

Mobile Learning: Cell phones and PDAs as Educational Learning Tools for Students in Tertiary Institutions

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ABSTRACT

Mobile learning is a new model of e-learning, which combines mobile computing and e-learning. With this new technology, learning will become more learner-centered and informal, rather than teacher-centered and formal. This paper reviewed and discusses the fact that Cell phones and PDAs can be used as educational learning tools by students in tertiary institutions. The knowledge acquired from this paper is useful to university administrators, ICT policy makers and academicians in developing countries. Since this idea succeeded in developed countries like Japan, Britain, USA, and Denmark among others, it is unlikely to fail in developing countries.

Keywords: *M-Learning; E-Learning; Cell phones; PDAs; Learning Tools; Tertiary Institutions*

1. INTRODUCTION

In this 21st century, there is a big motivation seen among students and lecturers to use mobile devices for educational purposes. Therefore we can have any time and any where educational world (Attewell & Savill-Smith, 2004). Mobile learning is a new model of e-learning, which combines mobile computing and e-learning. With this new technology learning will become more learner-centered and informal, rather than teacher-centered and formal. According to (Attewell & Savill-Smith, 2004), M-learning is the use of electronic learning (e-learning) materials on mobile devices such as personal digital assistants (PDAs), Tablet PC, mobile phones, Pocket PC, Palmtop computers and in general every devices that are small and autonomous enough to help us in every moment of our life.

In 2001, when m-learning project commenced few people knew about the concept of mobile learning or, indeed could envisage the potential of mobile devices for learning. The m-learning project was funded by the European commission and project partners in England. It not only involved developing learning materials to run on handheld devices in a time of rapid technological development, but also targeted reluctant young adult learners with poor literacy or numeracy. There are estimated 1.5 billion mobile phones in the world as at 2004. This number has since increased geometrically (Presky, 2004). The Netsize Guide (Netsize, 2008) revealed that mobile device have penetrated over 85% of the U.S. population. Infact, the latest study by Pew Internet and American Life Project of 2054 Adults found that the cell phones is the technological tool Americans would have the most difficult time giving up. The (Pew

Internet, 2008) research also indicated that 62% of all Americans have some experience with mobile access to digital data and tools away from home or work using a wire-less laptop connection or with a handheld device.

(Quinn, 2003), define mobile learning (commonly referred to as m learning) as all "knowledge in the hand". It includes the use of mobile/handheld devices to perform any of the following: Deliver education/ learning, Foster communications/collaboration, and Conduct assessments/evaluations Provide access to performance support/knowledge. Today, many numbers of portable devices can quickly and easily deliver and support these functions. Cell or Smart phones, multi-game devices, Personal Media Players (PMPs), Personal Digital Assistants (PDAs), or wireless single purpose devices can help deliver coaching and mentoring, conduct assessments and evaluations (e.g. quizzes, Tests, surveys/polls and certifications), provide on-the-job support and access to information, education and references, and deliver pod casts, updated alert, forms and checklists. In these ways, mobile learning can enhance and support more traditional learning modes, making it more portable and accessible.

The term mobile learning (m-learning) refers to the use of mobile and handheld IT devices such as personal Digital Assistants (PDAs), mobile telephone, laptops and tablet PC technologies in teaching and learning. The evolution from 3G to 4G will be driven by services that offer better quality video and sound. Thanks to greater bandwidth more sophistication in the association of a large quantity of information and improved personalization. This will lead to mobile learning achieving nearly all that e-learning can do today, without the need of carrying around a desktop or laptop computer (Nix, 2008).

2. CELL PHONES

Since their inception, the dimensions of cell phones have waned as much as their abilities have waxed. Common features of these devices now include Internet access, voice-messaging, SMS text-messaging, cameras, video calling, video streaming, conference phoning and even video-recording. In language learning, all of these features enable communicative language practice, access to authentic content, and task completion. The use of telephones in distance language learning is not unique to m-learning. (Twarog & Pereszlenyi-Pinter, 1988) used telephones to provide distant language learners with feedback and assistance. In 1996, instructors at Brigham Young University-Hawaii taught a distance-learning, English course from Hawaii to Tonga via telephone and computer (Green, Collier, & Evans, 2001). (Dickey, 2001) utilized teleconferencing to teach an English conversation course in South Korea.

One of the first projects using mobile phones in language learning was developed by the Stanford Learning Lab, which explored their use in language teaching (Brown, 2001). Specifically, they developed Spanish study programs utilizing both voice and email with mobile phones. These programs included vocabulary practice, quizzes, word and phrase translations and access to live talking tutors. Their results indicated that mobile phones were effective for quiz delivery if delivered in small chunks. They also indicated that automated voice vocabulary lessons and quizzes had great potential. Their tiny screen sizes were deemed "unsuitable for learning new content but effective for review and practice" (Thorton & Houser, 2002). Live tutoring was also effective, but poor audio quality was judged to potentially affect comprehension adversely.

