Mobile Learning

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Abstract - Technology supporting learning activities are becoming a big buzz word in today's world that we are living in. The term 'm-learning' or mobile learning is not behind with the evolution of numerous user-friendly mobile technology tools. From a European research perspective, technology enhanced learning is a multifaceted and multidisciplinary activity, which is playing a significant role in teaching and learning environments to empower and increase the learner interactions. The author wants to further share her personal experiences in this paper along with quotes and citations from other authors who have written in similar areas or experienced similar situations to make it more informative for the researchers and also take something from their experiences of practical implementations.

Keywords –mobile learning, m-learning, technology-enhanced learning, e-learning.

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INTRODUCTION

"Tell me, and I'll forget. Show me, and I may remember. Involve me, and I'll understand"
----Chinese Proverb (n.n)

The above Chinese proverb had always excited the author to promote further and research into this area of learning. This proverb best describes this topic of mobile learning in its true essence. According to the author, in a study done on a group of engineering students in the *Journal of Research on Technology in Education (n.d.)*, the students were divided into two groups. The first group was given a set of notes and was asked to construct a blender. Students in second group, were given the same notes but also were shown a video demonstrating the various steps involved in constructing a blender and were asked to construct a blender. Now one would wonder which group would do better? Well, this Chinese proverb just fitted so well. Study showed that the group that was given the notes and were shown a video, performed better in constructing the blender. This was just one of the examples demonstrating the use of multimedia technology for creating a significant learning environment. According to the author, a lot of research has already been done and is being done in this arena in how technology enhanced learning is playing a significant role in changing the way we teach and learn.

The reason for sharing the above example is to show the effectiveness of multimedia learning and how an environmental change can help creating a meaningful learning environment. The author wants to point out an article she read on the web (n.d.) which said IIM, Bangalore in India had launched various Entrepreneur programs for encouraging women in the area, a great innovative way for both enhancing the field and one particular section of society, but to how many could these programs be reached? According to the author, mobile technology in India seems to be booming at an alarming rate and what better way to make use of this mobile technology to reach out to this one particular section of society. According to the *International Journal of Technology Enhanced Learning (IJTEL),* " *Learning for anyone, at any time, at any place", is the motto. (n.d.)* Following the above motto, it seems appropriate for reaching out to not only this particular section of society but nearly everyone, at any time and any place by making the effective use of mobile devices. From the author's own experiences it seems almost everyone from a cleaning lady to an executive have access to mobile phones in India. The other day while walking in a University campus, (2011), the gardener lady was talking on mobile phone and doing her work. Imagine the power of mobile phones to reach out to masses in rural area to teach English or even solving their work related queries with the use of mobile technology and in return productive and more knowledgeable masses.

Existence of Mobile Learning:

In this paper when we are talking about mobile learning, we are talking about learning made possible through the appropriate use of mobile phones and devices. Research has shown that the concept of mobile phones have been in existence way before the technology was available to make them mobile. Bell Labs and Motorola were racing to be pioneers in this technology, but in 1973 a scientist by the name of Martin Cooper made the first mobile call using a portable calling device. Following then in 1977, AT&T introduced their wireless network. By the end of 1987 there were over one million users of cell phones in USA alone. Since, then worldwide use of mobile phones has increased rapidly and as they say rest is history. Various studies by other researchers and scholars have suggested that adoption of mobile phones is dependent on age, education and wealth. However, in author's opinion, it could have been dependent on these factors initially when mobile phones came into existence and also on the availability of the devices and networks, but a lot

of research needs to be done at national and international levels to determine the real reasons.

According to the author, (Learning Light, 2006) *mobile learning was initially referred to the term of using laptops instead of desktops for learning purposes. Mobile learning was initially referred to laptop learning and with the introduction of wireless networks and hand-held devices such as the PDAs and pocket devices, it became the hand-held learning.* (Learning light, 2006). Thus the classroom teaching was not limited to just a traditional classroom, but from there it came to desktops, then laptops, and finally into the learner's pockets. The concept of creating, collection and circulating is so true according to this article by learning light. (2006). The author of this paper personally thinks that learning and teaching both have gone a tremendous change and will continue to grow with educational technologies and web. We have to stay in the cutting edge of educational technologies to avail and become a part a part of this cutting edge revolution of teaching and learning.

