University Students Awareness on M-Learning

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Abstract—Mobile learning (M-learning) is the current technology that is becoming more popular. It uses the current mobile and wireless computing technology to complement the effectiveness of traditional learning process. The objective of this paper is presents a survey from 90 undergraduate students of Universiti Teknologi PETRONAS (UTP), to identify the students' perception on M-learning. From the results, the students are willing to use M-learning. The acceptance level of the students is high, and the results obtained revealed that the respondents almost accept M-learning as one method of teaching and learning process and also   able to improve the educational efficiency by complementing traditional learning   in UTP.

Keywords—M-learning, Traditional learning, Wireless Technology.

I. INTRODUCTION

LEARNING is a continuous process of acquiring new knowledge, behaviors, values, preferences or understanding, and may involve synthesizing different types of information. Today, Education and learning can be classified into four broad categories; Formal Education (F), Non-Formal Education (NF), Informal Education (INF), and Random/Incidental learning [1]. Random learning is excluded from statistical observation because it is not intentional. Formal Education is similar to conventional learning; Learners are assembled in a class, at a particular time and with the same curriculum and taught by a teacher. Non-Formal Education may take place inside and outside educational Institutions. Non-Formal is similar to distance learning, which incorporates all forms of instruction in which instructors and students are physically removed from one another, There is no particular class time. In this form, teachers and learners can communicate at their own choice of time by exchanging either printed or electronic media or through technology in a real-time communication [2].

The next development of distance education was Electronic learning (E-Learning). E-learning can be defined as the provision of education and training electronically, on the Internet and web [3], removes boundaries of the classes, saves costs of education and makes education available at every time and just for the right person . Informal learning is defined as "intentional but it is less organized and less structured, and may include for example, learning events that occur in the

family, workplace and in daily life of every person, on self-directed, family-directed, or socially-directed basis"[1].

Recently, wireless and mobile technologies are under the great advancement. Now we are in Mobile age. With the new paradigm "anytime and anywhere computing" a shift from "Electronic" to "Mobile" services has begun [4]. Currently, E-commerce is extended to M-commerce and E-learning to M-learning.

M-learning has been defined as E-learning through mobile and hand held devices using wireless transmission [5]. It combines individualized (individual or personal) learning with anytime and anywhere learning. The learning is facilitated by the use of Internet, small portable computing devices and E-learning. These computing devices may includes: Smart Phones, Personal Digital Assistant (PDA) and similar to wireless and hand held (W/H) devices.

Lecturing is still the most widespread form of classroom instruction in higher Education [6]. In the conventional learning, communication between teacher and students is frequently unilateral unless teachers expect students to answer question. Lecture with a large audience provides a problematic situation since only one or at most a few students are able to interact with the lecturer at a given moment [6]. The other problem is collecting of feedback from the audience; It may be easy for small number of audience, because the teacher can deduce from the reactions of students in the class, but it is difficult when the size of audience is large. In Universiti Teknologi PETRONAS, the only forms of interactivity are by questions that are raised by students. This type of interactivity is difficult especially in a large size of classroom. The current way of lecturing is only at specific place and time; students can not easily access lecture materials, assignments and sample quizzes from wherever they are and whenever they want. Finally, a fundamental problem in conventional learning is; it requires about 1 to 2 hours of continuous attention of the learners, but usually the attention span of the learners is only about 20 to 30 minutes. M-learning is the current technology that used to resolve the above challenges of traditional learning. This paper is intended to present survey result to know the awareness of students on M-learning.

Even if M-learning is used to resolve the above problems of traditional learning, it has so many limitations at the development time. These limitations are like, the most common is mobile device limitations, like screen size, resolution capacity, processing power, memory capacity, battery power, variety of input/output methods, etc. The other limitations are issues of content creation and lack of standards for Mobile learning system.

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The objective of this research is to present a survey from 90 undergraduate students of UTP on the observation of M-learning and also its challenge in using as educational instrument. Besides this paper also presents on the challenges of traditional learning.

