010) found mobile learning should be carefully designed even with its distinct learning advantages. Wang and Shen (2012) found mobile learning instructional design must

satisfy learner needs in order facilitate learning. Instructors' readiness to use mobile learning should be examined in relation to the competencies. The relationship between the competencies and effective mobile learning design should also be studied.

Future research regarding mobile learning in regards to students should focus on the acceptance and usage of the mobile technology for educational outcomes. Uzunboylu and Ozdamli (2011) found educators' attitudes regarding mobile learning must be understood for successful use of mobile learning. Mobile learning educators need to design learning tools that take into account student acceptance of the technology (Iqbal & Qureshi, 2012). Researchers should examine whether the use of the competencies in developing mobile learning instruction has an effect on student acceptance of mobile learning. Kukulska-Hulme (2010) suggested educators need to understand student needs in regards to mobile learning.

The course management and polices grouping should researched through examination of each of the competencies within this grouping. Researchers could study the effect each of the competencies have on instructor and student acceptance of mobile learning. How instructors manage and set policies for mobile learning courses could provide important data on these competencies affect the implementation of mobile learning.

The instructor skills grouping should be researched through examination of each of the competencies within this grouping. Researchers could study the effect each of the competencies have on instructor and student acceptance of mobile learning. Research

into how instructor skill sets work in relation to mobile learning implementation could provide valuable insight.

The assessment grouping should be researched through examination of each of the competencies within this grouping. Researchers could study the effect each of the competencies have on instructor and student acceptance of mobile learning. The examination of assessment competencies in the mobile learning environment could provide data on how to measure educational outcomes in this environment.

The course content grouping should be researched through examination of each of the competencies within this grouping. Researchers could study the effect each of the competencies have on instructor and student acceptance of mobile learning. Research into course content competencies could provide insight on how to design and deliver content for mobile learning.

The learning grouping should be researched through examination of each of the competencies within this grouping. Researchers could study the effect each of the competencies have on instructor and student acceptance of mobile learning. Research into these competencies could indicate which learning methods and styles will be most effective in a mobile learning environment.

The technology grouping should be researched through examination of each of the competencies within this grouping. Researchers could study the effect each of the competencies have on instructor and student acceptance of mobile learning. The study of technology competencies could provide insight into what technology skills are needed to successfully design instruction for the mobile learning environment.

The communication grouping should be researched through examination of each of the competencies within this grouping. The effect each of the competencies have on instructor and student acceptance of mobile learning could be studied by researchers. Research into the use of the communication competencies in this grouping could provide data to support the use of best communication skills for mobile learning.

Future research should use experimental designs like the Solomon Four-Group design to test each of these competency groupings. The use of the Solomon Four-Group design will allow researchers to reduce the influence of confounding variables. The design will also allow researchers to test whether the pretest for each grouping has an effect. Researchers should look at the use of these competency groups in instructional settings held entirely online and those that use a blended approach.

Summary

Mobile learning provides instructors the means to extend their size and scope of their teaching. Mobile learning can harness a number of online learning environments. The ways to deliver content online are increasing and mobile technology can harness the many of these methods to increase the effectiveness of mobile learning. Instructors should be aware of the role mobile learning plays in these delivery methods for online education.

Mobile learning can also allow instructors to use multiple devices for e-learning opportunities. An online course can be taken through a student's PC or mobile device, and the student can seamlessly switch between those devices to achieve learning goals. Lu (2012) found mobile learning should be integrated into existing e-learning

infrastructure on campuses. Students can start an online course on a PC but if they need access content or turn in assignments, they can use their mobile devices to continue to pursue their educational objectives.

Hybrid or blended courses are another e-learning avenue that will benefit from mobile learning. Hybrid courses start with some sort of class activity, such as a lecture or assignment, in a traditional classroom. The students then access further educational content online. Given the pervasive nature of mobile devices among college students, access the online portion of a hybrid course through these devices is a natural evolution of the hybrid course. Flipped courses are another form of hybrid or blended courses. The students access content like lectures online and come into the traditional classroom to complete activities and engage in hands-on learning. The ubiquitous nature of mobile devices among college students would allow them to use mobile learning to access class content prior to entering the traditional classroom. Mobile learning presents the ability for blended learning to truly combine real world experiences with those from a digital environment (Chu et al., 2010).