Research has shown that, the term mobile learning came into existence alongside e-learning; and with the entry of numerous trendy mobile gadgets available to each and everyone; and the entry of twenty- something in the workplaces, mobile devices are changing the way we teach and learn. Therefore, innovations in educational and mobile technology using mobile devices could be a great resource for projects globally, as it is a flexible approach of teaching and learning, thus moving out of the environment of more traditional classrooms. For example research has shown that several projects done in collaboration with national and international universities to teach English through the platform of mobile phones are under way. The author wants to share the below quotation as it is truly a phenomenon in this 21st century and digital age we live in. It is changing the way we teach and learn and not just limited to self-learning, outdoor-learning, at work-learning and life-long learning. The term pedagogical innovation, according to the author is defined as an innovation in means of giving instructions, using the tools and technologies available in this 21st century and digital age.

> *"One of the strongest arguments for bringing new digital technologies into schools, universities and other educational institutions is that, by doing so, we would trigger pedagogical innovation."(n.d.)*

Defining Mobile Learning:

Is mobile learning a learning and teaching supported by mobile phones or mobile devices? This is a question that comes in mind? Or does it mean learning and teaching anywhere and for everyone? Or is it the learning on the move, away from a traditional classroom environment? Or a combination of all of the above? Well let us look from a bird's eye view the different definitions of by different scholars and researchers.

> *Pinkwart, et al. (2003) for example, defines e-learning as 'learning supported by digital "electronic" tools and media', and by analogy, mobile learning as 'elearning that uses mobile devices and wireless transmission'. Quinn (2000) defined it earlier, as simply learning that takes place with the help of mobile devices…. More recently, Traxler (2005) defined it as "any educational provision where the sole or dominant technologies are handheld or palmtop devices", but a few paragraphs later he admitted that this definition might be rather technocentric and argues that we might need to look at mobile learning from the learner's and user's perspective… This definition gives mobile technologies a special role, because they dramatically increase our possibilities of communication and conversation.*

It is interesting to see so many different perceptions about defining mobile learning. But defining mobile learning only in terms of mobile devices will not be fair, as it has the word 'learning' attached to it as well, so we need more research work in that domain. According to the author of this paper, it could be defined as a means for learning for anyone, anywhere and at anytime. Below was a paper which the author came across while attending and presenting at the *World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2010.* It was interesting to see the definition of mobile learning in the year 2004 and how in the year 2011 it still holds its relevance.

According to the authors, "*M-Learning (Mobile Learning) is a band new and learner-centered computing paradigm, which is believed to really enable Anytime and Anywhere Learning, with its distinguishing features from other previous*

concepts of learning such as computer-based learning and electronic learning (e-learning). There have been some efforts for defining m-learning. However, both practitioners and researchers are still wondering how m-learning is different from e-learning, which is still considered a new paradigm of learning." (*Son, C., Lee, Y. & Park, S. 2004*).

Although, the definition of mobile learning as mentioned above is becoming much more clearer in this century we live in. From a traditional classroom, teaching and learning have come in the pockets of learners and they have more control on their learning at anytime, anywhere accessibility. We are not only limited to mobile educational technologies such as cell phones but now we even have pockets tablets and ipads. Carrying the whole world of knowledge in their pockets is just a matter of choice now.

## Significance of Mobile Learning:

It is important to note that any 'computer-supported' learning does not necessarily means connecting remote learners. It is actually the effective use of technologies out there to enhance the face-to-face interactions between the learners and teachers or just peer to peer interactions. The term Scaffolding here, in this context as we are talking about the role of mobile learning among learners and teachers would be the appropriate place to mention. According to Vygotsky, a famous Russian Psychologist, 'Scaffolding Instruction is defined as the role of teachers and others in supporting the learner's development and providing support structures to get to the next stage or level." (Raymond, 2000, p.176). So if we really look at the above definition of mobile learning, different educational tools as in the case of mobile devices could be the support structures for mobile learning.

