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# **Adoption of Mobile eLearning (MeL): Experiences of polytechnic students in Singapore**

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The adoption of Information and Communication Technology (ICT) in Tertiary Institutions in Singapore is well advanced, and modern teaching and learning practices with a high level of ICT use are being successfully integrated with elements of the traditional on-campus lectures and tutorials. This study focusses on on-campus students enrolled in an undergraduate marketing subject in one of the largest Polytechnics in Singapore, where Mobile eLearning Technology (MeL) has been in operation for about seven years. The purpose of this study is to ascertain the value adding aspects of e-learning technology and to understand if learning is facilitated or enhanced by the use of such technology. In the transition phases between the more traditional learning environments and the mobile learning environments, it is important to assess the views of students because they have experience of both environments. This study is an attempt to understand how the technology is being used and if there are difficulties with technology adaptation and its capacity for learning facilitation. The findings indicate that students were positive about the transition from traditional learning environments to Mobile e-Learning environments.

Keywords: technology, Mobile eLearning, Singapore tertiary education.

## **Introduction**

In order to meet the needs of students in today's world, access to technologies must be equally available to all students. Access to technology is an important issue for educators and students. Although today's tertiary institutions have many desktop computers available, one factor that determines their use is where those computers are located. If the desktop computers are connected to the Internet but are not in a convenient location, both students and educators will face accessibility problems and this may limit the use of such facilities (Gahala 2001). Wireless technology is transforming many learning environments and together with cost effective laptop computers, is already bringing about changes in learning approaches and techniques.

Some researchers have claimed that quality education comes from the content, design and preparation, not from the delivery technology (Eastman and Swift 2001). Others believed that the use of technology in online classrooms can encourage creative teaching and

promote learning within classes with students who can work on their own and, require learning flexibility (Abernathy 1999; Benbunan-Fich 1999). This has led to new teaching methods and flexible learning approaches being constantly researched in education (Graham and Scarborough 1999; McLoughlin 2002) both in developing and well developed countries.

Tertiary Institutions in Singapore are increasingly replacing elements of their traditional on-campus lectures and tutorials with more advanced learning methods. In particular, more and more tertiary institutions in Singapore provide an ideal opportunity for their on-campus students to further access learning resources that provide students with more control in their learning environment, thereby meshing tertiary learning smoothly with their non-college life. This study focuses on on-campus students enrolled in an undergraduate marketing subject in one of the largest Polytechnics in Singapore that has been using Mobile e-learning Technology to facilitate teaching and learning.

## **Literature review**

### **Information and Communication Technology (ICT) to facilitate flexibility in learning**

Business faculties have extensively practiced flexible teaching and learning in tertiary education for a number of decades. Burton and Nesbit (2005) identify that in a country like Australia, this started at the University of New South Wales in the MBA program. Globally many institutions have integrated these flexible teaching and learning formats widely throughout programs (Daniel 2000). Recent research shows that tertiary students enrolled in marketing subjects preferred to study in a flexible mode as compared with traditional face-to-face teaching (Ho & Polonsky 2007).

The use of Information and Communication Technology (ICT) to create a flexible teaching and learning environment is one of the major priorities for today's tertiary institution to sustain within their served market. Tiene & Luft (2001) claimed that working in an appropriately designed technology-rich environment has the potential of producing a variety of positive outcomes such as improved patterns of social interaction, changes in teaching styles, more effective teaching, increased student (and perhaps, educator) motivation, and enhanced student learning.

According to Hitchcock (1999), educators believe that flexible learning with the support of ICT makes it much easier for tertiary students to complete their educational goals, even while they are at home, at work, or on vacation. Postman (1992) explained that new technologies alter "the things we think about education". Technology has become a serious arena for academic work (Mollgaard & Sides-Gonzales 1995). This is the promise and the potential. It is also the challenge.

### **E-learning**

Computer systems, over the last four decades, have found an increasing role in tertiary institutions, especially in the past 15 years with the growth of internet-based applications (Chen & Kinshuk 2005; Galuszka 2005). As Chou & Tsai explain, "Computer networks open new avenues for the design, development, storage, and distribution of and access to

learning materials” (Chou & Tsai 2002). These have allowed institutions to provide flexible learning via distance and/or e-learning. For the past decade, e-learning has been seen as a form of flexible and distance learning (Aggarwal 2000; Bowles 2004). According to Bowles (2004), e-learning can be explained as:

*“E-learning is learning that involves the acquisition, generation and transfer of knowledge using information and communication technology (ICT).”*

As claimed by Alonso, Lopez, Manrique & Vines (2005) with the integration of computers, and especially the web, into the education system, there has been a shift from centralised classroom-based education towards distributed e-learning courses that can be taken anytime and anywhere. E-learning has emerged as one of the fastest-moving trends in tertiary education. Thousands of technical and management courses, including degree and certificate programs, are now being offered by tertiary institutions, for-profit professional development centers, and industry training facilities worldwide (Ubell 2000).

