Research Article
Mobile Learning Applications Designing Concepts and Challenges: Survey

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Abstract: The aim of this study is to discuss the mobile learning, for we know that mobile learning now a days play an important role in education and learning, most of people all over the world nowadays using smart mobile phone, PDAs through wireless mobile technology anywhere and at anytime, each new generation of mobile has new features and applications, the usage of mobile devices are continually increasing, one of these usage within last decades is Mobile learning, people learn material from different locations and sources and the freely control their on learning by choosing what they want to learn and what time and what source, many work have been done in the area of mobile learning and it consider to be one of the future learning techniques, this study discusses the general concept of mobile learning and the proposed works and the effective of M-learning in the life, discuss the essential role of mobile learning process and then it will investigate the Comparison between mobile learning and other types of learning. And also we will discuss witch evaluation and selection criteria of M-learning applications are being used and then we will investigate if the criteria used by the users are enough or we need more criteria to insure the usability of the M-learning application according to the Human Computer Interaction theories (HCI) and ISO standards.

Keywords: Computer interface, e-learning objects, mobile applications, mobile learning, social constructivism, student engagement

INTRODUCTION

No doubt that the recent decades are considered the technological decade, for the using of computing device is becoming widely anywhere and anytime all over the world, the spread of using computing technology contributed in enhancement of different life aspects, economic, governmental, media, advertising style, education and so forth. The use of internet and world wide web (www) provide sold ground of Electronic learning (E-learning) at the first time and many educational organizations and universities provide systems that support E-learning and now with this rapidly using of smart phones and tablets that now invaded with all families and all kind of people of all ages and the increasing of the variety applications that provides wide range of knowledge and learning information, a new terms has been generated which as Mobile learning (M-learning) and a lot of researchers are concerned on mobile learning, M-learning has many definitions, these are two of simple definitions of mobile learning, (Deegan and Rothwell, 2010) "combination of e-learning and mobile computing", (Wains and Mahmood, 2008)" a type of e-learning which blends wireless and mobile technology for the

learning experience";" the intersection of mobile computing and E-learning (Ally, 2005)". Mobile learning can be considered as one of the most recent new topic in the learning and education field, this method of mobile learning is combines two very promising areas-mobile computing and e-learning. Many works and researches considered that the M-learning will present the new model of the future of learning and education strategy. Recently, now a lot of research is going on to explore and supposing the help of M-learning for providing fast and better educational environment.

The technology of using computers and other computing devices like note pads, tablets, mobile phone in education have been concerned in supporting the process of learning in formal settings, such as classrooms and lecturer or seminars and conferences. Using a computer and Mobile have in education is represented one of the advantages of e-learning for being its independence of both time and locations.

No doubt that, using smart phones has an incredible influence in our society and it has effected and changed some approaches as example, when we look to the children playing games are interesting and attracted most of them, not just as games only but it can

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be used to change their and ways of thinking to better if they play a suitable games that have been developed to increase the children controls and thinking and now, the using of smart phone contributed in expands the electronic and distance learning anywhere any time, without particular location of classrooms in universities and schools. And this combination of e-learning and mobile computing is some time called mobile learning.

Since the early time of M-learning has been proposed till now lots of works have been done, to optimize and investigate the using of mobile device in learning environment and some works review and discuss this area (Waycott, 2001; Chen *et al*., 2002; Waycott *et al*., 2002) and the mobile applications designing become one of the most active research area that concern about designing scenarios for M-learning, one of these scenarios done by Roibás and Sánchez (2002), Ally (2005) and Sung *et al*. (2005), recently a lot of university and high schools become using M-learning as one of the modern tool of learning and also has been using for adults and children.

The Mobile phone and tablets are currently becoming the most common platform for M-learning, many institutes and schools now use M-learning as one of their tools of learning, Where and when wireless networks and phones are available and this process of exploring new methods of using mobile technology and facilities and environments to satisfy what learners need and to help learners working by themselves and with others to get knowledge and education. Some research findings prove that using new forms and tools of teaching as a tablet PDA in drawing made students spend more time in working on that subject (Waycott *et al*., 2005; Cobcroft *et al*., 2006; Traxler, 2007; Akour, 2009), when it comparing to the other subject. Much m-learning architecture is designed to support well earning of learning.