Recently while talking to a faculty in the area of Agribusiness, who was looking for a solution for her students to get access to educational materials and lectures while on field trips and for herself to communicate face to face with her students. The author suggested a cheaper version of ipad a mobile device with audio and video capability of playing e-learning lectures, available in the market as a substitute for her students. The device could work as a voice recorder to gather data for their research work, e-book and e-resource capability like kindle, access to reference PowerPoint or word notes and materials at their finger tips while on the field trip and in addition a learning tool with access to tons of video and audio lectures from other professors and

universities. In addition there are tons of free online video conferencing tools available for a face to face interaction which could be implemented at the institutional level, as suggested by the author. But according to the author, some of the limitations that come across in implementing the video-conferencing tools are the cost and infrastructure facility like a constant access to internet being some of the major areas to look into first, which the author is trying to work. Of course, after that is the training of the faculty members interested in using the above educational technology tools and for that the Center for Educational Technology and e-learning can be of great help of which the author was the coordinator.

Similarly, according to Geddes (2004*), mLearning is the acquisition of any knowledge and skill through using mobile technology, anywhere, anytime that results in an alteration in behavior.* (Geddes, 2004) However, 'the following points are to be noted from this definition: The term 'mobile technology' refers to any device that is designed to provide access to information in any location, or while on the move. Specifically this would include, but not be limited to mobile phones, personal digital assistants (PDA), tablet computers and laptops. In this figure shown below, Terms such as teaching and training are not used in this definition. It is not suggested that these methods of facilitating learning will disappear, however, greater emphasis will be placed on self-directed learning.; The behaviorist idea of an 'alteration in behavior' is used because as the information age continues to progress, more people will be gaining more knowledge, more often and more easily. However, without an alteration in behavior, it is not deemed to be learning. Figure-1 as shown below, is a graphic representation of mLearning, which in this instance is synonymous with flexible learning. It details the time issue by showing that if information is a) not available, b) not available at a certain time or place, or c) is the incorrect information, and does not result in the required behavioral change, then time is expended unproductively'.(Geddes, 2004)

Thus, research shows that 'M-learning' goes beyond the use of mobile phones or laptops. Firstly, it is a larger concept than just the simple use of mobile phones. It is an access to information for anyone, anywhere and at anytime at your fingertips. So far we have seen briefly the evolution of m-learning and definitions by various scholars and researchers. Further in this paper we will briefly discuss some of the mobile technologies available in the world and their successful implementations in various fields. In addition a look at some of the assets of mobile learning and case studies.
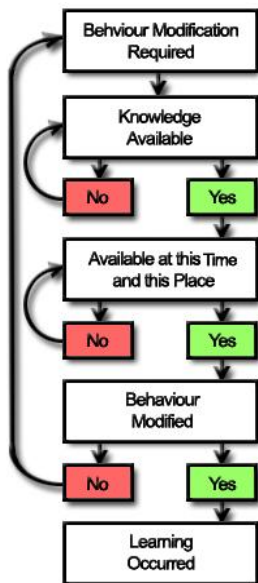
Figure 1: Mobile Learning (adopted from Geddes, 2004)
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Assets of Mobile Learning:

The use of mobile and hand-held devices which support learning in a whenever and wherever way, has helped in transmitting learning materials to and from learners in a variety of situations. Collecting and sending data from field trips or homework, or to simply communicate with teachers and other experts outside the traditional classroom, mobile learning is breaking the boundaries of a formal school-based learning.

Similarly, for professional learners of this 21st century, who have less time at their hands mobile technologies can prove to be a great asset. For example, while waiting at the airport, brushing up their French or Spanish or simply going over their presentations before a meeting, or simply updating their knowledge on various websites such as WebMD, which is widely used by doctors in USA. Also, mobile learning offers new ways to extend education outside the traditional classroom into the conversations and interactions of everyday life. Does this mean that technology enhanced learning be considered as a tool for pedagogical innovation?