Mobile learning can be used by students to access Massive Open Online Courses (MOOC). The design of MOOCs serve mobile learning well, as this online environment is designed to serve massive amounts of students and utilizing mobile technology for MOOCs would allow access to a larger number of students than targeting only students with PCs. Rodriguez (2012) found many students are using mobile technology in utilizing MOOCs.

Mobile learning is changing the learning experience for college students. The use of mobile learning will soon become a necessary part of learning in higher education (Shin et al., 2011). Instructors will benefit from developing mobile learning competencies to lead instruction in this emerging environment. These competencies cover classical teaching methods and practices, as well as understanding the latest in technology. Mobile learning is poised to take a key role in e-learning, maybe even becoming the method for delivering online educational content. Sound instructional skills and practices for mobile learning will only serve to provide better learning outcomes for students.

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Document of Consent: Waiver approved under 45 CFR 46.117 (c) 1 or 2/ 21 CFR 56.109 (c)1

Waiver of Consent:

Provisions:

Comments:

This research project has been approved. As principal investigator, you assume the following responsibilities

1. **Continuing Review:** The protocol must be renewed by the expiration date in order to continue with the research project. A Continuing Review application along with required documents must be submitted by the continuing review deadline. Failure to do so may result in processing delays, study termination, and/or loss of funding.
2. **Completion Report:** Upon completion of the research project (including data analysis and final written papers), a Completion Report must be submitted to the IRB.
3. **Unanticipated Problems and Adverse Events:** Unanticipated problems and adverse events must be reported to the IRB immediately.
4. **Reports of Potential Non-compliance:** Potential non-compliance, including deviations from protocol and violations, must be reported to the IRB office immediately.
5. **Amendments:** Changes to the protocol must be requested by submitting an Amendment to the IRB for review. The Amendment must be approved by the IRB before being implemented.

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1186 TAMU

College Station, TX 77843-1186

Tel. 979.458.1467 Fax.

979.862.3176 <http://rcb.tamu.edu>

6. **Consent Forms:** When using a consent form or information sheet, you must use the IRB stamped approved version. Please log into iRIS to download your stamped approved version of the consenting instruments.

If you are unable to locate the stamped version in iRIS, please contact the office.

7. **Audit:** Your protocol may be subject to audit by the Human Subjects Post Approval Monitor. During the life of the study please review and document study progress using the PI self-assessment found on the RCB website as a method of preparation for the potential audit. Investigators are responsible for maintaining complete and accurate study records and making them available for inspection. Investigators are encouraged to request a pre-initiation site visit with the Post Approval Monitor. These visits are designed to help ensure that all necessary documents are approved and in order prior to initiating the study and to help investigators maintain compliance.
8. **Recruitment:** All approved recruitment materials will be stamped electronically by the HSPP staff and available for download from iRIS. These IRB-stamped approved documents from iRIS must be used for recruitment. For materials that are distributed to potential participants electronically and for which you can only feasibly use the approved text rather than the stamped document, the study's IRB Protocol number, approval date, and expiration dates must be included in the following format: TAMU IRB#20XXXXXX Approved: XX/XX/XXXX
Expiration Date: XX/XX/XXXX.

