



## Utilizing New Media in Documenting Measured Drawing Products

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### Abstract

Computers and Internet have successfully provided students with various online educational services. With the latest developments in the mobile technology, new methods are emerging to provide educational services through mobile technologies such as mobile phones and PDAs. By providing the educational services using the wireless medium, the educational institutions can facilitate self-access learning. By using the mobile educational services, lecturers and students can access the services anytime and anywhere they want. This paper discusses the possibility of providing architectural heritage studies on web application through mobile technology. This offers a new approach in architectural education, namely imparting knowledge, or facilitating the imparting of knowledge, through a medium other than the traditional methods used in polytechnic. It does not seek to replace the conventional methods of teaching, which have traditionally been through lecture classes and design studios. It merely aspires to bridge some of the gap that is found between the two and thereby promote better understanding of architectural knowledge. The case study is an important tool in architectural education. Students learn by analyzing, comparing and evaluating aspects of important architectural works. By providing a tool by which this evaluation is facilitated and enhanced through the process of associative thinking, architectural learning is enriched. The paper will conduct formative evaluation of the student projects with the aim to test the feasibility of providing mobile educational services for diploma level architectural students in Port Dickson Polytechnic. The study found that the mobile learning can be a useful complement to the current computer based learning

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### INTRODUCTION

Since decades computing technology has been applied to learning, but it has developed drastically with the development of the web. In recent years the growth of mobile technologies is promising a new revolution. The forecasts are already getting true (Scott 12) since according to DoCoMo about 37% of Japanese population owns Internet capable phones. The handheld devices e.g. mobile phones, handheld computers and personal digital assistant (PDA) are more portable and affordable than before. According to an estimate from Microsoft, by the end of 2012, there will be nearly 100 million PDAs in use worldwide. In Malaysia according to Suruhanjaya Komunikasi dan Multimedia Malaysia (2016) about 70.4 of the population in Malaysia are using mobile phones. The quick growths of the mobile phone users bring new challenge to educational institution in Malaysia for providing new dimension in learning. Mobile learning (m-learning) is a new dimension in education which combines mobile computing and e-learning. Today the Web-Based Learning has become a common medium of education. It is why because traditional learning in lecture room is not enough, because in lecture room instruction, it is lecturer centered rather than student centered, dominated by information derived from textbooks and notes, confined in space, time and conceptual structure, involves little joint work in small groups and is not concerned with solving problems identified by students (Hume 2010). Web-Based learning (or in other words "e-Learning") is learning, which is delivered, in whole or part, using the WWW (World Wide Web) as the delivery medium (Jackson 2014). The WWW allows not only the transmission of information in text but other types such as graphics, video, audio, animation, etc. via the Internet from one computer to another. This ability allows for the delivery of educational content using multiple methods (computer-based, video, text, audio) within one system. On the other hand besides Web technology, new technologies such as WAP (Wireless Application Protocol) and GPRS (General Packet Radio Service) technologies offer education institutions additional tools. WAP and GPRS allow students and lecturers access to the Internet, anywhere and anytime, via the micro browser equipped mobile phone (Tariq et al. 2015). In the recent years, the quick advance of mobile technologies has brought a new term of learning known as WAP based learning or sometimes called mobile learning. Mobile learning has been considered as the new future in an educational process. There is a lot of work and research that is going on the mobile learning. People try to understand how the mobile devices will help us in having a better education. In this paper some suggestions will be given on how to build a website using free mobile host in the Internet. This website will be used as a reference where students in

the design class can get the information needed through mobile devices to help them in the design process. Finally this paper will discuss challenges and limitations in mobile learning and the future work.

## DEFINING MOBILE LEARNING

Today people agreed that mobile learning is an e-learning through mobile devices. In general by mobile device we mean PDAs and digital cell phone or any device that is small, autonomous and unobtrusive enough to accompany us in every moment of our every day life that can be used for some form of learning (Trifinova 2013). Lehner & Nosekabel (2015) defined mobile learning as any service or facility that provides a user with general electronic information and educational content that helps in acquiring knowledge regardless of location and time. Vavoula and Sharples (2014) indicated there are three conditions in which learning can be defined as mobile, which are mobile in terms of space, mobile in different areas of life and mobile with respect to time. From these definitions, a mobile learning can be defined as a learning process that have the ability to deliver educational content anytime and anywhere the learners need it.

## DESIGNING PATTERN FOR MOBILE LEARNING

As a new trend in learning process, mobile learning benefits with certain characteristics (Chen et al. 2002):

1. Urgency of learning need;
2. Initiative of knowledge acquisition;
3. Mobility of learning setting;
4. Interactivity of learning process;
5. Situating of instructional activities; and
6. Integration of instructional content.

