

Proposed system for learning & testing by mobile

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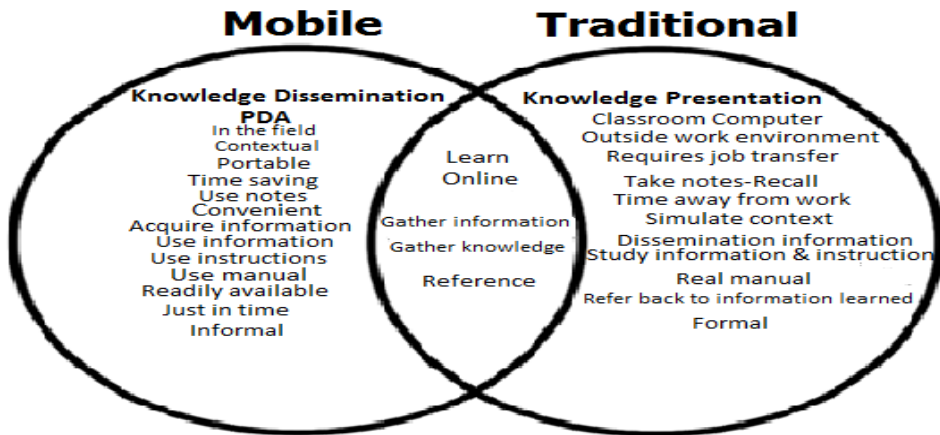
Dr. Nabil I. Al Buhisi

Introduction

A mobile phone (also known as a cellular phone, cell phone and a hand phone) is a device that can make and receive telephone calls over a radio link whilst moving around a wide geographic area. It does so by connecting to a cellular network provided by a mobile phone operator, allowing access to the public telephone network. By contrast, a cordless telephone is used only within the short range of a single, private base station. In addition to telephony, modern mobile phones also support a wide variety of other services such as text messaging, MMS, email, Internet access, short-range wireless communications (infrared, Bluetooth), business applications, gaming and photography. Mobile phones that offer these and more general computing capabilities are referred to as smartphones. The first hand-held mobile phone was demonstrated by Dr Martin Cooper of Motorola in 1973, using a handset weighing around 2.2 pounds (1 kg). In 1983, the DynaTAC 8000x was the first to be commercially available. From 1990 to 2011, worldwide mobile phone subscriptions grew from 12.4 million to over 5.6 billion, penetrating about 70% of the global population and reaching the bottom of the economic pyramid. (21) According to a 2012 survey, around half of the U.S. mobile consumers own smartphones and could account around 70% of all U.S. mobile devices by 2013. (21) In the 25–34 age range smartphone ownership is reported to be at 62%. The European mobile market, as measured by active subscribers of the top 50 networks is 860 million. (21) According to an Olswang report in early 2011, the rate of smartphone adoption is accelerating: as of March 2011 22% of UK consumers had a smartphone, with this percentage rising to 31% amongst 24- to 35-year-olds. In China, smartphones represented more than half (51%) of handset shipments in the second quarter of 2012. (21)

The term M-Learning, or "mobile learning", has different meanings for different communities. Although related to e-learning, Edtech and distance education, it is distinct in its focus on learning across contexts and learning with mobile devices. One definition of mobile learning is: Any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies.(48) In other words mobile learning decreases limitation of learning location with the mobility of general portable devices. The term covers: learning with portable technologies including but not limited to handheld computers, MP3 players, notebooks and mobile phones. M-learning focuses on the mobility of the learner, interacting with portable technologies, and learning that reflects a focus on how society and its institutions can accommodate and support an increasingly mobile population. There is also a new direction in MLearning

that adds mobility of the instructor and includes creation of learning materials "on-the-spot, "in the field" using predominately smartphone with special software such as AHG Cloud Note(It gives any employee with an Android smartphone a tool to instantly create visual, video and text documentation or instructions). Using mobile tools for creating learning aides and materials becomes an important part of informal learning. M-learning is convenient in that it is accessible from virtually anywhere. M-Learning, like other forms of E-learning, is also collaborative; sharing is almost instantaneous among everyone using the same content. The diagram in Figure 1 describes where the mobile and traditional learning differ in their approaches, where they intersect and where the same(2).