### **From E-learning to Mobile eLearning (MeL)**

On-line learning or e-learning environments have been developed and used around the world during the past decade (Aggarwal 2000). Most of the e-learning courses are a mixture of static and interactive materials, and whilst they use technology they recognise the importance of face-to-face interaction. Thus, most educational program designers ensure that some individual face-to-face teaching for students is incorporated into the programs. Some advantages of web-based e-learning methods are its accessibility, the ease with which content can be updated and hyperlink functions that permit cross-referencing to other resources (Aggarwal 2000; McKimm, Jollie & Cantillon 2003; Ho and Madden-Hallett 2007).

In recent years the quick growth of mobile technologies is promising a new revolution that might be comparable with the Web. These have encouraged tertiary institution to migrate from e-learning into Mobile eLearning (Laouris & Eteokleous 2005; Mostakhdemin-Hosseini & Tuimala 2005). In brief, one of the major advantages for MeL is where learning previously occurred in front of a computer terminal, in the classroom, laboratory, or at home, it is now enabled to occur in the field, or at any location where the mobile device is fully functional (Sharma & Kitchens 2004). Details about the operation of MeL are explained below.

Mobile eLearning has been defined using many different names – m-Learning, Mobile eLearning (MeL) and wireless learning (Constantine, Arger, & Ling 2003; Bowles 2004; Thomas 2005). According to Bowles (2004), MeL can be defined as the ability to perform training and assessment tasks using any device connected to any network. Prensky (2001) provides a similar view as Bowles. He explained MeL as ICT assisted learning, using mobile devices. Typically, the mobile devices are the new, sophisticated wireless Personal Digital Assistants (PDA), mobile telephones, laptop computers and tablet PCs (Prensky 2001).

Over the past seven or eight years, institutions in North America have been introducing MeL into campus life. In European countries, such as the United Kingdom, and at

universities in other countries around the world, pilot projects that started at the end of the 90s are now giving rise to “wireless ready” learning environments, overcoming the restrictions of hard-wired technology (Thomas 2005). In the ever-more competitive national and international markets for students, this is a campus facility that universities are increasingly using as a point of differentiation in attracting potential student.

The mobile eLearning system using portable devices such as PDAs, smart phones and wireless laptop computers can realise “anywhere, anytime” learning (Kim, Iqbal, Yun, Baek & Kim 2007). In other words, tertiary institutions that have introduced wireless technology into campus life to facilitate student learning with the use of any portable devices such as laptop computer (for accessing blackboard, viewing online journals, internet surfing and so on) anytime and anywhere they wish, are equipped with MeL technology.

Students involved in the research came from one of the largest Polytechnics in Singapore in the west part of the ‘island country’. Since July 1999, the Polytechnic has introduced the ‘own-a-notebook’ computer scheme for students. To date, all new students enrolling in the Polytechnic courses will need to have their own laptop computers.

The Polytechnic (which has been introducing MeL into campus life) claimed that the use of laptop computers is an integral part of the learning experience for their students. It gives them the flexibility to work on assignments, surf the Internet for information, access subject web-sites, participate in online discussions, and communicate with their tutors and classmates through email anytime and anywhere they wish. MeL also gives their students a head start in the IT revolution, equipping them with skills not only to do well in their studies but also to excel in their future careers. It allows students to use their own laptop computer for their studies on campus, thereby making student learning mobile. Furthermore, MeL aims to enable the Polytechnic students to become more IT savvy and develop greater mastery in self-learning through increased access opportunities, the two critical life-skills for future professionals (Ngee Ann Polytechnic 2008).

## **Methodology and data collections**

The population for this study were students taking an introductory marketing subject at a government funded polytechnic in Singapore. The Polytechnic is an ideal location for such a study because it has been introducing MeL into campus life since early 2000 (the pioneer in Singapore among other tertiary institutions). Also, in 1999 the Polytechnic became the only tertiary institution, and the first in the South East Asia, to provide all of its students with notebook computers. The experience that the Polytechnic has had with wireless technology over the past years, provided an ideal laboratory environment to investigate the perceptions of students towards MeL.

