

## **mLearning by Design**

Jean M. Haefner  
Adjunct Professor, Game Design and Development  
University of Wisconsin - Stout

Joan Hanor  
Professor of Educational Technology  
California State University San Marcos

### **Background**

The growth and use of cell phones in the last 20 years has happened so rapidly that the number is now nearing 5 billion. By the year 2000 the gross national product of a nation could be predicted by the number of new subscribers to wireless networks. Mobile devices have opened up new ways to socially interact, creating jobs for product designers, applications developers, and others (Simon, 2011. pp. 12-14). It is projected that by 2013, there will be 6 billion subscribers, overtaking the television and internet as the most common means of communication (Mobile Matters, 2012).

### **Definitions**

According to Crescente and Lee (2011), "E-learning can be broadly defined as content designed for access through electronic communication, such as the Internet, intranets, digital versatile discs, and synchronous and asynchronous modules." M-learning moves this idea a step further by locating content to various internet connected handheld devices including smart phones, tablets, laptops, netbooks, iPods, iPads, e-readers and PDAs (p. 112). mLearning gives the learner highly interactive real-time access along with anywhere, anytime flexibility. The means to learning is "always on - always on you" (Mobile Matters, 2012, Mobile Is section, para. 2; Franklin, 2011). Cochrane (2010) further defines mLearning to include the various smart phone features such as GPS, social network access, video and audio podcasting and others, all under the heading of mobile Web2.0 technologies (p. 134).

### **Benefits of mLearning**

As with any learning system, the success of mLearning may be measured best through its pedagogical intentions and foundations. The fundamental nature of mLearning does not reside within the technology itself but rather evidences itself through instructional design issues. In a literature review of learning theories used in E-Learning (Pange & Pange, 2011) four learning theories were explored: Behaviorism, Cognitivism, Constructivism and Active Learning. They suggest that the design of an online learning system could embrace similarities within the fundamental principles of all four. By including a variety of educational approaches, more consideration might be given to various learning styles.

Keskin & Metcalf (2011) extend their study of mobile learning theories further to include: Behaviorism, Cognitivism, Constructivism, Situated Learning, Problem-Based Learning, Context Awareness Learning, Socio-Cultural Theory, Collaborative Learning, Conversational Learning, Lifelong Learning, Informal Learning as well as Activity Theory, Connectivism, Navigationism, and Location-based learning. Their detailed analysis and specific examples indicate adaptability of their use to mobile technology.

When assessing benefits of mLearning, factoring the biology or characteristics of adult learners should be taken into consideration. This would include attention to different learning styles, opportunities for learner control and personalization of agenda, flexible pacing and use of authentic activities and assessment. While it is noted that many higher education students have a greater familiarity with

technology than their predecessors it is also true that some do not. Employing the learners' own mobile devices both individually and collaboratively enables personalization and the ability to use mobile learning spontaneously in varied contexts and locations.

### **Some Current Uses of mLearning in Higher Education**

Generally speaking, mLearning occurs through the mediation of a mobile device. While the use of mobile technologies has accelerated to the extent that they now overtake the increase of personal computers in both professional and social contexts, the use of mLearning technologies for instruction is not yet prevalent within universities (Herrington & Herrington, 2007). Earlier research found institutions such as Louisiana State University (LSU) transforming web pages into a format appropriate for mobile wireless devices (Kim, Mims & Holmes, 2006), and colleges are acknowledging the need to address the increasing use of mobile device users. As early as 2002 the University of Minnesota and the University of South Dakota, required students to have mobile wireless devices (Oliver & Wright, 2002). For a summary table of the list of colleges and universities that undertake projects using different mobile wireless technologies in teaching and learning see Kim, Mims & Holmes (2006).

For some university level early adaptors of mLearning, there is evidence that points to the use of these "new" tools to do older familiar teacher-centered tasks in perhaps pedagogically outdated or inappropriate ways. In a review of ways that universities use personal digital assistants, the most general uses were for storage and retrieval of information including e-books, courseware and timetables (Kim, Mims, and Holmes, 2006). A traditional instructional system of lectures is furthered through recordings and downloads on digital audio players such as Apple's iPod. Other examples of mLearning at the institutional level include teachers in the UK providing prompts for course requirements, polling classes and pop quizzes using SMS (short messaging service). Some universities provide phone exams in which the student/user is identified as the test taker through voice print (Herrington, 2007).

These traditional strategies for delivering instruction do not acknowledge the users interaction with the mobile device socially and the potential to incorporate that element into the task of creating new knowledge. MLearning promotes the development of "situated learning" which is an augmented knowledge context environment specific to the learners' personal or daily life. The characteristics of situated learning theory or authentic learning support the advance of mLearning as tools for complex and sustained tasks and problem solving, as opposed to simple tools for information delivery and retrieval (Seely Brown, J., Collins, A., & Duguid, P., 1989, Jan-Feb). Other researchers support the concept that mLearning has the ability to actively engage learners both individually and in groups through problem-based and inquiry-based learning and contribute to the development of critical thinking and problem solving skills. They suggest that through mLearning, students' broader access to information allows them to record and use hands-on exploration in unique locations such as museums, and art galleries allowing for increased interaction beyond the standard audio guide. The mobile device enables detailed study with divergent content available for differing ages and abilities, and can be location based (Granic, Cukusic, and Walker, 2009).

### **Barriers and Opportunities**

According to Pange and Pange (2011) research indicates the bulk of strategies employed in e-learning lack pedagogy and are seriously deficit in a number of areas including delivery, pacing, time management, design interface, strategies for teaching, and learner's attention. Many courses continue to be offered within a specific timeframe, with no deference given to the learner's preferred pace or level of ability. In addition, the interface design in e-Learning is often too complicated and visually distracting (pp. 62-63). Little attention is paid to learners' different cognitive levels and predilections. As argued by some, learning remains passive, and learning paths are still inflexible (Chee, 2004).