When considering the topic of mobile learning, it is important to determine whether it is useful or necessary for the student to have instant access to information. As a designer, is to determine what will best suit the needs of the project. In practice, each of these types of learning combined with classroom learning (face-to-face) giving a mixture called flexible (blended) learning. Figure 2 shows the different types of learning, and all belong to flexible learning(2).

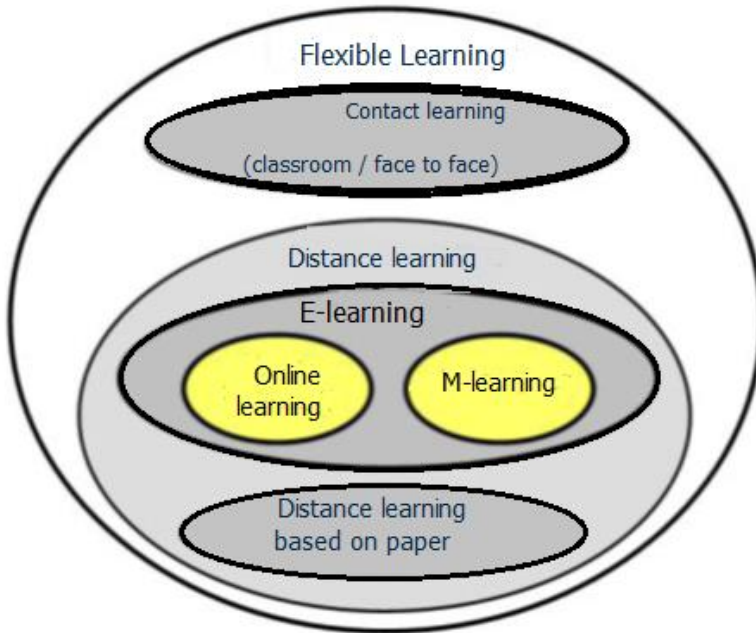


Figure 2

In the general case, mobile education can be seen as one of the many forms of learning or study, which takes place interactively through the use of mobile devices. Mobile devices are here, one of the mediators in the transfer of knowledge to the user.

We can easily see that there are services that need to be adapted in order to reach the ultimate limits of certain devices, to be able to fulfill everything that they provide. Besides, there are other devices capable of data transfer, to its emergence have new services, caused by mobility.

E-learning is a learning environment that is based on the use of information and communication technologies in order to provide service learning activities and online training(1). Also oversees the interaction between students, teachers, authors and administrators during the online training. As mentioned earlier, the utilization of mobile technologies in online training prior to the m-learning, it's a point that combines e-learning and mobile technology. While m-learning and e-learning differ in M & E, they obviously have similar characteristics since both are related to online training. For example, participants in m-learning as well as the participants of e-learning and are called "learners", author, administrator and tutor. As is the case with e-learning-a, and m-learning are enabling content for learning during training. Similarly, both can be realistically or remote time therefore we can use the same modes of transmission. Also, in both environments

require the use of virtual tools in order to successfully monitor the training and management of the interaction between the different actors.