Learning on W/H devices will never replace classroom or other electronic learning approaches [7] On the other hand, if it is properly used, mobile technology can complement and add value to the existing learning models like the social constructive theory of learning with technology [8] and conversation theory [9]. The constructive learning is a frame work which argues the humans generate knowledge and meaning from experience and reflect in an environment to solve problems. The conversation theory suggests that learning to be successful if there is a continuous two-way conversation and interaction between learner/teacher and among the learners also. Therefore, M-learning has the capability to support both of the above mentioned learning theories.

II. RELATED WORKS

Over the past two decades, there appear to be a paradigmatic shift away from education and training to learning; from teacher-centered to student-centered education; from rote learning to learning as reflection; and from face-to face to distance and E-Learning. The main reason for this transformation is innovative application of electronic technologies, to support the approaches of traditional education [10].

There are several studies that have been done to test the role of W/H devices of learning.

The M-learning project at the University of Rogensburg, which is extending Internet based E-learning platform VUR (Virtual University Rogensburg) to Mobile based by developing platform called Wireless E-learning and Communication Environment (WELCOME). This platform complements E-learning by making some of the contents for W/H devices and other educational administration services, such as calendar, events, phonebook, etc. The supported kind of mobile device is PDAs. Educational features provide access to materials. To remain platform independent, PDFs, Real Video, and Real Audio streams as well as flash animations are used though it is not imperative to make use of all available media [4].

MOBILE is a Mobile-Based Interactive Learning Environment which aids for elementary school english learning. The system consists of a mobile learning server and mobile learning tools, which is able to support in or out door learning activities. The system structure of the MOBILE supported the following mobile devices include notebook Computers and PDA. The digitized teaching and assessment materials are stored in the learning content management system (LCMS). The mobile learning system installed in the notebook computer is composed of the Mobile Management System (MMS), Mobile Assessment System (MAS), Mobile Instruction System (MIS), and Mobile Learning Database (MLDB), and their functions [11].

The system has integrated mobile phones in to traditional learning and testing process, which combines the advantage of the two. The system architecture of the system has three layers, Client, Application Server, and Database server. Mobile phones are client and phones should also support WAP and J2ME (Java 2 Mobile Edition). Tomcat Servlet is used as a web application server under the second layer. And MYSQL as a Database under the database server layer. This research used J2ME to develop mobile learning application that runs under the first layer called Client [12].

Modeling of M-learning for University investigates the use of Mobile learning technologies in higher Education, and proposes a blended mobile learning model, which has the ability to serve the emerging learning process and delivery, and provide a well balanced learning environment that meets the current learners' needs. Blend M-Learning technologies within online and traditional learning environment without any major changes [13].

[14] uses mobile learning for a wireless classroom. They conducted a survey with two hundred students who have faced in conventional classroom problems. The main purpose of this research is to enhance the conventional classroom teaching and learning approach, to overcome the learning difficulties faced by students in conventional classrooms through the use Mobile devices in Wireless classrooms. This application was developed using ASP.NET together with XML, by using SQL server database.

[15] highlighted the potential of Mobile education, and how the power of handheld computing can be combined with traditional use of desktop computing to realize new improvements and considers how an application such as desktop-based online virtual community (MOOsburg), which provides a collaborative learning environment, can be used to support educational activities in an active, Mobile learning community. This application was developed with the java software called Java 2 Micro edition (J2ME) using thin-client architecture such that it can work on variety of PDA, cellular phones and pagers which supports java virtual machine within MOOsburg platform.

MobiLP is a Mobile Learning Platform for enhancing life wide learning, is a web-based learning system which supports access from both mobile and non-Mobile computing devices. It aims at providing educational contents and communication services to teachers and students anytime, anywhere. It used three-tier architecture and consists of three layers. The first layer is front-end, implemented by technologies like JSP, HTML, and XML. The second layer is middle layer, implementation technologies are JSP and java Servelets. The last layer is called Database, implemented by Java, JDBC, and SQL [16].