The knowledge differential in mobile learning may also be an issue for consideration at the university level. As noted by Herrington & Herrington (2007) many university professors may feel less competent in the use of mobile devices and are offered little institutional incentive to explore the advantages of incorporating this into their instruction. Whether college students may or may not learn better using mLearning is not necessarily the question. The fact is that many students today are very competent with ubiquitous technologies and already use them daily for social networking, communications, data collection and storage. The facility and imaginative uses of these devices suggests there is great opportunity for use in higher education.

As with e-learning, there exist a variety of mLearning styles and types. While technology affords the designer the opportunity to creatively design stylistically pleasing interfaces and environments, multimedia, and virtual classrooms, the most important consideration with mLearning is to ground the decisions within a strong pedagogical foundation. Once this is determined, ways may be found to incorporate the selection of approaches into an effective method of instruction. Other factors to consider are learners with low achievement levels; strained communication between the learner and the instructor; and technology issues for both (Cochrane, 2010, p. 114). The capabilities of the learner as well as the instructor should be considered, along with the selection and suitability of the mobile device (Dickerson and Browning, 2010). Aside from issues centering on learning, more practical issues should also be taken into consideration including the cost of phone and internet service plans, and availability of technical support (Dickerson and Browning, 2010). Security is also an issue due predominantly to open wireless systems, and communication limitations as evidenced in error rates, and interruptions. Applications can also pose security problems. If these various features are not considered, the result may have a negative effect on the learner as well as the institution sponsoring the endeavor (Talmale, Chauhan, Shrivatava, 2011).

Keskin and Metcalf (2011) outlined the learning theories associated with mLearning that included the learning theory, definition, focus, and examples using mobile technologies. Their table provides an excellent starting point for anyone interested in utilizing these technologies in their work, for training, or in the classroom. Examples of the theories in practice include; information and content delivery; context and content-dependent learning; learning via social context; problem-based learning; collaboration, and interaction-based learning and others. All of their examples include mobile technology methods that can be exercised. The paper also provides examples from the University of Central Florida's Mixed Emerging Technology Integration Lab (METIL). An example from Johnson & Johnson provides a virtual world training center. One from Microsoft is in the form of a mobile course and includes sales materials. Dream Corp's example is a cross-media training module providing information based on differing tracks of leadership, compliance, and a flexible workforce. Other examples are also provided.

### **Conclusion**

As defined, mLearning offers the ability to provide interactive access in real-time, with anywhere, anytime flexibility with smart phone features such as GPS, social networking, video and audio podcasting and others (Mobile Matters, 2012, Mobile Is section, para. 2; Franklin, 2011, Cochrane, 2010, p. 134). Wright and Parchoma (2011) argue these to be "affordances" unclear in usage and logically inconsistent. Though the eventual consequences are not yet clear to researchers, educators, or designers it is necessary to further examine and study the implications of mLearning for the design of teaching and learning. Future research should consider the multiplicity of meanings that are promoted by mLearning. We must determine what the learner is allowed and what is denied. We must clarify the philosophical and theoretical foundations and assumptions of mLearning as it applies to higher education. And finally we should examine design paradigm shifts that this mode of learning has and will reveal both to education and to the world in general. Roshelle (2003) sums it up nicely:

*Mobile learning challenges many of the fundamental assumptions that have been made for decades about higher education. It challenges what it means to teach and what it means to learn in higher education. It challenges the wisdom, timing and fixed spaces of established pedagogies and the usefulness of traditional tools and resources. The affordances of mobile technologies and appropriate theoretical frameworks have the potential to enable teachers to adopt mobile learning in sound and significant ways, and to ensure that it survives beyond novelty and convenience value. Research is needed to establish these affordances in the context of appropriate theoretical underpinnings and pedagogical applications (as cited by Herrington and Herrington, 2007).*

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### **About the Presenters**

**Jean M. Haefner** holds a MFA in Web and Interactive Media from the University of Wisconsin - Madison. She has worked as an online course developer, and multimedia and Web designer. She currently teaches Game Design and Development at the UW - Stout. She has presented nationally and internationally on e-portfolios, Videoconferencing, Mobile Devices, Distance Learning, and teaching in Virtual Worlds. Besides traditional visual art research, other areas of interest include emerging design principles, serious games, simulation, and situated learning in 3D space. Blending a visual approach with technology, she explores and reports research pertinent to art, design, and education communities.

Address: University of Wisconsin - Stout  
School of Art and Design  
318 Applied Arts Building  
Menomonie, WI 54751

Email: [haefnerje@uwstout.edu](mailto:haefnerje@uwstout.edu)

Phone: 715-232-5374

**Dr. Joan Hanor** earned her doctorate with an emphasis in Educational Technology from UW-Madison in 1995. Her prior training was in Fine Arts and education (BFA, Massachusetts College of Art & MA University of Iowa). She teaches and develops online educational technology courses at CSU San Marcos and works collaboratively to maximize opportunities for distance learning within the greater K-16 community. She has initiated and coordinated videoconferences and has taught workshops, seminars and courses on how to apply videoconferencing within divergent educational settings. She has presented nationally and internationally on topics of Distance Learning, Videoconferencing, e-portfolios, and educational use of Mobile Devices.

Address: California State University San Marcos  
College of Education, Health and Human Services  
333 S. Twin Oaks Valley Drive  
San Marcos, CA 92096

Email: [jhanor@csusm.edu](mailto:jhanor@csusm.edu)

Phone: 760.750.4305