(Thorton & Houser, 2005) also developed several innovative projects using mobile phones to teach English at a Japanese university. One focused on providing vocabulary instruction by SMS. Three times a day, they emailed short mini-lessons to students, sent in discrete chunks so as to be easily readable on the tiny screens. Lessons defined five words per week, recycled previous vocabulary, and used the words in various contexts, including episodic stories. Students were tested biweekly and compared to groups that received identical lessons via the Web and on paper. The authors then explored usability and learning issues. The results indicated that the SMS students learned over twice the number of vocabulary words as the Web students and that SMS students improved their scores by nearly twice as much as students who had received their lessons on paper. Students' attitudes were also measured. The vast majority preferred the SMS instruction, wished to continue such lessons, and believed it to be a valuable teaching method. The authors theorized that their lessons had been effective due to their having been delivered as push media, which promote frequent rehearsal and spaced study and utilized recycled vocabulary.

(Levy & Kennedy, 2005) created a similar program for Italian learners in Australia, sending vocabulary words and idioms, definitions, and example sentences via SMS in a spaced and scheduled pattern of delivery and requesting feedback in the form of quizzes and follow up questions.

Another program by (Thorton & Houser, 2003) utilized a classroom polling system, EduClick, to survey students during class in order to determine vocabulary retention. Poll questions were projected, students used their cell phones to surf to the polling software and make their selections and the tabulations were projected as bar graphs. In this way, students and teachers alike received immediate feedback.

(Kiernan & Aizawa, 2004) set out to study whether or not mobile phones were useful language learning tools and to explore their use in task-based learning. They argued that second language acquisition is best promoted through the utilization of tasks which require learners to close some sort of gap, thereby focusing the learner on meaning. In the traditional classroom, however, such activities are easily defeated by the close proximity of students. The use of mobile technologies would be one way to separate learners. In their study, upper and lower level university students were placed into three groups: PC email users, mobile phone email users, and mobile phone speaking users (due to cost, this latter group became face-to-face speaking users). Then they were given a pre-test, three narrative tasks, three invitation tasks and a repeated post-test. While all the face-to-face speaking users completed these tasks in the time provided, only two pairs of PC email users and one pair of mobile phone email users completed the tasks. The face-to-face speaking users had significantly faster performances and the mobile phone email users had the slowest; however, the latter were not significantly slower than the PC email users. These differences were attributed to relative speed of typing versus speaking, and the relative speed of typing on mobile thumb pads versus keyboards. An interesting side-note was that the fastest mobile phone email user had told the entire story in only a single text-message. In general, fewer words were used by mobile phone email users, yet they were able to communicate effectively. While the upper-level students' performance improved significantly on the post-test, this was likely due to a change in the post-test format for this group (since the pre-test required written translations but the post test consisted of multiple choice questions). One of the newest technologies with potential application in language learning is moblogging, an amalgam of mobile and weblogging. (Mielo, 2005) further defined moblogging as using a cell phone or PDA "in the field" to post words and or pictures to a website. Blogs themselves are a recent trend in language teaching. They provide opportunities for language creation (i.e., journaling) and collaborative activities. Mob logs offer the potential to expound these benefits by removing time and place boundaries and adding authentic and personal visual content. While the applications of cell phones have typically been pedagogic in nature, they have also been used for practical or administrative matters, such as

simplified and flexible student-teacher communications (e.g., course updates and reminders) and referrals to related websites and other up-to-date instructional resources (Dias, 2002; Levy & Kennedy, 2005).

3. PDAs

Personal Digital Assistants (PDAs) are more often associated with m-learning than cell phones. Their use has been integrated into various disciplines within high schools, universities and medical schools (Carlson, 2002). In language learning, one of its primary functions has been as translator. Software programs such as MobiLearn allege to turn PDAs into 'talking phrasebooks. In evaluating the gains of Chinese learners of English using handheld translators, (Myers, 2000) made numerous observations; the learners repeatedly practiced saying unfamiliar words typed into the machine; they took written notes about new words and phrases learned from the machine; they typed full words into the machine and quickly learned to recognize word stems, they were shown words in context according to the lexical approach; they soon preferred to look up words and phrases from the English side of the translator rather than the Chinese side, indicating an attempt to function in the foreign language; and they quickly improved their spelling. Despite these benefits, the author promotes the use of a contextual translator only in cases where the target language is similar to the native language. More elaborate language learning software programs have also been developed for PDAs. (Garcia Cabrere, 2002) evaluated a business Spanish course developed for smart-phones, encompassing video clips, exercises, and a glossary. Students were reported to be highly motivated and impressed - particularly by the video and multimedia functions--but expressed difficulty in using pointers and virtual keyboards for data entry.