[7] explores the extension of Electronic learning in to wireless/handheld (W/H) computing devices with the help of a mobile Learning framework, provides the requirements to develop mobile learning applications that can be used to complement classroom or distance learning. The course contents delivered by Macromedia Cold Fusion Server ᵀᴹ through Microsoft IIS web server to personal computer. The course interaction can be conducted both via Personal computer as well as a W/H devices. VBulletin application provides access to the discussion forums via PC, while

World Academy of Science, Engineering and Technology
International Journal of Educational and Pedagogical Sciences
Vol:4, No:2, 2010

WiForum application provides access via any WAP-enabled Phone with Internet/data access service.

[17] introduces approach in building multimedia learning environment based on digital library and mobile student services. The learning materials can be accessed from standard desktop PCs, but also from wireless PDA or Mobile Phones. The learning environments provides all the multimedia and communication functionalities either on desktop PC or any portable device (like handheld computer). This application uses Windows 2000 Server that includes Apache web Server which communicates with Oracle 9.2i Database. Client side in this case is a pocket PC operating on Windows CE platform by using Internet explorer. The communication between Client and Server is typically via wireless Internet.

Fourth generation (4G) technology promote and introduces new development of mobile communication technology and mobile learning; then made some mobile learning models which based on 4G technology, and gave some examples for these methods. And discussed about M-learning format based on 4G and the advantage of M-learning which based on 4G technology [18].

The above works demonstrates the potential of M-learning applications in education to support traditional learning system, by considering the popularity and support of wireless and handheld devices. By considering the advantage of m-learning, this paper is intended to find out the UTP students' awareness for M-learning technology.

III. METHODOLOGY

The survey was conducted with 90 undergraduate students from different Departments of Universiti Teknologi PETRONAS. The departments are Electrical and Electronics Engineering, Civil Engineering and Chemical Engineering.

The purpose of the questionnaire is to find out the students' awareness about elicit information on acceptance, user friendliness, didactic efficiency and feasibility of m-learning. Besides that presents also the challenges of traditional and mobile learning. This questionnaire has about 4 sections, Acceptance level, user friendliness, didactic efficiency and technical feasibility of M-learning. Questionnaire is a good way of obtaining either qualitative or quantitative data, since the user responses are written and can be tallied to illustrate user preferences [20]. The questionnaire is based on a 5-point Likert scale with strongly agree as 5, agree as 4, uncertain as 3, disagree as 2 and strongly disagree as 1. The questionnaire is based on 5-points.

IV. RESULT AND DISCUSSION

This section presents a survey with 90 students on M-learning. The result of the students' response is as follow:

Table I shows the result on students' acceptance level for M-learning.

TABLE I
ACCEPTANCE OF MOBILE LEARNING

	N	Mean	Std. Deviation
Using of Mobile as a learning Instrument is Easy	90	3.56	.949
Can be Used to learn different technologies	90	3.96	.748
Makes Learning more Enjoyable and interesting	90	3.89	.917
Used to support the current learning system	90	3.67	1.039
Valid N (list wise)	90	3.77	

Fig. 1, shows that the response on user acceptance towards m-learning. 22 percent strongly agreed and 42 percent agreed while 2 percent strongly disagreed. Another 6 percent disagreed while the remaining was uncertain. The obtained data indicates that the respondents are interested in using of this technology. Significant percentages (64%) of the respondents have reported that M-learning is an interesting and enjoyable technology or instrument of learning that can serve as a strong support tool. However, from the data obtained still the acceptance level of m-learning can not be considered to be as high enough as it is supposed to be due to inexperience use of Mobile as a learning instrument.
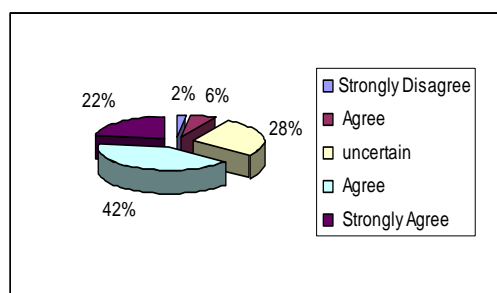

Fig. 1 Response on User Acceptance

Table II shows the students response on the user friend ness of mobile device when it is used as a learning instrument.