Mobile lessons and exercises can increase the way of gathering information from a variety of web sites and a variety of sources and different formatting text, images, sound, videos and so forth. And also learners are free to choose the sources and in most situations they can get some feedback on the subjects from the learners' who already have taken or started the subject courses', the feedback could be taken for their opinions and comments and comments before getting starting in course and this is one of the good benefits of using online resources. And no doubt that, the Active Mobile learning and distance learning techniques can beneficial than the routine and class room learning model to the students as the result of the research that has been done by Ratto *et al*. (2003) showed that the active and interactive techniques can help learners to get and acquire knowledge easily.

MOBILE LEARNING APPLICATIONS

Today, the information and knowledge are easy getting rather than the past, information are documented and available in deferent shapes of multimedia, text, image, audio and in electronic books, web sites, Encyclopedias and library and on the comments and opinion of people on forum and merchants websites, this significant growth of informatics technologies lead to enhance the information getting sources. The traditional way of getting information from just schools, university, newspapers and media have been changed, new technologies have been involved, with the growth of local and global networks via wireless communication channels and different service providers in each country that make competition between them that results of cheap services that automatically increased the number of people who using smart phone, IPDs and other portable device that led in accessing to information any time anywhere and now many organizations and big project are working to increase the M-learning like M-learn project (www.mobilearn.org) this project is one of the biggest project that study the all area of M-learning, the Mobile applications are now become in increasing, with the different operating systems platforms, the application is covered wide area of education.

M-learning applications design: The mobile learning application design is different from the other desk systems, for the mobile are smaller in size when compared with desktop and laptops and the capacity of storage space is small too and still there bad computing ability and processor speed, these limitation of the mobile phone specification led researcher to try to solve these problems by developing different models and concepts, one of this concept is using cloud computing that proposed by Gao and Zhai (2010) they basic principles is integrate data that stored and distributed in different computers or server's and use it products and processor resources for computing and collaborative work, using cloud computing will provide inherit the cloud computing capability and resources and the mobile phone will not depend on it specification it will be dependants of the cloud computing.

Requirements of m-learning applications: The learning methods and techniques are recently have been changed, with the rapid growth of technology and wireless communications and different computing devices, the mobile device is one of these technology that gave excellent opportunity to electronic and distance learning, M-learning provide and increase the scale of learners, now the learning is not exclusive only for institutions such as colleges or schools, learning can be taken anywhere any time for any level of age according to the choice of learners. This wide use of M-learning led to good enhancements in both mobile designs, application design, the mobile design is concern on many factors characteristics as shown in the Fig. 1.
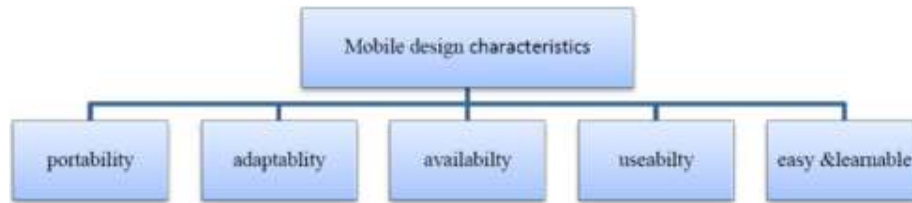
Fig. 1: Mobile design is characteristics

The mobile learning application design must be portable and provide learning and time and anywhere and it will be highly adaptable according to the users' skills to be more beneficial to the users and it must be available anywhere by telecommunication services and wireless techniques, all learning tools must be con provided with useful and it most friendly and easy to use and to provide better communication between users.

METHODS AND E-LEARNING OBJECTS

Within the rapid growth of wireless technology and increased number of internet service providers in all over the world countries that constructed to enable most of people using the smart phones and it Varity applications in, there are many companies work on enhancing this applications, one of the important multimedia bases applications that has been used in smart phone is Mobile Learning Engine (MLE) and it is available Free in www.mlearn.net, MLE is developed by using java platform and it is combatable with different operating system (android,, Microsoft MS Pocket PC, Symbian OS, Palm OS and so forth.

No doubt that, new technologies always and using multimedia items make took attention of students and let them more patient than the standard classes, some studies show that using new technology like M-learning by using smart phone, Tablet, PDA, effect and increase the students spend learning time and also it increase the overall students results and response time (Dvorak and Burchanan, 2002) and that doesn't mean that the M-learning will replace the existing tool (Waycott *et al*., 2002) but it could be one of the assistance tools, recently a research done by Kissinger (2013) studied using Electronic books in college learning and it discussed the learning and reading experiences of state college students.

