Mobile Learning

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The early 21st century has seen an unprecedented growth in mobile learning technologies. (Hafeez-Baig & Danaher, 2007) Mobile telephone ownership and usage is now almost ubiquitous among student communities. (Uden, 2007) Such growth presents unique and challenging opportunities for developers, researchers, and educators to appropriate new and emerging mobile technologies towards learning; a concept increasingly recognized as mobile-learning or m-learning. In this paper I will consider some of the concepts of m-learning from three perspectives; the technologies used in m-learning; educational implications for m-learning, and finally a look at mobile learning design and evaluation. As part of the discourse, the paper will adopt the definition; mobile learning is the ability to learn independently of time and place, being facilitated by a wide range of mobile devices.

Technology

Any technology used in mobile learning offers a set of characteristics centered on access and learning experiences. In Mobile Learning Reviewed, (Kineo, 2009) several characteristics of mobile learning are presented. Ubiquitous, on demand learning is omnipresent, due in part to the increased availability of access provided by mobile network providers. Mobile learning should be bit-sized in duration, and collaborative in nature. The social platforms offered by mobile technologies enhance the cooperative nature of learning, allows learning to be situation dependant, or not, as well as

promoting the blended nature of mobile learning. While such characteristics, along with others, may guide buyers and designers of mobile learning, individual technologies offer their own unique set of affordances.

Accessing the Web using mobile technology continues to grow. When Laouris and Eteokleous (January, 2005) conducted a Google search {“mobile learning” + definition}, the search produced 1,240 hits. The same search six months later produced 22,700 hits. In 2006, 19% of the online population of the United States used mobile phones to access the web. In Spain and Germany these numbers were 34%. (comScoreNetworks, 2006). It seems certain that these numbers will continue to grow. Figure 1, (adapted from Corbeil and Valdes-Corbeil, 2007) provides informational data on some of the most current mobile devices.

Mobile Device	Positives	Negatives	Instructional Uses
USB Flash Drive	Small and portable Mass storage. Easy interface Inexpensive.	Single purpose device.	Storing coursework, audio/video files. Collaboration between students.
Graphing Calculator	Display mathematical functions. Programmable. Usually individual use.	No Web access. Costly ($ 125)	Math/ Science concepts. Multiple modes of representation. Data gathering abilities.

MP3 Player	Compact and light. Long battery life.	Not interactive. Replaced by newer technology.	Download podcasts and audio content.
iPod	Downloads music, photos, and video. Mass storage. Address book/calendar	Cost Small screen size Not interactive.	Download podcasts and other lecture material. Can exchange information files with others.
Cell Phone	Inexpensive. SMS (text message) Access to network.	No Web access. Small screen size.	Data and voice transfer. Synchronous and asynchronous modes.
E-Book Reader	Large screen size. Full text search and bookmark capabilities.	Single purpose device. Not interactive.	Ability to store e-books, magazines and textbooks, for learning and research.
Personal Digital Assistant (PDA)	Large screen. Web accessible. Combines several computing tools in one. Text and data entry possible.	Bulky in size which makes transport difficult. May require peripheral devices.	Plays audio/video/flash movies. Can edit documents/text. E-mail access and text messages.

Smart Phone	Web accessible. Combines a multitude of communication and computing features in a single compact system.	Cost to access web and data. Small screen. Small keys or virtual keyboard.	Plays audio/video/flash movies. (and more) Enable global collaboration and research. Support interactive and mobile learning.
Ultra-Mobile PC	Small size is portable. Offers most features of a regular laptop.	Expensive. Lack full sized keyboard.	Offers all features of regular laptop, including ability to access course Web based materials
Laptop/Tablet	Ideal devices to take your work with you. Web access. Provide power and capabilities of most other devices combined.	Relatively Expensive. Large in size, which makes transport challenging, and cannot be easily used while walking.	Complete and functional portable system. Robust productivity tool. Includes voice recognition and voice to text capabilities.

Figure 1.

The Smart Phone, combined with continuous internet access currently holds the most promise regarding mobile learning. [These] mobile devices are revolutionary because they transcend the boundaries of the structural stasis of classrooms and lecture halls...they do not have to be in one place in order to be effective (El-Hussein & Cronje, 2001). Currently, the instructional technology transmitted by means of mobile technology is mainly social and, to a lesser extent, economic (El-Hussein & Cronje,

2001). The challenge for educators will be to capitalize on the attractive features mobile devices offer, and rechannel the current paradigms of education towards mobile learning.

Education

Mobile learning is not just about learning using portable devices, but learning across contexts (Walker, 2006). As we take learning out of the confines of the classroom; many of the existing ideas regarding education will have to change. Our assumptions of writing and speaking will change, as will notions of formal and informal education.