TABLE II
USER FRIENDLINESS

	N	Mean	Std. Deviation
Mobile learning is Good, b/se it makes student centered	90	3.81	.947
Is used to access lecture materials anywhere and anytime	90	4.00	.994
It is easy to communicate with the Instructor	90	3.97	.854
That is possible to see classroom timetable	90	4.09	.802
That is possible to send answers for assignments to the lecture	90	3.77	.912
I recommend it as a one method of teaching and learning	90	3.74	.906
Valid N (list wise)	90	4.00	

World Academy of Science, Engineering and Technology
International Journal of Educational and Pedagogical Sciences
Vol:4, No:2, 2010

Based on Fig. 2, 26 percent is strongly agreed and 40 percent agreed on the system as user friendly and easy to use. However, 2 percent strongly disagreed and 8 percent disagree on the user friendliness of the system while the remaining was uncertain. Based on the obtained data, more than half of the respondents (66%) commented that M-learning makes student centered, easy to communicate each other or possible to get educational information and also easiness of getting lecture materials anywhere and anytime. In general, the students can easily use this system with out any difficulties, because, almost all of the respondents are familiar with mobile technology.
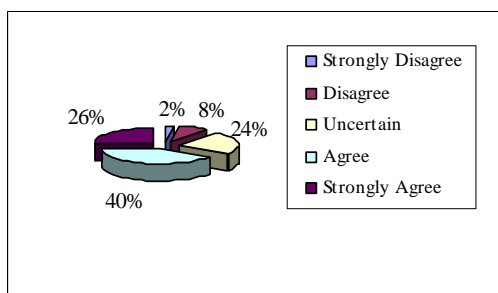

Fig. 2 Response on User friendliness

Table III shows the response on the educational efficiency of mobile device when it is used as a learning instrument.

TABLE III
DIDACTIC EFFICIENCY

	N	Mean	Std. Deviation
Maximize the quality of Electronic learning	90	3.96	.860
The objective of the course can be met	90	3.52	1.008
Downloading course content is easy	90	3.62	.943
That is easy to collect feedback from the students and also convenient for communication with other students	90	3.97	.741
Valid N (list wise)	90	3.77	

Fig. 3 shows that 21 percent strongly agreed and 43 percent agreed on that M-learning could improve educational efficiency by maximizing the quality of E-learning, easy to transfer the basic course objective, collecting feedback and to download course content. While 2 percent strongly disagree and 6 percent disagree, are preferred the current traditional learning system. The remaining 28 percent are uncertain. In general, the obtained data indicates the respondents believed that there is a tendency on which M-learning could improve the educational efficiency as a complement of traditional learning.
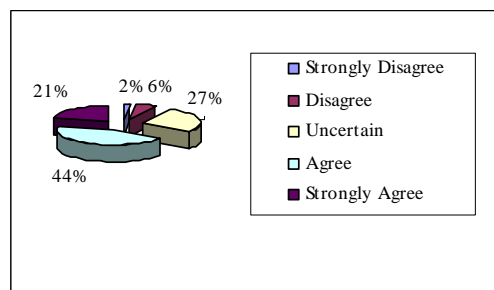

Fig. 3 Response on Didactic Efficiency

Table IV shows the response of students on the practicability of m-learning.