Data was collected from students enrolled into the subject – *Principles of Marketing* – using a questionnaire. The survey asked students to respond to basic profile questions with a range of statements using a five-point Likert-scale. The statements focussed on the use of the technology, user friendliness, access to support, methods and time of use,

learning and perceptions. The questionnaire survey was circulated to the participants in the final week of lecture in semester one, 2007. It was made clear to the students that this was not part of the assessment of the subject and the research purpose was explained. The questionnaire survey required between five and ten minutes to complete. The students were in their first year of college and were studying a range of business courses. There were 261 completed surveys collected, comprising 156 female students and 105 male students.

## **Results**

The following paragraphs will report on the areas relating to the Mobile e-Learning environment: students' levels of experience with the use of such technology; the purpose for which the technology is being used; the ease of adoption and students' views on various features of MeL. Where appropriate, gender differences in the use and benefits of MeL are investigated.

### **Experience**

The level of experience with the use of ICT was relatively high in that most students described this as 'average experience' rather than 'advanced experience'. This may be a matter of perception. Males tended to classify themselves as a slightly more experienced. Only 5% of the students classified themselves as 'inexperienced'. The sample included 156 females and 105 males, with mean scores of 3.60 for females and 3.85 for males on a 5-point scale (1 = 'Inexperienced' and 5 = 'Advanced Experience'). While the males classified themselves higher on the experience scale, there was no statistical difference between the genders when it came to experience.

### **Purpose of use**

In addition to getting access to learning and class material via MeL, there was a low level of use for 'chatting' between students in relation to learning and class work or for social chatting. Almost 75% of the students classified this as 'never' or 'rarely'. Less than 2% classified this as 'frequently' being used for this purpose. On the whole, females tended to be more likely to utilise this function with the female mean being 1.77 compared with 1.52 for males (measured on a 5-point scale: 1 = 'never' to 5 = frequently'). The difference between the genders was not statistically significant. While MeL is designed as a classroom integrated learning tool to access WebCT, over 50% of the students used this 'frequently' outside of class time, mainly during the early and late evening period. Only a third of the student body used it to seek support or advice from lecturers or tutors. The use of this technology for interaction with other students on the system was very low at 1.9%. Other systems such as Facebook and MySpace are more likely to be platform of choice for interacting with friends and may explain this low usage.

The uses of MeL were classified as follows:

Reason for use	% of Students
To access lecture notes and tutorial material	99.6
To complete assessment tasks and projects	70.9
To access learning support material	57.1
To find out about administration of the module	48.7
To interact with staff – email or chat	34.6
To interact with other students about subjects or learning	1.9

### **Easy of use and time-management**

Most students (97.2%) considered that access to WebCT via the MeL program was user-friendly and they did not face difficulty with the use of the technology. However, only 33.8% of the students believed that they have ‘more spare time’ as a result of being in a MeL environment and 41.7% believed that it has led to greater efficiency in the way their time can be managed. The contribution of MeL to enhanced academic performance was normally distributed with 50.6% being undecided, 24.1% claiming improved performance and 25.3% not believing that it had led to improvement in their performance. There was no significant difference between the genders.

### **Conclusions and limitations**

One of the nation’s most important educational goals is to produce students adequately prepared for life and work in the 21st century. Computer and wireless network-based technology will play a key role in reaching that goal. How the technology is utilised and whether it is value adding in terms of the overall educational goals is something that will need to be monitored on an ongoing basis.

This paper attempted to investigate the perceptions of tertiary students in MeL adoption. Keeping in mind the limitations of the study and its exploratory nature, the results provide some insight into how MeL is perceived by students in terms of its contribution to education and learning. Overall, it appears that students have accepted flexible learning via MeL as an alternative to the traditional classroom environment. The MeL environment demands high levels of input from course designers, who must depend on the views and experiences of the first generation of MeL users. In designing new forms of instruction, tertiary institutions in many cases are unable to incorporate and involve student views, largely because of lack of such information. Technology is providing the interface between the institution and the students within an emerging wireless environment and for this transition to be successful, the ‘architecture’ of the new learning environment would need to understand the rapidly changing behaviour of students with respect to technology as well as their learning and study habits. MeL has the capacity to integrate the learning, educational, social and personal environments of future students, as a consequence of being forever connected through ICT. This study shows that today’s students are adapting well to these changes. However, they continue to use different

platforms for different purposes. For example, for social interactions mobile phones, Facebook and MySpace appear to be the platform of choice.

Further research is needed to expand this area of study as this paper is based on one campus. The Polytechnic involved in this research is a traditional institution where students study full-time on-campus, similar to a school setting. Samples from more diverse campuses, with more independent learning environments would provide more insight on the adoption of MeL. Many educational institutions provide wireless zones within the campus with the focus on providing access. It is important to undertake studies of student experiences and use of such facilities, so that such information can be available for the next generation of MeL designers. MeL designers need to be mindful of the future integration of various communication platforms.

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