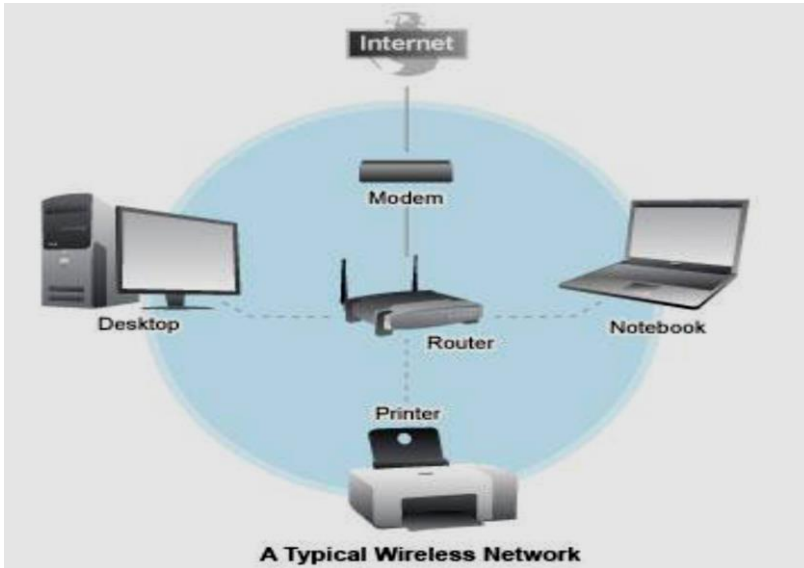
History Pre-1970s (22)

Arguably the first instance of mobile learning goes back as far as 1901 when Linguaphone released a series of language lessons on wax cylinders. This was followed up in later years as technology improved, to cover compact cassette tapes, 8 track tape, and CDs. **1970s, 1980s** Alan Kay and his colleagues in the Learning Research Group at Xerox Palo Alto Research Center (8) propose the Dynabook as a book-sized computer to run dynamic simulations for learning. Their interim Dynabooks are the first networked workstations. **1990s** In May 1991, Apple Classrooms of Tomorrow (10) in partnership with Orange Grove Middle School of Tucson, Arizona, use mobile computers connected by wireless networks for the 'Wireless Coyote' project. Universities in Europe and Asia develop and evaluate mobile learning for students. Palm corporation offers grants to universities and companies who create and test the use of Mobile Learning on the PalmOS platform. Knowledgeility creates the first mobile learning modules for CCNA, A+ and MCSE certification using the core tools that later became LMA. **2000s** The European Commission funds the major multi-national MOBIlearn and M-Learning projects. Companies were formed that specialize in three core areas of mobile learning: Authoring and publishing, Delivery and Tracking, and Content Development.

WLANS

Wireless networks are the areas of communication and the speed of data transfer can be divided into two categories: wireless local area networks (Wireless Local Area Network - WLAN) and wireless personal area networks (Wireless Personal Area Network - WPAN). WLAN networks are wireless LAN (Local Area Network), whose main goal is to increase the speed of data transfer and the distance at which communication takes place. This category includes WiFi (IEEE 802.11) wireless protocol. On the other hand, WPAN networks are not designed to replace the existing LAN. They are provided to enable wireless communication devices low power consumption, in which communication is carried out within the area of personal operating (Personal Operating Space - POS). Wireless local area networks (Wireless Local Area Network - WLAN) make computers, mutually linked into a single structure at a specified location, shared information and shared resources (printers, databases, etc.). Wireless networking (wireless networking) is connected computers, digital

communications devices, network equipment, and various other devices via radio waves. It is used in locations where wired infrastructure is not possible to set or the introduction of the same high price. Within wireless network enabled services are the same as in wired networks, but they have a number of advantages compared to wired LAN, such as mobility, flexibility, scalability, speed of flow, ease of installation and cost reduction (Figure 3)(28).



Basically, wireless networks require PARTICULAR infrastructure: wireless PC card in networked computers, access point (Access Point), a wireless PC adapter and network connection to the access point. The limiting factor for the relatively short range connections (30-300m) and the band. If it is necessary to bridge larger distances using additional antenna with an amplifier for signals. Wireless networks use technology that allows two or more devices communicate using standard network protocols, and electromagnetic waves to transmit the signal. Because the signal is transmitted (broadcast), it is not possible to protect the physical medium that carries data. For the formation of a wireless LAN are needed following components:

WLAN wireless card and 2. Access Point devices.