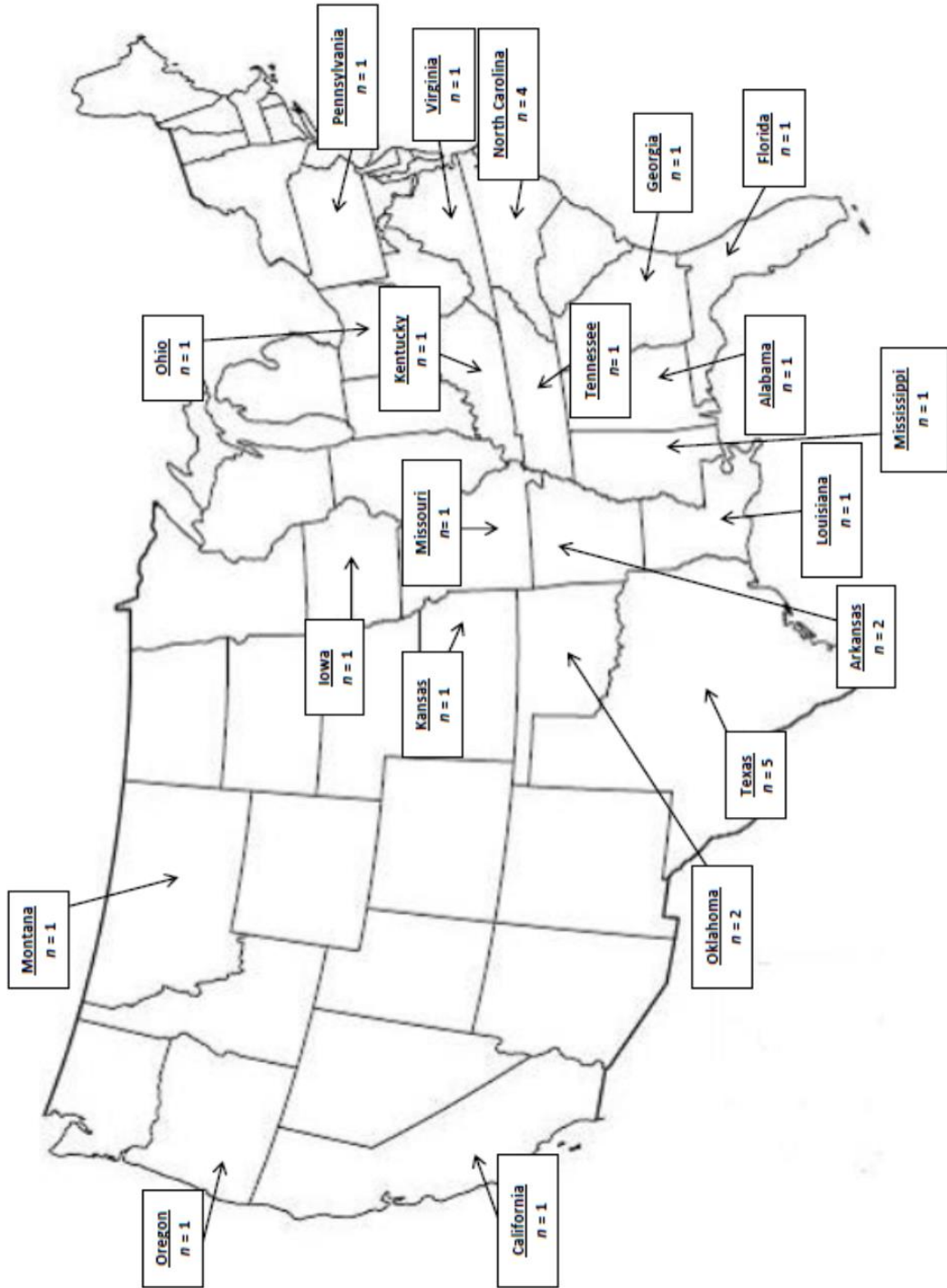
The Office of Research Compliance and Biosafety is conducting a brief survey for the purpose of programmatic enhancements. Click here to take survey or copy and paste in a browser

https://tamu.qualtrics.com/SE/?SID=SV_1CgOkLNU45QebvT

This electronic document provides notification of the review results by the Institutional Review Board.

APPENDIX B

PARTICIPANT MAP



APPENDIX C

Round One Invite

Hello Dr. (NAME),

I appreciate your participation in this Delphi study. The purpose of this study is to determine the competencies needed for instructors to develop instructional strategies for new and emerging technologies.

Your expert knowledge and experience as an agricultural education faculty member is an important part of this study. Your contribution to this research will be of great value to the field of agricultural education.

In the first round of the Delphi, you will be given a definition of a new and emerging instructional technology based on the literature. You will then be asked to provide six competencies needed to develop instructional strategies for this technology.

Please click on the following link to complete the online survey for round one:
\${1://SurveyLink?d=http://survey.qualtrics.com/SE/?SID=SV_0oHeQj6npbMiNaB}

Your participation in this research is completely voluntary and all your responses will be kept confidential. The records of this study will be kept private. No identifiers linking you to this study will be included in any reports associated with the data. By entering and completing the survey you are giving permission for the researcher to use your responses.