(Thorton & Houser, 2003) developed an English idiom website, including definitions, illustrative videos and animations, and multiple-choice quizzes, specifically for mobile technologies. In their study, students accessed these web pages using either PDAs or mobile web and video phones, and then evaluated their usability. Scores were generally positive-and similar-for both media, but PDA users rated their video quality higher than the mobile phone users, likely due to larger screen size and higher resolution. All students expressed difficulty with the listening tasks, though the authors noted that neither headphones nor earphones were used in the study and that none of the actors or writers were native English speakers. PDAs offer numerous other uses, including Internet and wireless access and therefore, file-sharing between teachers and students and amongst students themselves. Data is also easily backed up on personal computers. Further, at present, a standard feature of these devices is handwriting recognition. Despite such functionality, (Beauty, 2003) believed that the future success of PDAs depends in part on their ability to accommodate voice recognition.

Mobile learning as developed by distance teaching institutions has been concerned with three main types by the research carried out on mobile learning generally in Europe (Carvalho et al., 2008). Firstly, mobile learning has been introduced on a large scale with a general aim of increasing quality and access by supplying courseware/learning materials to be accessed by handheld devices and also develop the learning management system to include handheld devices for communication between students and between students and tutors/administrators. Secondly, mobile learning solutions have been introduced to increase quality by supplying some teaching materials on handheld devices, so that students may use their mobile phones or PDAs for test, quizzes, revision before exams or studying specific materials in spare time when PC or internet connection is not available. Thirdly, mobile learning solutions have been used by some institutions for mainly administrative purposes. E.g. Dirksen Opleidinden in Netherlands used SMS messages for quick information to their students and also used SMS questions with answers for exams preparations for their students.

4. MOBILE LEARNING

The convergence of the mobile devices with learning gives paradigm shift from e-learning to mobile learning (Traxler, 2007). The term M-learning is coined to describe the convergence of mobile technologies with E-learning and we can achieve this by utilizing wireless connectivity. In business, for example, the importance of m-learning has been raised as many companies look into mobile technologies to support mobility of their Knowledge Management (KM) activities. The advent of M-Learning created an environment of anywhere, anytime learning.

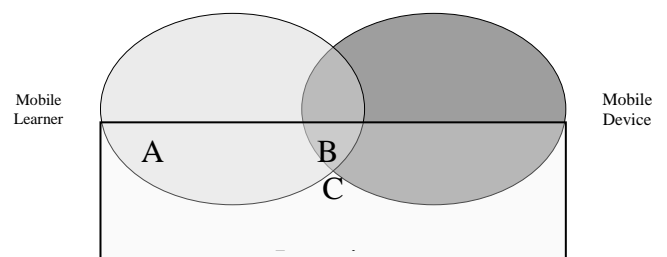


Figure I: Mobile learning

Figure1, above explain mobile learning visually. We have circles represent the mobile learner and mobile device. Below is the rectangular represent learning. We have three key shaded areas represented by A, B and C. A is learner centric, B is mixed /blended better word will be compound and C is device centric learning. Compound is where both

the learner and device interact. Learner centric, the learner is mobile where as the device centric is where mobile device is used even in classroom. You can use mobile device where learner may not be mobile. Mobile learning (M-Learning) is novel in that it facilitates delivery of learning to the right person, at the right time, in the right place using portable electronic devices(Ally, Schafer, Cheung, McGreal, & Tin, 2007). The E-Learning Guild defines mobile learning as ,“any activity that allows individuals to be more productive when consuming, interacting with or creating information mediated through a compact digital portable device that the individual carries on a regular basis, has reliable connectivity and fits in a pocket or purse”(Wexler, Metcalf, Rogers, & Wagner, 2008).

M-Learning actually complements E-learning. It helps the busy individual to capture lost time like while waiting for an appointment or travelling in a train or stuck in a jam to read/study materials that are already downloaded on their hand held devices. By this they can help themselves to learn while on move. Putting the power of knowledge literally in the hands of today’s society, by enabling them to have 24/7 access to acquire and ascertain study materials via a mobile device, takes away the constraints of always having to be in a “classroom environment” for learning to be effective. M-learning is E-learning where different mobile devices are used for educational purposes. Mobile learning and technology enhanced learning emerged as a research domain in education and have their own research on design and pedagogical concerns(Kelly, Lesh, & Baek, 2008; Kukulska-Hulme, 2005; Sharples, Taylor, & Vavoula, 2007).

5. INFORMAL LEARNING

Mobile learning is a new model of e-learning, which combines mobile computing and e-learning. With this new technology learning will become more learner-centered and informal, rather than teacher-centered and formal. An informal learning is any form of learning outside classroom; the learning activity is controlled by learner and it is unstructured. Table 1, shows other definitions of informal learning.