With increasing availability of laptop computers implementation of wireless local networks has become a very attractive not only in business but also in the home environment. Convenience introduction of wireless local area networks consisting of a huge comfort of their use, quick and easy implementation and efficient integration with existing computer network. WLANs functionality is very similar to cordless phones, because these

networks connect a mobile user handsets to the public system for data transmission. Mobile user device in this case is a laptop computer, while the public system for the transmission of data by the Internet. Wireless LANs are useful because they can connect desktop computers to the Internet with low price without installing cables to desired locations of computers. In order to meet these requirements has been developed a number of standards, each of which contains in its title tag IEEE 802.11. The original IEEE 802.11 standard was designed for the transmission bit rate of 1 Mbps. Today is a very popular 802.11b standard, often called WiFi, which allows the transfer of up to 11 Mbps. For much higher speed of transmission provided for the 802.11n standard. Alternative WLANs are ad-hoc network (see Figure 4(28)). In these networks some computers may form a network in which all devices have the same functionality, the ability to communicate with each other. These networks therefore function without APs and without any Internet connection. And while the actual data transfer (ie, the physical communication level) is almost identical to that of WLANs media for access and functionality related to networking in ad-hoc networks can be very different. Ad-hoc networks are usually limited to a few devices, and the area covered by the order of 10 m or less.

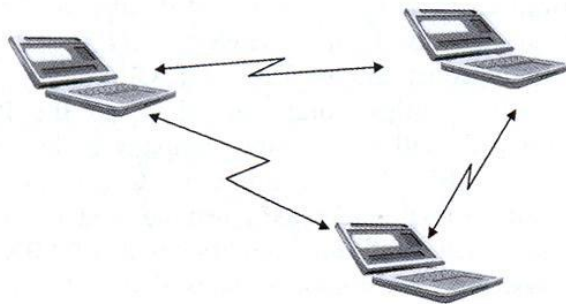


Figure 4 - The principle of ad-hoc networks.

Educational Messages Services

The service, is an extension of the communication tools which are incorporated in all Learning Management System (LMS). The main idea is to spread to everybody – students or professors – implied in a virtual course, any interesting change. For example: a change in the contents of the course; publication of the examination dates; new schedules of tutorials, the qualification of an exam, proposal of new exercises, etc. In fact, any event related to the virtual course that can be notified with a message.

The users who want to use the system will have to activate it at first, and to make it they will have to download from the LMS a java application called midlet which is based on the J2ME (Java 2 MicroEdition) technology, and

also to execute that midlet in a mobile device. The midlet is a java application that conforms to the Mobile Information Device Profile (MIDP) standard; this java application activates the Learning Messages Notification System for that mobile device.

The activation is composed by three steps: the first one, in which the user connects to the LMS server from a mobile device; the second step is where the user downloads the midlet from the LMS; and the third step, the midlet that has been downloaded is executed, then the midlet asks some information to the user and the answers are sent to the LMS server.

The messages are SMS type (Short Message Service), which is a wireless available service in the mobile digital network, and it will be used the Wireless Messaging Application Programming Interface (WMA), of Java language for the activation process previously mentioned. This API owns a way of access to the applications to be able to receive and to send messages and it is based on the GCF, Generic Connection Framework, therefore the work environments will be J2ME, Java 2 Micro Edition Wireless Toolkit. The messages are sent through a PC card modem wireless with access to Global System for Mobile Communications (GSM) and General Packet Radio Service (GPRS), which are two international standards that allow the mobile communications without wires.

The traditional architecture of the Learning Management System is extended due to the addition of the necessary elements to register mobile users in the system DB and to send SMS to them. Figure 5 (46) shows a diagram which represents the architecture.

Learning messages notification system architecture.