Should you have any questions, please feel free to contact me at xxx-xxx-xxxx or travislrby@tamu.edu.

Thanks for your time and participation.

Sincerely,

Travis L. Irby, Doctoral Candidate
Agricultural Leadership, Education, and Communications, Texas A&M University
xxx-xxx-xxxx
travislrby@tamu.edu

APPENDIX D

Round One Instrument

Competencies Needed for Instructors to develop Instructional Strategies for New & Emerging Technologies

I appreciate your participation in this Delphi study. You have been selected for this study due to your expert knowledge and experience in our field. The success of this study is dependent on your contribution. Your participation will make this study a success and add great value to agricultural education research.

Please list six competencies needed to develop instructional strategies for mobile learning based on the following definition: Mobile learning is a form of technology-based learning occurring at any time or location through the use of mobile technology accessing wireless or satellite networks (Marin & Mohan, 2009; Sha, Looi, Chen, & Zhang, 2012).

APPENDIX E

Round One Reminder

Hello Dr. (NAME),

This is a reminder that round one of the Delphi has begun and your participation is quite valuable. If you have not completed the round one survey please do so at your earliest convenience by clicking the following link:

http://survey.qualtrics.com/SE/?SID=SV_0oHeQj6npbMiNaB

Your expert knowledge and experience in the area of agricultural education is an important part of this study. Your contribution to this research will be of great worth to the field of agricultural education.

Your participation in this research is completely voluntary and all your responses will be kept confidential. The records of this study will be kept private. No identifiers linking you to this study will be included in any reports associated with the data. By entering and completing the survey you are giving permission for the researcher to use your responses.

Should you have any questions, please feel free to contact me at xxx-xxx-xxxx or travislrby@tamu.edu.

Thanks again for your time and participation.

Sincerely,

Travis L. Irby, Doctoral Candidate
Agricultural Leadership, Education, and Communications, Texas A&M University
xxx-xxx-xxxx
travislrby@tamu.edu

APPENDIX F

Round Two Invite

Hello Dr. (NAME),

I appreciate your continued participation in this Delphi study. The purpose of this study is to determine the competencies needed for instructors to develop instructional strategies for new and emerging technologies.

Your expert knowledge and experience as an agricultural education faculty member is an important part of this study. Your contribution to this research will be of great value to the field of agricultural education.

In the second round of the Delphi, you will be given 108 statements regarding the competencies needed for instructors to develop instructional strategies for mobile. You will then be asked to provide your level of agreement with these statements.

Please click on the following link to complete the online survey for round two:
\${1://SurveyLink?d=http://survey.qualtrics.com/SE/?SID=SV_6AnPUcKmhDGRaDz}

Please complete this survey no later than September 16th, 2013.

Your participation in this research is completely voluntary and all your responses will be kept confidential. The records of this study will be kept private. No identifiers linking you to this study will be included in any reports associated with the data. By entering and completing the survey you are giving permission for the researcher to use your responses.

Should you have any questions, please feel free to contact me at xxx-xxx-xxxx or travislrby@tamu.edu.

Thanks for your time and participation.

Sincerely,

Travis L. Irby, Doctoral Candidate
Agricultural Leadership, Education, and Communications, Texas A&M University
xxx-xxx-xxxx
travislrby@tamu.edu

APPENDIX G

Round Two Instrument

Competencies for Instructors to Develop Instructional Strategies for New & Emerging Technologies: Round 2

I appreciate your continued participation in this Delphi study. You have been selected for this study due to your expert knowledge and experience in our field. The success of this study is dependent on your contribution. Your participation will make this study a success and add great value to agricultural education research. There are a total of 108 statements for Round 2. You will be asked to rate your level of agreement with each of these statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.

Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
Instructors need instructional design skills. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need HTML skills. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand motivation theory. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to understand student demographics. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand color psychology. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need a sense of humor. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need expert content knowledge. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to access web-based content. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand technology. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand andragogy. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand pedagogy. (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to understand how instructional technology is delivered. (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
Instructors need to know student learning styles. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to know teaching styles. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to understand student engagement. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need effective written communication skills. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need effective oral communication skills. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need effective visual communication skills. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to create user-friendly interfaces. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to have current knowledge of technology tools. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to facilitate learning. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<p>Instructors need to be able to manage a course. (10)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>Instructors need to encourage student interaction. (11)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>Instructors need to develop accessible technologies. (12)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
<p>Instructors need to develop interactive teaching components.</p> <p>(1)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>Instructors need to assess learning outcomes.</p> <p>(2)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to motivate students. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to code or develop programs. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need program evaluation skills. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need usability assessment skills. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to use active learning. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to use social media for learning. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to use blogging for learning. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to use wikis for learning. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to understand distance education. (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to use presentation tools. (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
Instructors need an understanding of Prezi. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to use wireless technology across platforms. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to create synchronous learning experiences. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to develop reusable learning objects for asynchronous delivery. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to use effective communication strategies for distance learners. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to be organized. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to be clear. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to integrate technologies. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to be personal. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to have a constant presence. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to develop leadership skills. (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to manage interdisciplinary teams. (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
Instructors need to be able to translate language. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<p>Instructors need to develop effective delivery methods for illiterate populations.</p> <p>(2)</p>	○	○	○	○	○	○
<p>Instructors need to create mobile learning environments.</p> <p>(3)</p>	○	○	○	○	○	○
<p>Instructors need to use mobile technology.</p> <p>(4)</p>	○	○	○	○	○	○

Instructors need to adapt face-to-face instruction for online delivery. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to use learner-centered teaching strategies. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to use basic software and hardware. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to communicate online. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to remember mobile learning is still learning. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need several years of teaching experience. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to be able to utilize apps for learning. (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need efficacy in using computers. (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
Instructors need efficacy in using mobile devices. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need efficacy in using software. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to design new technology applications. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to promote collaborative learning. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to manage instruction across time zones. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to use inquiry-based learning. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to troubleshoot internet problems. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to be able to use video. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to be able to use photography. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to use digital communication tools. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to be flexible. (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to develop curriculum. (12)	○	○	○	○	○	○
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Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
Instructors need to understand learning theory. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to teach adults regardless of instructional delivery medium. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to teach younger students regardless of instructional delivery medium. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to troubleshoot mobile technology issues. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to ensure academic integrity. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to be able to sustain a learning community. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to use mobile technology to meet course objectives. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to problem solve technology issues. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to understand security issues. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to identify mobile devices that will support learning. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need knowledge of communication theories. (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to decide between synchronous and asynchronous delivery. (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
Instructors need to be creative. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to be patient. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to blend mobile learning with face-to-face learning. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to understand the strengths and weaknesses of mobile learning. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand social systems. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand structural systems. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to be able to define mobile learning. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to adapt available mobile technology for learning. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need self- directedness. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need non- linear thinking. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand risk. (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand university specific content management systems. (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
Instructors need to organize content. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to capture lectures. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to establish evaluation systems. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need critical thinking skills. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need identify when to use technology. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<p>Instructors need to identify how to use technology. (6)</p>	○	○	○	○	○	○
<p>Instructors need to establish purpose of identified technology. (7)</p>	○	○	○	○	○	○
<p>Instructors need to identify learning content. (8)</p>	○	○	○	○	○	○

Instructors need to identify an online site. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand usability standards. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<p>Instructors need to understand the difference between full and part-time students. (11)</p>	○	○	○	○	○	○
<p>Instructors need to understand ADA policies. (12)</p>	○	○	○	○	○	○

APPENDIX H

Round Two Reminder

Hello Dr. (NAME),

This is a reminder that round two of the Delphi has begun and your continued participation is quite valuable. If you have not completed the round two survey please do so at your earliest convenience by clicking the following link:

http://survey.qualtrics.com/SE/?SID=SV_6AnPUcKmhDGRaDz%0D%0A%20

Your expert knowledge and experience in the area of agricultural education is an important part of this study. Your contribution to this research will be of great worth to the field of agricultural education.

Should you have any questions, please feel free to contact me at xxx-xxx-xxxx or travislrby@tamu.edu.

Thanks again for your time and participation.