One idea seems certain, mobile learning has much to offer regarding the context of learning. Once out of the classroom, mobile devices offer opportunities for "just in time" learning as content accessed from the Web allows immediate scaffolding of knowledge. Innovative design of mobile learning applications can facilitate users not only studying learning contents conveniently but also interacting with others collaboratively anytime and anywhere (Huang, Hwang, & Chang, 2010). This freedom, both of location and time, is one very favourable aspect of mobile learning, especially in the younger component of our culture, in which mobile technology is ubiquitous. It is precisely the mobility of these devices that makes them highly prestigious and therefore desirable as instruments of learning among learners of the same age group. (El-Hussein & Cronje, 2001). They go on to present three concepts for mobile learning,

Figure 2, in which the columns of mobility are both interdependent and operate on the same hierarchical level.

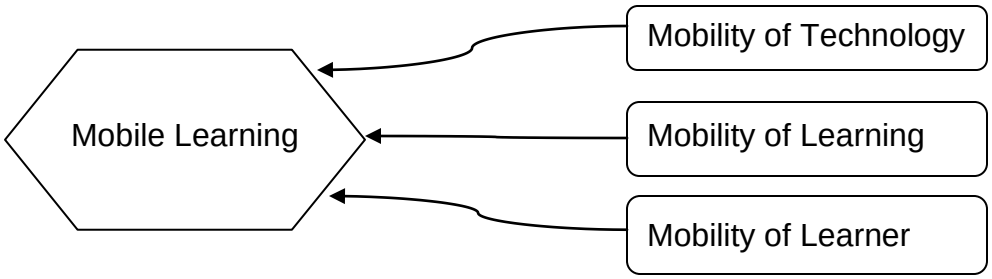

Figure 2.

Grohmann, Hofer, and Martin (2005) offer some advantages of mobile learning in the context that new technologies have both changed and transformed the ways that people live, work, and learn.

- Independence from location and time
- Personalised adaptive learning
- Changes in the culture of learning
- Integration into the (context) of work
- Mobile learning in the context of integrated, blended learning
- Cost reduction

It is argued that many learners find mobile devices to be particularly attractive and are motivated to use them (Jones, Issroff, & Scanlon, 2006). Motivations towards learning, both in and out of the classroom, are often indicators towards success. Mobile learning can be about supporting people in the activities they are willing to participate, and can enhance their enjoyment of these (Beal, 2006). Jones, et al (2006) suggests six

reasons why mobile learning may be motivating for learners; 1. Learners are able to extend more control over their learning goals; 2. Ownership of learning was perceived to be a huge motivating factor; 3. It was more fun to learn with mobile devices; 4. Communication, both informal SMS, and within the learning community; 5. Learning in context; and 6. Continuity between learning contexts. The “coolness” of mobile technologies is also considered as a motivating factor in mobile learning.

As we are out and about, we may well be in new, often uncontrolled environments (Beal, 2006). Since modern learners hold a different perception of technology, collection, retention, and sharing of knowledge can look very different in a mobile learning activity. Simple photo capture or extended video is easily shared among mobile devices, or can be posted on Facebook or YouTube as part of community knowledge. Through media sharing and social networking software such as MySpace, Bebo, and Flickr young people are developing transferable skills the employers prize, such as knowledge-working, media production, and collaborative working (Sharples 2006). Mobile learning opens our minds to the possibility of a radical new paradigm and encourages us to abandon the constraints of our habitual ways of thinking, learning, and communicating (El-Hussein & Cronje, 2001).

While mobile learning holds much promise, it is not without its drawbacks and constraints. On the pedagogical level, the idea of mobile learning is often associated with informal learning settings which could be triggered by situational affordances or could just take place whenever and wherever the learners want. It is an issue as to whether this kind of learning yields the necessary degree of systematisation and

coherence (Hoppe, 2006). Many educators will question if the curricular needs can be met, especially with the restraints of small screen sizes. Learning materials need to use multimedia strategies that are information rich rather than textual strategies (Ally, 2004). Grohmann, Hofer, and Martin (2005) list some advantages of mobile learning.

- Lack of automatic competence
- Lack of social contact
- Loss of privacy
- Lack of profitability
- Lack of acceptance
- Lack of standards

While Hoppe (2006) identifies knowledge integration as being a challenge for learning settings orchestrated by mobile devices, others, including myself, remain overly concerned with the access to the devices themselves. Costs of initial purchase, along with mobile access costs may provide virtual barriers, much like the classroom walls mobile learning is attempting to tear down. The current K-12 school system is likely to provide a formidable barrier to mobile learning. Parents want schooling that is familiar to them. Most are risk adverse and many are scared of the danger of new technology (Sharples, 2006). Walker (2006) echoes some of the same sentiment; noting that while mobile devices can support learning, they have the potential to render our current school system obsolete. We need to be reminded that schools are valuable for childminding, a concept that is not likely to change in the near future. Schools are currently safe havens of learning. While our current system contains a reasonable amount of trust, new mobile technologies can alter that perception, especially with

parents. While always on technology may appear beneficial, full digital recording of our lives impinge on the actual enjoyments of these experiences, while the social and cultural implications when others are recorded will need to be addressed and respected.