Reading an article in the Journal of Philosophy of Education, titled "Technology Enhanced Learning as a Tool for pedagogical innovation", according to Laurillard (2008),-educational policy aims are always very ambitious and to achieve these aim effectively, we have to rethink our approach in learning and teaching. According to this

research the existing 20th century educational-institutions models are not going to be effective in this global and digital 21st century. Keeping this aim in mind technology driven approaches have driven changes in the teaching and learning approaches. However, is it the innovation in lectures or is it the technology driven education approach responsible for pedagogical innovation? If any approach is successful in remote city around the globe, how will it be successful in emerging nations or a different nation or country? These are some of the research questions that the author wants to dig further.

Focusing on figure2 below it appears that the whole learning scenario is changing in this 21st century. The learner is not restricted to a traditional classroom and teachers but segregates knowledge from various other resources such as blogs, wikis, internet, library, senior peers and the environment he is living in. There is enormous information available at the finger tips of the learners and mobile technology is just enhancing this kind of learning and teaching.
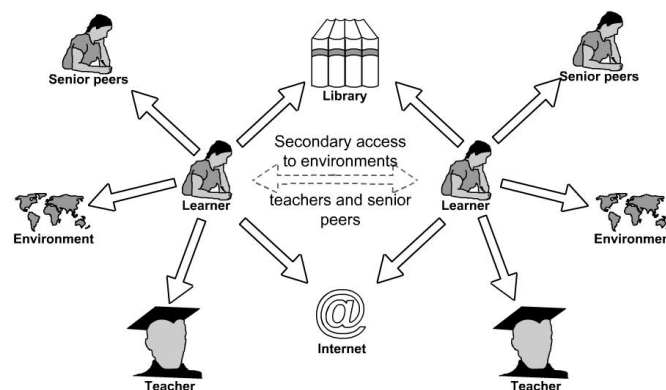
Figure 2: The Learner Centred Collaborative Environment (adopted from Geddes, 2004)
Copyright © 2004 Geddes S.J.

Case Studies:

Case Study 1: The author of this paper won the first prize in the College Technology competition. The posters and presentations were made on Palm One few years back in 2005, when it costed approx. $500 apiece. The target population for this product came from a big American corporation looking to invest in this technology for their employees who travelled a lot and wanted to stay in touch with the latest trends in their field and also being able to check their emails and inbox. Many of them had to wait for hours at the airport. Palm-one was a great solution for them to brush up their presentations before their meetings just at the palm of their hand without any elaborate tools or connectivity problems. The rest if of

course is history as the recycle plan was to distribute and make it available to the rest of the employees within the same corporation at no extra cost. The author had won the first prize on this project in the college.

Case Study 2: The author would like to share her second case-study on E-learning experience, where her study's concept was pioneered in one of the business development departments of corporate America. The sample populations for this study were college and adult professionals such as managers and directors. They were chosen from the same organization but from different levels, different age groups of the corporation, and based on their leadership potential. One of the participants wanted to be a part of this study but he had to withdraw in between the study as he was promoted to a senior level executive position. The participation had no extrinsic motivational factors but was on voluntary basis. The Blackboard was the communication tool used and the study was conducted entirely online. After the study was completed the feedbacks received from the participants were very positive. Some of them suggested web-breaks instead of tea or coffee breaks in their work hours and some found it very helpful in relating to their existing work. During the entire study through the means of the communication tool, the participants could interact with each other more and know about their professional work which was not possible otherwise. During the study, they even started relating their research and study materials, to their real life work experience.