Sincerely,

Travis L. Irby, Doctoral Candidate
Agricultural Leadership, Education, and Communications, Texas A&M University
xxx-xxx-xxxx
travislrby@tamu.edu

APPENDIX I

Round Three Invite

Hello Dr. (NAME),

I appreciate your continued participation in this Delphi study. The purpose of this study is to determine the competencies needed for instructors to develop instructional strategies for mobile learning.

Your expert knowledge and experience as an agricultural education faculty member is an important part of this study. Your contribution to this research will be of great value to the field of agricultural education.

In the third round of the Delphi, you will be given 48 statements regarding the competencies needed for instructors to develop instructional strategies for mobile learning. A consensus was reached on each of these statements in the second round. You will be asked to provide your level of agreement with these statements and confirm consensus.

Please click on the following link to complete the online survey for round three:
\${1://SurveyLink?d=http://survey.qualtrics.com/SE/?SID=SV_3qI9VZK0OrmzJ4h}

Please complete this survey no later than September 20th, 2013.

Your participation in this research is completely voluntary and all your responses will be kept confidential. The records of this study will be kept private. No identifiers linking you to this study will be included in any reports associated with the data. By entering and completing the survey you are giving permission for the researcher to use your responses.

Should you have any questions, please feel free to contact me at xxx-xxx-xxxx or travislrby@tamu.edu.

Thanks for your time and participation.

Sincerely,

Travis L. Irby, Doctoral Candidate
Agricultural Leadership, Education, and Communications, Texas A&M University
xxx-xxx-xxxx
travislrby@tamu.edu

APPENDIX J

Round Three Instrument

Competencies for Instructors to Develop Instructional Strategies for New & Emerging
Technologies: Round 3

I appreciate your continued participation in this Delphi study. You have been selected for this study due to your expert knowledge and experience in our field. The success of this study is dependent on your contribution. Your participation will make this study a success and add great value to agricultural education research. There are a total of 48 statements for Round 3. You will be asked to rate your level of agreement with each of these statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.

Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
Instructors need instructional design skills. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand student demographics. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need expert content knowledge. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to access web-based content. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand technology. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand andragogy. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to understand pedagogy. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand how instructional technology is delivered. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
Instructors need to understand student engagement. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need effective written communication skills. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need effective oral communication skills. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need effective visual communication skills. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to create user-friendly interfaces. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to have current knowledge of technology tools. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to facilitate learning. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to be able to manage a course. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
Instructors need to encourage student interaction. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to develop interactive teaching components. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to assess learning outcomes. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to motivate students. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to use active learning. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand distance education. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to use effective communication strategies for distance learners. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to be organized. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
Instructors need to be clear. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to integrate technologies. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to use learner-centered teaching strategies. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to use basic software and hardware. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to communicate online. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need efficacy in using computers. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to promote collaborative learning. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to be flexible. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
Instructors need to develop curriculum. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand learning theory. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to ensure academic integrity. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to be able to sustain a learning community. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to be creative. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to be patient. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need self- directedness. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand university specific content management systems. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please select your level of agreement with the following statements regarding the needed competencies for instructors to develop instructional strategies for mobile learning.	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Somewhat Agree (4)	Agree (5)	Strongly Agree (6)
Instructors need to organize content. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to establish evaluation systems. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need critical thinking skills. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need identify when to use technology. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to identify how to use technology. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Instructors need to establish purpose of identified technology. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to identify learning content. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors need to understand ADA policies. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX K

ROUND THREE REMINDER

Hello Dr. (NAME),

This is a reminder that round three of the Delphi has begun and your continued participation is quite valuable. If you have not completed the round three survey please do so at your earliest convenience by clicking the following link:

http://survey.qualtrics.com/SE/?SID=SV_3q19VZK0OrmzJ4h

Your expert knowledge and experience in the area of agricultural education is an important part of this study. Your contribution to this research will be of great worth to the field of agricultural education.

Should you have any questions, please feel free to contact me at xxx-xxx-xxxx or travislrby@tamu.edu.

Thanks again for your time and participation.

Sincerely,

Travis L. Irby, Doctoral Candidate
Agricultural Leadership, Education, and Communications, Texas A&M University
xxx-xxx-xxxx
travislrby@tamu.edu