Regardless, educators will have to shift from being the transmitters of knowledge to facilitators of learning in order to create new learning pathways that are more situated, personal, collaborative and long term (Corbeil and Valdes-Corbeil, 2007). We need to be prepared to take advantages of the affordances mobile learning has to offer. It is only through careful attention to the implication on learning using mobile devices that we will be able to design learning situations that will lead to the evolutionary growth of mobile learning.

Design

As we move towards designing effective mobile learning environments, we must keep in mind an obvious, but essential difference; the assumption that learners are continually on the move (Sharples, Taylor, & Vavoula, 2005). This constant movement forces us to embrace the fact that a considerable amount, if not all, learning will take place outside of the conventional classroom or lecture hall. Such designs must account for the unique and artful ways that individuals engage in learning at unforeseen or impromptu sites.

The National Research Council (1999) concludes that all effective learning is;

- Learner centered
- Knowledge centered
- Assessment centered

- Community centered.

With 90 % of young adults in the United Kingdom owning mobile phones (Crabtree, 2003), any design models must incorporate a convergence of learning and technology. A summary of such convergence is proposed by (Sharples, Taylor, & Vavoula, 2005), in figure 3 shown below.

New Learning	New Technology
Personalised	Personal
Learner Centered	User Centered
Situated	Mobile
Collaborative	Networked
Ubiquitous	Ubiquitous
Lifelong	Durable

Figure 3.

In their design and analysis of learning systems, Chen and Huang (2010) report that students exposed to mobile learning systems achieved more than students limited to a classroom due to three factors; greater variety of learning materials; illustrations were more effective and advanced; and learners had their own storage space for knowledge, outside of the classroom.

Despite the omnipresent use of technology, mobile learning design continues to evolve relatively cautiously. What follows paragraphs represents an overall design principle for mobile learning followed by an example based design. Together they offer a representative overview of what mobile learning design can look like.

The following characteristics are recommended for the incorporation of mobile learning into a higher education learning environment. (Herrington, Herrington, and Mantei, 2009),

1.	Real world relevance:	Use mobile learning in authentic contexts, where mobile learners can engage with learning in situated in real life.
2.	Mobile contexts:	Use mobile learning in contexts where learners are mobile across topics, time, and space.
3.	Explore:	Provide time for exploration of mobile technologies. Use peer tutoring and authentic introductory tasks to scaffold learners with limited technological skills.
4.	Blended:	Blend mobile and non mobile technologies. This increases the versatility of the end-products of the learning process.
5.	Whenever:	Use mobile learning spontaneously. Being at the right place at the right time holds endless possibilities for both individual and community knowledge building.
6.	Wherever:	Use mobile learning in non traditional learning spaces. Learning about art and architecture where they are situated (reside) is very powerful.
7.	Whomsoever:	Use mobile learning both individually and collaboratively. The sharing of knowledge is a powerful tool in any learning situation.
8.	Affordances:	Exploit the affordances of mobile technologies. A camera in a smart-phone may not have the same resolution, but is available, and therefore more likely to be a component of mobile learning.
9.	Personalise:	Employ the learners' own mobile devices, as they are most likely to be familiar with their affordances.
10.	Mediation:	Use mobile learning to mediate knowledge construction. This can promotes personal learning, along with individual goal setting.

11. Prod*use*: Use mobile learning to produce and consume knowledge. Web 2.0 applications like Wikis and blogs allow constructivist approaches to knowledge sharing.

In Mobile Learning Reviewed, (Kineo 2009) present a range of short, support forms of learning intervention design approaches. They are presented in figure 4 below.

Design Approach	Commentary/ Application
Support through Instant Information	General reference material. Text and richer media available via the internet. May include language and medical support.
Assessment Skill Checks Quizzes	Simple structured quizzes, delivered via SMS Tutor/teacher can offer immediate feedback, individually or to the entire group. Can be structured as a group learning activity. Driving exam questions, SAT questions can be delivered to mobile device daily for review and skill retention. Potential for commercial availability.
Collaborative Learning	SMS/voicemail/email contact to tutor or group. Podcasts and YouTube video. Participating in learning polls. Information can be stored in a central location which promotes knowledge communities.
Audio Learning	Most mobile devices have MP3 file capabilities. This application available to visually impaired learners. Audio books, learning a new language. Audio tours of new workplaces and museums. Listen to experts for tips and review.
Video Learning	Video clips, podcasts, YouTube. Games and multimedia. Lots of potential for increase motivation of learners. Learners can post video to web for collaborative learning, review, or as a way to store knowledge. Small screen size less an issue as screen sizes and resolution increase.
Focused Learning	A short focused learning module may incorporate more traditional learning approaches, but with enhanced graphics and

Modules	interactivity. Such modules would have to be short and simple.