There are many methods and learning objected have been proposed in e-learning and mobile learning, the term Electronica mobile objects (ELOs) has many definitions, it is defined by South and Monson (2000) as "Digital media that is designed and/or used for instructional purposes. Such objects range from maps and charts to video demonstrations and interactive simulations".

Usability and accessibility of m-learning: The main goal of M-learning and its application design is to earn more and large number of users. Usability and accessibility to this application is the real concern of the developers and Human and Computer Interaction (HCI) researchers, The "usability" is terminology that refers to a set meaning and of multiple concepts, such as execution, user satisfaction, time, performance and learn ability, many researches try to propose and create better software that support M-learning applications. The usability has different definitions one of the common definitions is "The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use' (Din, 1998), other definition is "usability means the measure of the quality the users experience when interacting with interface and applications" (Lee and Grice, 2004).

The common categories of usability: Learnable, Efficiency, Memorability, Errors and stratification, all these categories must be concerned when designing M-application, the learn ability is mean how the application is easy to learn and to understand to system users and how it is rabidly the user will be familiar to work with it, the Efficiency is how the application system will high productivity and useful; Memorability is measure of how the application will be easy to remember and interact with the specific level of users; Less of Errors mean the system application should be robust and without any errors when it has been used. Satisfaction mean the system will satisfy the user or learners need and it should be should be pleasant when they use.

MOBILE LEARNING EVALUATION

Since the term M-learning appears for the first time lots of research is being done to investigate the cognitive and pedagogical aspects of the usage of mobile devices in education and evaluation of this way of teaching and impact and there many works studied this issue (Deegan and Rothwell, 2010; Akour, 2009; Waycott *et al*., 2002), they studded the impacts of using the new technology of mobile and the internet and the useful of using it for reading,

The evaluation process and tools are very important in any aspects, in software ware product there is few tools are used in this manner, the software quality definition is "satisfying the certain information

needs by identifying the entities and the attributes of these entities" and this definition is defined by El Emam and Card (2002). This evaluation is depend on the general ideas that categorize software product quality characteristics that defined in ISO/IEC 15939 (2002) and Caballero *et al.* (2007).

The educational system evolution has been taken as important issues in education system building, many works have been done and suggested in evaluation methods, one of sophisticated work have been done by Muzio *et al.* (2002) his work is concerned on the children system aspect, he proposed two evaluation methods quantitative evaluation qualitative evaluation, in quantitative evaluation he e examine statistically all the potential cognitive (learning) that has been achieved and useful when using of the Tap and Learn system, the evaluation based on.

Based on the self-regulation learning model that helps children be checking their academic outcome and strength and weaknesses and practice their learning. In the qualitative evaluation the method examine and measure the quality of experience of the children while playing with the Tap and Learn system and then evaluate the quality of experience while interacting together in groups by asking the students and children some questions at the end of each session to understand the opinions of the children about the playing and learning environment and overall these ISO/IEC 9126 tools of usability that measure the functionality, reliability, usability, efficiently, maintainability and portability must be taken.

Challenges: Mobile technology takes learning out of the classroom, often beyond the reach of the teacher. This can be perceived as a threat, so the challenge is to develop designs that clearly identify what is best learnt in the classroom, what should be learnt outside and the ways in which connections between these settings will be made.

One of the most challenges for designers and Human Computer Interaction (HCI) researchers is how to develop robust software that has efferent tools which supportable all level of learners and satisfying all the user need not only in content by in using and interaction style, the Human and computer Interaction plays major rule in application design and this still represent big challenge in both hardware-related and software-related, the general hardware challenge are limitation of input and output facilities, mobile size and weight design is also consider as one of the challenge for it must be portable and small (Shen *et al.*, 2009) and in the same time it must be usable and interactive, the software challenges are designing menus and icons and navigation.

CONCLUSION

This study has highlighted some of the main aspects of Mobile learning area, it discussed the how

mobile learning is going on and how it has been evaluated, it discussed and illustrated the overall achievement in the area of mobile learning and it discussed many different issues of M-learning usability, design and evaluation and it showed how the process and the techniques of presenting knowledge and learning, should be more related to this rabid developed area and also showed how the nature of mobile devices that portable and light and the wireless technology have a good influence to education and lastly we and lastly we discussed some challenges that face M-learning evaluation and applications, The coming future will be focus on how to develop M-learning and electronic learning interest. New application will be proposed.

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