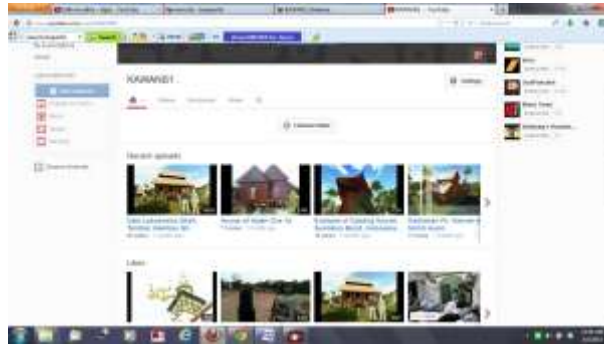
Mobile learning needs to have its own pattern or model. Traditionally learning environment conducts in the lecture room, where all the learning activities such as lectures, assignments, presentations and so on, are all carried out at a designated place and time. Through desktop computerized education the range of education has been extended out to places where wired connection is available. Today with mobile technologies, the learning process can be extended to places and time of learners' choice without considering the availability of wired infrastructure. This is a great step in a learning process where the learners begin to gain control of their own learning schedule. The shift from e-learning to mobile learning increases the activity of educational information exchange between the learners and the teachers. The website through mobile devices presented in this paper is a highly portable learning resource center that allows learners to access anytime and anywhere they need. A dynamic learning environment created by the mobile devices can extend the learning activities further than traditional learning. This website customizes the informations that can be refered to solve the problem given in the design module for the architectural diploma students in Port Dickson Polytechnic.

The aim of the project described in this paper is to prepare users with personal tools that are *highly portable*, so that they can be available wherever the user needs to learn, *unobtrusive*, so that the learner can capture situations and retrieve knowledge without the technology obtruding on the situation, *available anywhere*, to enable communication with teachers, experts and peers. *adaptable* to the learner's evolving skills and knowledge, *persistent*, to manage learning throughout a lifetime, so that the learner's personal, accumulation of resources and knowledge will be immediately accessible despite changes in technology, *useful*, suited to everyday needs for communication, reference, work and learning and *intuitive* to use by people with no previous experience of the technology. In designing this website certain educational theory need to be considered. By using a proper theory ini designing the website the pedagogical approach to be used for the development of this website will be suitable for mobile devices.

## PEDAGOGY OF MOBILE LEARNING

Most theories of pedagogy fail to capture the distinctiveness of mobile learning. This is because they are theories of teaching, predicated on the assumption that learning occurs in a lecture room environment, mediated by a trained teacher. Any theory of mobile learning must embrace the considerable learning that occurs outside the lecture room and is personally initiated and structured. It must also account for the dynamics of learning. A relevant theory of learning must embrace contemporary accounts of the practices and ontogeny of learning. Learning is a constructive process, involving the active construction of knowledge. The theory that is going to be used in constructing this website is Carroll's Minimalist Theory. The Minimalist theory of J.M. Carroll focuses on the instructional design of training materials for computer users and has been extensively applied to the design of digital documentation (Kearsley 1994). For this paper this theory has been used in developing an educational website on mobile device. As Kearsley (1994) explains, this theory suggests that all learning activities should be meaningful and self-contained, activities should exploit the learner's prior experience and knowledge, learners should be given realistic projects as quickly as possible, instruction should permit self-directed reasoning and improvising and training materials and activities should provide for error recognition and use errors as learning opportunities. The critical idea behind Carroll's Minimalist theory is that designers must "minimize the extent to which instructional materials obstruct learning and focus the design on activities that support learner-directed activity and accomplishment" (Kearsley 1994).