Figure 4.

Whatever design options are employed, mobile learning should incorporate three S's; apply a structure, but keep it short and simple. Take advantage of the affordances the web has to offer in terms of access and collaboration, along with the web's rich media diversity.

Conclusion

The ubiquitous use of mobile technology, especially amongst young people, holds extreme promise for mobile learning. Despite their small screen size, smart-phones, with web connectivity, numerous collaborative features, and a seemingly endless set of emerging applications, hold countless opportunities for learning outside of the classroom. Mobility offers just in time learning in situated contexts, increasing both motivation and personalization towards learning. Collaboration offers learners unique opportunities to contribute to and take advantage of knowledge communities. Designers of mobile learning are encouraged to take advantage of all the affordances that current and emerging technologies have to offer, yet at the same time promote situated learning that is both short and simple, essential characteristics of learning on the go. As with all learning, everyone needs to be cognisant of the ethical implications that mobile learning must address. Sharing often compromises privacy, and mobility may foreshadow an end to our traditional school system, a paradigm change we may not yet be willing to accept.

References

Ally, M., (2004). Using learning theories to design instruction for mobile learning devices. *A book of papers from MLEARN 2004.* pp 5-8

Beal, R., (2006). How to enhance the experience without interfering with it. *Big Issues in Mobile Learning*, University of Nottingham, pp 12-16

Chen, H.-R., & Huang, H.-L. (2010). User Acceptance of Mobile Knowledge Management Learning System: Design and Analysis. *Educational Technology & Society, 13* (3),

Corbeil, J., & Valdes-Corbeil, M., (2007). Are You Ready for Mobile Learning? *Educause Quarterly*. Nov.

comScoreNetworks, (2006). Europeans More Likely than Americans to Use Mobile Phones to Access the Internet. Downloaded from http://www.prnewswire.com/news-releases/. Dec.

Crabtree, J., Nathan, M. and Roberts, S. (2003). *Mobile UK: Mobile phones and everyday life*. London: The Work Foundation.

El-Hussein, M., & Cronje, J., (2010). Defining Mobile Learning in the Higher Education Landscape. *Educational Technology & Society, 13* (3), pp 12–21.

Grohmann, G., Hofer, A., & Martin, G. (2005). Helping to define the future of mobile learning. Paper presented at the 4th international conference on mobile business, University of Technology.

Hafeez-Baig, A., & Danaher, P., (2007). Future Possibilities for Mobile Learning Technologies and Applications at the University of Southern Queensland. *MoLTA.*

Herrington, A., Herrington, J., & Mantei, J., (2009).Design Principles for Mobile Learning. *New technologies, new pedagogies: Mobile learning in higher education,* Faculty of Education, University of Wollongong.

Hoppe, U., (2006). How can we integrate mobile devices with broader educational scenarios? *Big Issues in Mobile Learning,* pp. 32-35.

Huang, Y.-M., Hwang, W.-Y., & Chang, K.-E. (2010). Innovations in Designing Mobile Learning Applications. *Educational Technology & Society, 13* (3), pp 1–2.

Jones, A., Issroff, K., & Scanlon, E., (2006). Affective factors in learning with mobile devices. . *Big Issues in Mobile Learning,* University of Nottingham, pp 17-22

Jones, A., Issroff, K., Scanlon, E., Clough, G., & McAndrew, P., (2006). Using Mobile Devices for Learning in Informal Settings: Is it Motivating? *IADIS International Conference on Mobile Learning.* July 14-16.

Kineo and UFI/Learndirect (2009). Mobile Learning Reviewed.

Sharples, M., (2006). How do we address the conflicts between personal informal learning and traditional classroom education? *Big Issues in Mobile Learning*, University of Nottingham, pp 20-23

Sharples, M., Taylor, J., & Vavoula, G., (2005). Towards a Theory of Mobile Learning. *A Book of papers from mLearn 2005*

Uden, L., (2007). Activity theory for designing mobile learning. *Int. J. Mobile Learning and Organization,* 1(1)

Walker, K., (2006). Mapping the Landscape of Mobile Learning. *Big Issues in Mobile Learning,* University of Nottingham, pp 5-6