Learning messages notification system architecture

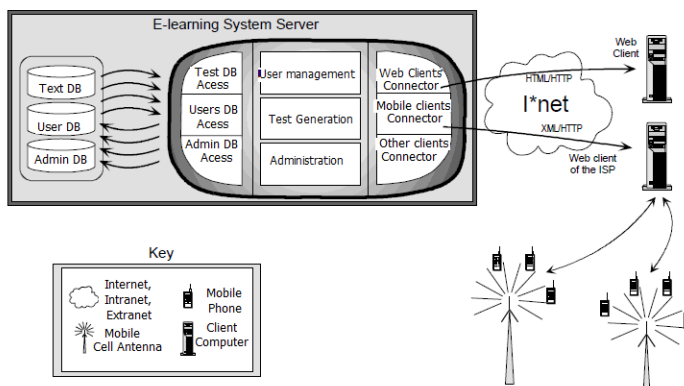


Fig. 5. System Architecture.

The modem allows to send and to receive quick text messages. The modem which has been used in the system is Sony Ericsson GT47/GT48(5). It is an intelligent and versatile GSM/GPRS control terminal that encapsulates

everything needed for wireless M2M – Machine to Machine – capability in a compact unit. Alternatively, it can be used as a stand-alone and powerful GPRS modem with its intrinsic TCP/IP stack.

Once it is activated and depending on the profile – professor or student –, the system can work and send different types of messages. The system will inform to the students about the following situations: New educative contents, Change in the educative contents, Final exam data, Qualifications of an exam, Timetables, etc. The professor will receive the following messages: Tutorial timetables, Assessment statistics: percentages of failed students and percentages of passed students, E-mails without response in the LMS, etc.

These types of messages can be changed or modified for creating new types of messages if it is necessary for the right work of the system. Finally, the students or professor will only have to open and read the educational messages received in their mobile devices and to set in motion.

SMS quizzes

Students can answer quiz questions by sending SMS messages to a server that grades students' answers automatically and keeps students' grade books. This is a very powerful tool in education. Using Real Times Quizzes completely changes the dynamics of the classroom. Students are more focused. Real time Quizzes support learning also in the way that, with proper use of these quizzes, it is possible to catch students' misconceptions before they have time to root into students' thinking. The SMS authoring tool is a web-based application which allows authors to set up an automated response system for a multiple-choice quiz. Authors can present their questions in a variety of ways, such as a paper handout, a poster, a PowerPoint presentation or web site. Participants answer the multiple-choice questions by SMS text message and receive almost instant feedback and up to seven daily follow-up messages if required. It is found that the quiz through SMS has the potential to be used in the teaching and learning environment. However there are some constraints and issues in the operation of this system that needs to be addressed before the system can be utilized optimally. These constraints and issues involve the system stability, the users / students and other general issues.

Conclusions

As we progress through the 21st Century, and the already hectic pace of our lives increases, society will need to find faster and more inventive ways to utilize previously unproductive time. Lifelong learning will be essential

for maintaining a competitive advantage in the global economy, for personal growth, and for simply functioning efficiently in an increasingly technological environment. With an increasing requirement to conduct learning activities independently, the ability to read and comprehend, and to metacognitively analyse and understand our learning processes, will be key factors in our successful development and our ability to function in the 21st century.

These requirements and skills can be improved through the use of mLearning. It provides access to learning during previously unproductive times, it allows more flexible and immediate collaborative options, it allows controlled learning in contextual situations, and provides greater options for teachers to observe and assist in independent learning.

In this study eight random samples have been taking from professors and students in Alaqsa University (classified according to gender, and academic field of specialization). Two questions were asked:- The first one for mobile use as a tool in educational administration and the degree of acceptance. The result was almost totally acceptance, The results did not have any statistically significant or noticeable difference between the samples. Knowing that Al-Aqsa University using SMS messages as administrative educational tool for several years. The second inquiry was, the degree of interest for using mobile in other aspects of the educational processes. The result was almost the same of the first inquiry.

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