**Figure 3** KAWANS Chanel in You Tube.

## FORMATIVE WEB EVALUATION

A formative evaluation was carried out for the web where all the 30 architectural diploma students who are in the final semester at Port Dickson Polytechnic used the web and provided their feedback in the form of a questionnaire. All the participants were initially asked to go through the web as a reference for the information required for the project being given in their design class. After getting familiar with the web, they were given a questionnaire to fill in. The questionnaire contained 9 questions that inquired users' past experience with web-based educational systems and the feedback on the web. The questionnaire is enclosed on appendix one. The questionnaire revealed that most of the participants had uses some sort of web-based education system at regular basis. All of the participants found using web-base education system somewhat useful for following reasons it generates students' interest to acquire information, it provides convenient access to useful data, it is good in functionality, it refreshes academic information that they have learn before and it fastens their time to acquire information needed. All the participants had not used a web on mobile technology before. From this we concluded that the use of mobile technology in education was still new to all the participants. When asked whether they are willing to search information from the web on the mobile technology, most participants agreed that they will but some disagreed. The response was about 68% agreed, 20% disagreed and 12% no opinion. These educational services will be widely accepted when the mobile technology is developed and the cost is getting cheaper. The response of the participants when they being asked about their willing to buy a mobile device, such as mobile phone or PDA if they did not have one so that they can learn using web through mobile devices, the response was about 56% agreed, 38% disagreed and 6% did not know. This question shows the affordability of these devices to the participants. Most of the participants have mobile phones but they don't use it for browsing the wireless internet. The participants are not ready to spend money to buy additional mobile devices for mobile learning. This survey shows the cost to use mobile technology in education is still too expensive for most participants. The feedback from the participants on the usefulness of the web to become source of information for the measured drawing class was positive. 76% of the participants agreed that this web is a good reference for measured drawing class. When asked whether the design of the web is convenience to the users, 68% of all the participants agree that the design of the web is convenience to the users, 20% disagreed and 12% had no opinion on this matter. From these responses it can be concluded that the design of the web are satisfactory to the respondents. Most participants agreed that the web was easy to use. 76% participants agreed the web was easy to use and to understand. 16% participants had no opinion about the easiness of the web and only two participants said that this web was not easy to use. Participants suggested with the following suggestions for the improvements of the web condense information to provide faster access, make the navigation easier, place your name and logo on every page and make the logo a link to the home page, use link titles to provide users with a preview of where each link will take them, before they have clicked on it, write straightforward and simple headlines and page titles that clearly explain what the page is about and instead of cramming everything about a product or topic into a single, infinite page, use hypertext to structure the content space. In summary, about 70% of the participants agreed that the web will be a good reference for the students in measured drawing class. The participants agreed that the web will bring more convenience to the users. It opens new dimension for the learning process in polytechnic where the learning process will now change to the hand of the students. Time and place will not be a barrier for the learning process to occur. However more researches and discussions need to be done for the development of this new learning process

## CHALLENGES AND LIMITATIONS

Mobile learning now becomes a new standard in learning process and still required some improvements. Limited size of the screen and capacity of mobile phone make the learning tool using mobile device should not be more complex. Furthermore mobile phone is not a computer, so designing the web too complex will upset all the users if they need to press the buttons more than 10 times to get the informations. All the operation should be limited in a few steps, ideally, no more then 3 to 5 steps, with an easy way of escape at every step. Finally typing something is not convenient in mobile phones, so INPUT tag should avoided in the web pages, instead the SELECT tag should be used (Tariq 2015). Color images are another challenge in web design using mobile devices. A BitVisions has now started the first phase of its journey to becoming the leading color wireless images. BitVisions introduced the latest mobile technology imaging format in the form of Portable Network Graphics (PNG). This is a new bitmap format that provides portable, well compresses, well specified standard for loss less bitmapped image files (Tariq et al. 2005).

As compared to Internet, wireless data networks tend to have less bandwidth, less connection stability and less predictable availability. Due to strong limitations of battery life and form factor, wireless devices tend to have less powerful CPU's, less memory, restricted power consumption, smaller display and different input devices (Tariq et al. 2015). Despite the advantages of mobile technology, the technology is too limited for full-scale wireless Internet access. Once people get used to the Internet experience, they want it without the limits of screen size, access speed or place of access. Today mobile technology is improving. Today 4G can transfer data at the very fast rate (Whatis 2016). 4G refers to the third generation of developments in wireless technology, especially mobile communications. 4G offers the potential to keep people connected at all times and in all places. In Malaysia Celcom offers network that offers surfing speeds up to 384kb/s (Celcom 4G 2015). With Celcom 4G it offers high speed internet browsing to the users. With such high speeds, users will be able to download large files from the Internet, use a phone as an MP3 player, and conduct live videoconferences right from their wireless phones. The development of 4G network brings more opportunity for mobile learning. Now we found that 4G is capable of providing between 100 Mb/s and 1 G/s speeds both indoors and outdoors, with premium quality and high security (Whatis 2008). 4G will offer all types of services at a cheaper cost.