Implementations and Amplifying Mobile Learning:

The author would like to share some of the devices enhancing the learning activities based on her own research and the web has played a key role in getting the information about these materials. The first device is the famous $100 Laptop project that was undertaken. "MIT, USA, Media Lab visionary Nicholas Negroponte unveiled prototypes of a low(er)-cost, robust $100 laptop at the United Nations' World Summit on the Information Society. The neon-green hand cranked machines consume far less energy than traditional computers, and Negroponte hopes that they will help to close the technology gap and enable peer-to-peer learning among young people, especially in poorer parts of the world.", (n.d.). The author had seen $100 laptop in Hyderabad, India and it also had a cord to plug it for charging and a nice carry bag. Some of the features were impressive, but still one had to give an initial demo of how to use the product as it was not so simple as a regular desktop or pc. But the possibility of its being so cheap and being able to

be cranked for power is an amazing capability for emerging nations where power supply is not so reliable. It was a great start and an innovative way of looking technology such as a laptop being available so reasonably priced.

Recently in India laptops worth Rs.1500 approximately, ($30), are likely to hit the markets in 2011. It will probably be the cheapest laptop in the World. It appears to have all the necessary features such as the Wi-Fi, 2GB Ram memory, and powered by 2watt system. It is really becoming a reality for "Learning for anyone, at any time, at any place", (n.d.) by the International Journal of Technology Enhanced Learning (IJTEL),

The Touch User Interface – which is a Touch Screen and Multi Touch concept. This graphic tablet enables the visually impaired to draw and admire the emotions behind colors.

The Sony OLED Screen is thin enough to wind up around a pencil and carried around without any special carry bag accessory. This device is an OLED screen that's so surprisingly flexible that it can be rolled tightly around a tube, the size of a pencil. It is hard to believe that a computer screen can actually be rolled like a pencil and carried around.

The other device is the Sixth Sense: A Wearable Gestural Interface. This prototype is comprised of a pocket projector, a mirror, and a camera. The hardware components are contained in a pendant-like wearable device. The projector projects visual information on walls and other physical objects, which become interfaces, while the camera recognizes and tracks the user's hand gestures and physical objects using computer-vision techniques. It is developed in MIT media lab. It uses the natural hand gestures to interact with digital information. (Mistry, P. Maes, P., 2009)

Finally we talk about the eRoll Ebook Concept. This eRoll e-book reader was designed by Dragan Trencevski. This eBook is contained in a tube from which the OLED paper-thin screen is pulled out. The eRoll gadget features navigation buttons on the right side of the screen, which can be controlled using your thumb. We currently have mobile e-book devices such as the kindles, Ipads, notepads, Iphones, smartphones, blackberry, PDA etc., but having the capability to roll them into a tube makes them even more flexible to carry around like the eRoll e-book reader.

Conclusion:

Finally, in the end the author would like to mention about the book by Howard Gardner, The Five Minds for the Future. The author presented a paper on this book in the World Conference of e-learning for healthcare, and higher education in Florida, USA. Howard Gardner is a professor of Cognition and Education at Harvard Graduate School of Education at Harvard University. He is also well known for his book titled 'Multiple Intelligence'. According to Dr. Gardner from author's perception, in addition to the seven intelligences there is an eighth type of intelligence called the 'Artificial intelligence'-the machine intelligence, which is worth mentioning in this technology related article. In this digital and global society, in this paper research has shown that appropriate use of technology can actually enhance the learning and teaching capabilities of both students and teachers. Similarly, lack of appropriate technology can be a hindrance for the meaningful learning experience of students.

Concluding this discussion, of how electronic technologies can enhance the development in general, let us turn to the most basic of nature studies, i.e. the study of human nature and the ecology of the brain. Until recent years most of these studies were done in the surgery and by observation of brain-injured people. Now it is possible not only to see the structures of the brain with non-invasive technologies such as PET and CAT scans, but also the watch brain activity through functional MRI's. We are just beginning to understand what this information tells us about individual differences in learning. (Dickinson, D, 1998)

The above is just one example of how the data can be at the palm of doctors while taking a round in his hospital in addition to having the access to WebMD and the entire patients report at his fingertips right in his pocket. Thus the author would like to conclude that mobile learning can really change the way we are learning and teaching.

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