TABLE IV
TECHNICAL FEASIBILITY

	N	Mean	Std. Deviation
Navigation through Mobile learning is easy	90	3.52	.974
Necessary to use Graphics and illustrations	90	3.84	.806
Evaluation and questioning will be effective	90	3.68	.934
Valid N (list wise)	90	3.68	

From the above Fig. 4, 18 percent strongly agreed and 39 percent agreed on the technical feasibility and practicability of the system while 5 percent strongly disagreed and 9 percent disagreed on the feasibility. The remaining was uncertain. Significant percentage (57%) of respondents reported that more than half are agree on the easiness of navigation, using of graphics and the applicability in UTP. In general, the obtaining data is still can not be considered high, due to some challenges of Mobile, like screen size, Mobile phone keypad, battery, security and also the cost and connection of Internet. By the above reason some of the respondents are not much confident on the feasibility of M-learning.
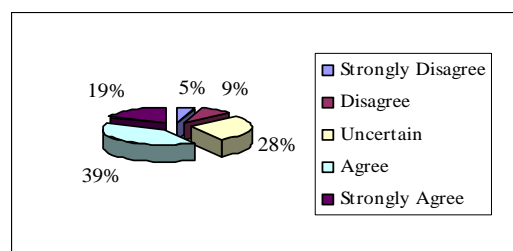

Fig. 4 Response of Feasibility of the System

From the below Fig. 5, about 56 percent of respondents chosen combination instructor-led Electronic and Mobile learning. This indicates that most of respondents are eager to use this technology as a complement of traditional and Electronic learning.

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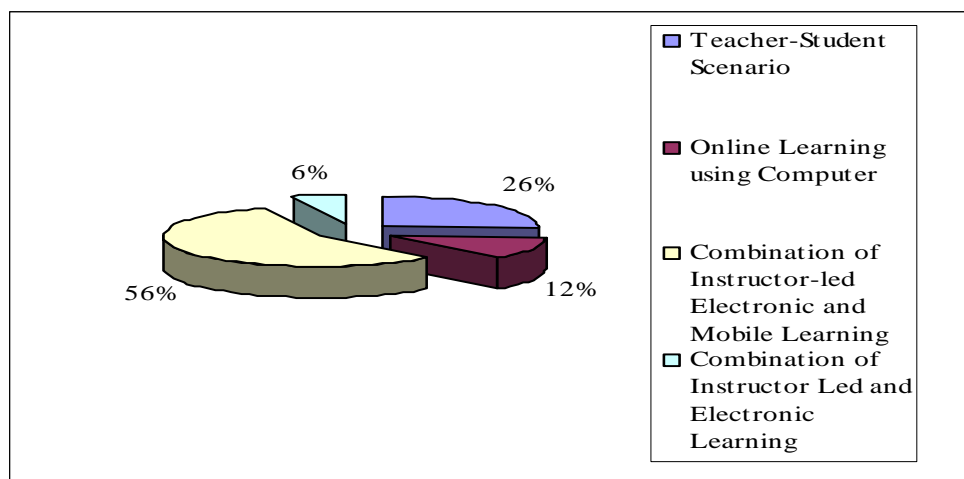International Journal of Educational and Pedagogical Sciences
Vol:4, No:2, 2010

Fig. 5 Students Response on selecting Methods of learning

Generally, most of higher institution students are familiar with Mobile technology, so that is recommended to use as a complement of traditional learning

V. CONCLUSION

The paper presents a survey from 90 UTP undergraduate students on the awareness of M-learning. The results show that the students are interested on this new technology. This also proves that the concept of M-learning can be more easily acceptable if it is able to provide at least the same learning experience based on the current education style and able to provide an interactive learning environment for the users. Apart from this, there are also some groups who disagree on this technology. Those who disagree on this technology want to stick to the traditional learning style or they might be resistant to accept new technology, by commenting the challenges of mobile device. Generally, M-learning is a best way of learning system to complement the current traditional learning system. So, from this work it can be inferred that M-learning is recommend for all institutions to get its advantage.

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