

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

Travis Irby

Texas State University

Robert Strong

Texas A&M University

Mobile learning is an evolving form of technology-based learning. The novelty of mobile learning gives educators a new tool for evaluating how to develop effective instruction for this new medium. A Delphi study was conducted using a 30-member panel comprised of experts across 20 states. The purpose was to determine the competencies needed to develop instructional strategies for mobile learning. The expert panel reached consensus on 48 competencies needed to develop instructional strategies for mobile learning. The competencies were grouped into 7 areas: communication, technology, learning, course management and policies, course content, assessment and evaluation, and instructor skills. Findings revealed the need for professional development to enable acquisition of these skills and also revealed the need to create a competency framework for the development of mobile learning. Instructors in colleges of agriculture using mobile learning can better meet the needs of their students when they possess the instructional design competencies needed to meet learners' needs. A lack of these competencies could lead to reduced effectiveness in the facilitation of learning overall when using mobile devices for instruction.

INTRODUCTION

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 learning is a natural progression of

technology-based learning occurring at any time or location through the use of mobile devices accessing wireless or satellite networks (Sha, Looi, Chen, & Zhang, 2012; Yau & Joy, 2011). Mohammad, Mamat, and Isa (2012) suggested mobile learning is a credible and cost effective means for educational insti-

• **Travis Irby**, Texas State University, Academic Services Building-North 307, San Marcos, TX 78666. Telephone: (512) 245-5526. E-mail: ti1001@txstate.edu • **Robert Strong**, Texas A&M University, 231 Agriculture and Life Sciences Building, College Station, TX 77843-2116. Telephone: (979) 845-1139. E-mail: r-strong@tamu.edu

tutions to adapt to its benefit. More satisfying educational experiences need to be designed for mobile learning, especially as education is a perpetual process facilitated by mobile learning (Wang & Shen, 2012).

Agricultural education can benefit from the use of instructional technologies such as mobile learning. Murphrey, Miller, and Roberts (2009) found agricultural science and technology teachers had a positive interest in using forms of mobile technologies like iPods and mp3 players. Instructors in areas of agriculture education have knowledge of mobile technologies but are still learning about its effectiveness with learning outcomes. Kotrlik and Redmann (2009) recommended faculty competencies in using instructional technologies should be examined.

The theories used to scaffold this study encompassed Venkatesh, Morris, Davis, and Davis' (2003) unified theory of acceptance and use of technology and Bandura's (1986). The purpose was to determine faculty competencies needed for the development of instructional strategies important for effective use of mobile learning in colleges of agriculture.

METHOD

Using Delphi research methods, researchers examined the competencies needed for college of agriculture faculty to develop instructional strategies for mobile learning. The main goal of the Delphi process is to create an expert consensus on the answers (Linstone & Turoff, 1975). A Delphi typically consists of two or more rounds where the expert panels answer questionnaires during each round. Delphi procedures primarily 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 reduce the range of the previous answers.

The population for this study was composed of agricultural education faculty across the United States. The sample ($N = 30$) was derived from a content analysis of articles from a 10-year period. The 10-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.

The faculty were initially recruited through a phone call. Some faculty preferred contact through e-mail, 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.

Three rounds were used to determine competencies needed at which time a consensus was reached. A total of 30 expert panelists from 20 states from all regions of the United States 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.

RESULTS

The Delphi panel used three rounds to determine competencies needed for faculty to develop instructional strategies for mobile technologies in colleges of agriculture. The first round presented panelists with a definition of mobile learning and then invited panelists to generate six competencies needed for faculty to develop instructional strategies for mobile learning in colleges of agriculture. The responses from 28 panelists were used to create 108 original statements on the needed competencies in round one.

The second round had the panelists rate their agreement with the 108 statements on a 6-point summated scale: 1 = *strongly disagree*, 2 = *disagree*, 3 = *somewhat disagree*, 4 = *somewhat agree*, 5 = *agree*, and 6 = *strongly agree*. The competencies that two thirds of the panel agreed or strongly agreed on were kept for round three. “Instructors need to be organized” ($M = 5.70, SD = 0.53$), “Instructors need effective written communication skills” ($M = 5.63, SD = 0.49$), “Instructors need effective visual communication skills” ($M = 5.63, SD = .49$), “Instructors need to assess learning outcomes” ($M = 5.57, SD = 0.63$) were the highest scoring statements, and “Instructors need to be able to manage a course” ($M = 5.53, SD = 0.73$). 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” ($M = 2.47, SD = 1.07$). 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 third round had the panelists confirm their agreement on the 48 consensus competency statements. 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” ($M = 4.87, SD = 1.01$). 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*”).

CONCLUSIONS AND RECOMMENDATIONS

Of the 108 competencies originally developed by the panel, 48 were kept as the needed com-

petencies through consensus. The data suggested the 48 competencies should be grouped into seven areas: communication, technology, earning, course management, course content, assessment and evaluation, and instructor skills. These competencies were similar to competencies needed to develop instructional strategies in general regardless of learning environment.

Recommendations for practice involve increasing instructor knowledge and skills in areas of the communication, learning, technology, course management, content, assessment, and instructional skills. The data supported the inclusion of communication skills in the needed competencies to develop instructional strategies for mobile learning. Instructors could enhance these skills by practicing communication through each of these media. 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.

Mobile learning as a practice could improve from the establishment of approaches, definitions, and theories within its framework (Keskin & Metcalf, 2011). 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 instruction by incorporating different teaching styles to better engage students in learning.

The data suggested 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. Distance education and career technical education 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 policies formed course management skills. Instructors should investigate the use of online learning management systems to meet student needs. Multimedia materials can lead successful learning outcomes in courses with an agricultural emphasis like horticulture (Rhoades et al., 2009).

Professional development committees could provide instructors with training designed to inform them of the necessary policies and procedures needed when managing course. Shen et al. (2009) suggested evaluation, observation, and testing are the key components for developing mobile learning environments. Workshops could be conducted to teach instructors how to design and assess learning outcomes in a mobile environment.

The data suggest instructors should develop a wide range of skills to foster the competencies needed for instructors to develop instructional strategies for mobile learning. It is recommended that instructors be organized and clear when it comes to instructional strategies, as well as creative and flexible. Instructors can rely on professional development, mentoring, and other instructors when trying to further enhance these skills.

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).

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