Table 1: Various Definition of Informal Learning

Wikipedia(2011)	Informal learning occurs in a variety of places, such as at home, work, and through daily interactions and shared relationships among members of society	Location
Jay Cross (2005)	Informal learning is unstructured, un official, Un schedule, outs ide school/Classroom.	Location
Christian Glahn (2009)	Informal learning self directed, un guided, unstructured, Embedded in Practice.	Learning style

Eratu (2000)	Informal learning takes place in day-to-day life activities, related to work, family or leisure and maybe intentional but most of the case its non intentional.	Learning style
Cofer (2000)	In informal learning learner set the goals and objectives for learning object	Control
Jenkins (2006)	Spontaneous, experiential and un planned. Engagement of learner through informal learning processes of observation , imitation collaboration and apprenticeship	Learning style
Paul Crowther (2007)	Learning took place out of spontaneous situations. Objectives and means controlled by learners There may be a facilitator who may provide some Content	Control

According to table above, learning style is a key factor in deciding learning activity either formal or informal. Another factor is the location if it’s inside the school or classroom. If the instructor is controlling the learning activities, this is considered as formal. In a formal learning environment the training or learning department sets the goals and objectives, while informal learning means the learner sets the goals and objective(Cofer, 2000).

6. MOBILE LEARNING AS EDUCATIONAL LEARNING TOOLS

The Mobile Learning (ML) applications powered by ML consisted of MLGuardian, MAlert, MLTransit, MLEmail, MLEmail, MLEmail, MLAcademics, MLGroups, MLPolling, and MLFIashCard, which are considered as educational learning tools for students in tertiary institutions.

MLGuardian served as a security feature for students by allowing them to share their GPS (Global Positioning Systems) location with family, friends, and more importantly with campus police. This Service can be used in the event of natural disaster like earth quick, fire , or any other emergency situation. Where they is need of help at particular location.

MAlert provided faculty and administrators with the ability to send broadcast text alerts to students. Faculty could use this application to notify students of class assignment changes while administrators could alert students to school cancellations. This service can be used for alert by sending SMS or even MMS for an events and weather forecast.

MLTransit served as a tracking device for campus transportation. Students were able to identify the GPS location of campus shuttle buses as well as information regarding schedules and cancellations.

MLEmail allowed students to access course forum archive to send e-mail messages to fellow students, instructors and administrators; to receive e-mail messages from the same; and to submit assignments by email attachments, either as text-based e-mail or as Word or text assignments.

MLAcademics provided mobile access to the school's learning management platform, Blackboard. Students were able to access their courses and view course assignments and announcements. Additionally, students were able to download learning content from Blackboard, Moodle or any LMS (Learning Management system) to include all course materials (e.g. study unit, resources, content page).

Using *MLGroups*, students were able to interact with friends, clubs, organizations and teams by creating group contacts. This component allowed students to send and receive e-mails under group messaging.

MLPolling enabled students to participate in polls as well as classroom quizzes by voting and answering questions. Students could also create their own surveys.

MLFlashcard application, instructors and students have the resources to create mobile flashcard sets through Web interface. The flashcards can include text and/or images using material imported from Publisher or Excel. These flashcard can be stored as Mobile learning Objects. Later stage can be enhanced by collaborative design and collaborative learning methodology.

MLSocial application allows the instructors and students use social media (face book for mobile, twitter, mobile blog etc) on their Smart mobile devices.

7. CONCLUSION

M-learning will not replace traditional learning. It just provides another way of learning using new mobile technology. Of variety of mobile devices available today, smart phones, PADS and Tablet PCs, are the most applicable mobile devices for delivering learning. PDAs offer greater functionality than mobile phones and similar advantages to tablet PCs, though tablet PCs are more robust than PDAs and offer additional features. PDAs, Tablets PCs, and mobile phones can be used in many educational settings to accomplish many different educational tasks. The following potential benefits are inherent in the use of mobile devices in teaching and learning as educational tools.

- Learner can interact with each other and with the practitioner instead of hiding behind large monitors.

- It is much easier to accommodate several mobile devices in a classroom than several desktop computers.
- PDAs or tablets holding notes and e-books are higher and less bulky than bags full of files, paper and textbooks or even laptops.
- It is possible to share assignments and work collaboratively; learners and practitioners can e-mail, cut, copy and paste text, pass the device around a group, or beam the work to each other using the infrared function of a PDA or a wireless network such as Bluetooth.
- Mobile devices can be used anywhere anytime, including at home, on the train, in hotels. This is valuable for informal learning and work-based training.
- These devices engage young learners who might have lost interest in education. Since this idea has succeeded in other countries like Japan, Britain, USA, and Denmark among others, it is unlikely to fail in the developing countries.

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