## DISCUSSION AND FUTURE WORK

In this paper, the evaluation of the web has shown that the mobile learning can be a useful complement to the current computer based learning. Both the learners and the teachers will benefit from the mobile technology for convenient and instant access to education resources. With the rapid development of mobile technologies, mobile devices will be much more powerful than current ones. Then, they can support more attractive user interface and more functionality. Mobile technology may be an ideal instructional approach for building a learning community within technological based educational settings such as polytechnic in the near future. But the technical nature of this technology must be refined, modified and enhanced first. Additional qualitative and quantitative studies are also needed to substantiate the usefulness of mobile technology and to establish guidelines for integrating such tool into our learning process. Future of mobile learning is not discouraged; new efforts in this technology are in progress. In the future the resolution of mobile learning enabled devices should improve as well as the display size. Moreover, if the mobile internet connection charges drop to a level affordable by the typical learners, such technology could be useful for both on-campus and off-campus students alike.

## REFERENCES

- Celcom 3G. 2015 <http://www.celcom.com.my/cep/xresources/CelcomCORP/consumer/3g/index.html>. (online) (23 April 2016)
- Chen, Y.S., Kao, T.C., Sheu, J.P. and Chiang, C.Y. 2002. A Mobile Scaffolding-Aid-Based Bird-Watching Learning System. In M. Milrad, H. U. Hoppe and Kinshuk (Eds.), *IEEE International Workshop on Wireless and Mobile Technologies in Education*. August 29 – 30. p 15 – 22. Washington, DC, USA: IEEE Computer Society.
- Hume, D. 2010. Guide to Web-Based Instruction (online). <http://www.moorbrook.demon.co.uk/guide.html> (20 April 2016)
- Jackson, H. R. 2014. An Overview of Web-Based Learning. (online) <http://www.knowledgeability.biz/weblearning/> (22 April 2016)
- Kearsley, G. 1994. Minimalism (J. M. Carroll). (Online). <http://www.gwu.edu/~tip/carroll.html> (19 April 2008)
- Lehner, F. and Nosekabel, H. 2015. The Role of Mobile Devices in E-learning - First Experience with a E-learning Environment. In M. Milrad, H. U. Hoppe and Kinshuk (Eds.), *IEEE International Workshop on Wireless and Mobile Technologies in Education*. p103-106. Los Alamitos, USA: IEEE Computer Society.
- National Centre for Education Statistics. 2003. Digest of Education Statistics, 2002. (online) <http://nces.ed.gov/programs/digest/d02/index.asp>. (18 April 2016)
- Scott, D. J. 2012. Japan's Widespread Use of Cellular Telephones to Access the Internet: Implications for Educational Telecommunications. *14th World Conf. on Educational Multimedia, Hypermedia and Telecommunications, 2002*. Denver, USA.
- Steinberger, C. 2012. Wireless meets Wireline e-Learning. *14th World Conference on Educational Multimedia, Hypermedia and Telecommunications, 2002*. Denver, CO, USA.
- Szabo, M. 1998. Survey of educational technology research. Edmonton: Grant MacEwan Community College and Northern Alberta Institute of Technology.
- Tariq Rahim Soomro, Moneef Jazzar, Ghulam Qadir Mirbahar, and Syed Mehmood Nqvi. 2005. WAP GIS: Approaches & Challenges. *Asian Journal of Information Technology*. Volume 4, Number 2, February.
- Tariq Rahim Soomro, M. Nawaz Brohi and Syed Mehmood Naqvi. 2015. Technological Trends of Distance Learning: From Web-Based to WAP-Based. (online) <http://web.unbc.ca/wccce05/WAP-Learning.doc>. (23 April 2016)
- Trifonova, A & Ronchetti, M. 2003. Where is Mobile Learning Going ?. Dipartimento di Informatica e Telecomunicazioni, Universita degli Studi di Trento Italy. *E-Learn 2013*.
- Vavoula, G. N. and Sharples, M. (2014). KleOS: A personal, mobile, Knowledge and Learning Organization System. In M. Milrad, H. U. Hoppe and Kinshuk (Eds.), *IEEE International Workshop on Wireless and Mobile Technologies in Education*. August 29 - 30, 2002. (pp. 152). Washington, DC, USA: IEEE Computer Society.
- Whatis (2017). Definition of 3G. (online) [http://searchtelecom.techtarget.com/sDefinition/0,,sid103\\_gci214486,00.html](http://searchtelecom.techtarget.com/sDefinition/0,,sid103_gci214486,00.html) (4 Nov 2016)
- Whatis (2014). Definition of 4G. (online) [http://searchmobilecomputing.techtarget.com/sDefinition/0,,sid40\\_gci749934,00.html](http://searchmobilecomputing.techtarget.com/sDefinition/0,,sid40_gci749934,00.html) (24 April 2008)