



ISSN: 2319-5967

ISO 9001:2008 Certified

International Journal of Engineering Science and Innovative Technology (IJESIT)

Volume 2, Issue 1, January 2013

Parallel Enhancement in M-learning and Mobile Computing

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Abstract: This paper provides an introduction to the application and new enhancement of Mobile technology and Mobile Computing in technical learning system. Mobile devices can be using every human to be interaction and access to knowledge resources every time in anywhere. With respect to wide application possibilities of mobile learning, investigating learners' acceptance towards it, an essential issue. The paper presents the M-learning approach as the next generation of E-Learning, whereas the next generation of the learning systems will provide easy access and widely available to all who wish to be part of it. The paper also highlights the benefits and future challenges of mobile learning in our technical learning system and environment. By exploring the capabilities of M-learning technologies, it is possible to construct a picture of how different components of M-Learning can be implemented. Portable digital assistants (PDAs), Short Message Service (SMS) messaging via mobile phone, and podcasts via MP3 players.

Keywords: M-learning, E-learning, PDA, SMS, Mobile Computing.

I. INTRODUCTION

The term mobile refers to possibility of taking place in multiple locations, across multiple times, and addressing multiple content areas using either static or portable equipment's such as wireless laptops, Personal Digital Assistants (PDAs) and smart phones. The fastest developing and rising computing platform with an estimated 1.6 billion mobile device users by 2013 is smart phones, mobile devices and PDAs [1]. The rapid growth of information and communication technologies and rising computer knowledge of the students make possible appearance of these new educational forms. If 15 years ago the main accents have been on Computer Based Training which used primary CD and local area networks as information medium, 5 years ago the accent is moved to use of Internet and Learning Management Systems. The E-learning as new term is appeared. Nowadays extremely actual and perspective is mobile learning (M-learning).

M-Learning is such a new field the research is still in a stage where different categories of M-Learning pedagogy are being developed, identified, and researched (Frohberg, 2006). With this developmental stage in mind, the very existence of m-Learning, not to mention its growing application, is directly tied to the growth of mobile technology. This fact is why it is so important for researchers and practitioners to be familiar with mobile technology applicable to m-Learning. It simply is not possible for someone to log onto a learning management system (LMS) wirelessly from a personal digital assistant (PDA) if wireless networks don't exist or if PDAs do not support wireless connectivity. Hardware advances are one of two key components to the emergence of m-Learning, the other being networking. To be mobile technology, hardware had to advance to a point at which people would carry and access the device on a regular basis. It is generally accepted that devices like mobile phones, PDAs, and MP3 players fit into the category of mobile devices. Wireless networking is the second technological component contributing to M-Learning success. While some m-Learning resources can be utilized in a non-networked, offline environment, many depend on access to the Internet to exchange information and access up-to-date information. To serve this need, mobile devices needed a way to access network resources without plugging into a land line connection. Currently the leading candidate for this technology is the IEEE 802.11 wireless communication standard, commonly called Wi-Fi. Also gaining ground in the market are wireless phone broadband connections and, to a lesser extent, the IEEE 802.15.1 wireless communication standard, commonly called Bluetooth.

II. E-LEARNING

Education via the Internet, network, standalone computer. E-learning is essentially the network-enabled transfer of skills and knowledge. E-learning refers to using electronic applications and processes to learn. E-learning was first called "Internet-Based training" then "Web-Based Training" Today you will still find these terms being used, along with variations of E-learning such as E-learning, ELearning, and eLearning. In our view there are 3 kinds of definition; E-Learning can refer to:



ISSN: 2319-5967

ISO 9001:2008 Certified

International Journal of Engineering Science and Innovative Technology (IJESIT)

Volume 2, Issue 1, January 2013

- A conceptually simple form of content-based computer-based training.
- Distance education or similar forms of formal open learning making use of technology.
- Any form of pedagogical model that makes use of information and communication technology.
- **D Schneider** says that there is no commonly accepted definition of E-learning.

E-learning intersects numerous fields of thought and practice, and cannot be trivialized into a simple formula for success. As Figure 1 suggests, writings on the ‘theory’ of E-learning encompass an array of academic perspectives: training and education, learning and knowledge, technology and the investigation of individual market segments. In this new industry, key concepts and understandings are still emerging. Any study of the effectiveness and efficiency of E-learning therefore has to engage with multiple issues, including the role of E-learning in knowledge and learning, its contribution to competent performance, its relationship to organizational transformation and strategies for embedding E-learning into other forms of electronic interaction.

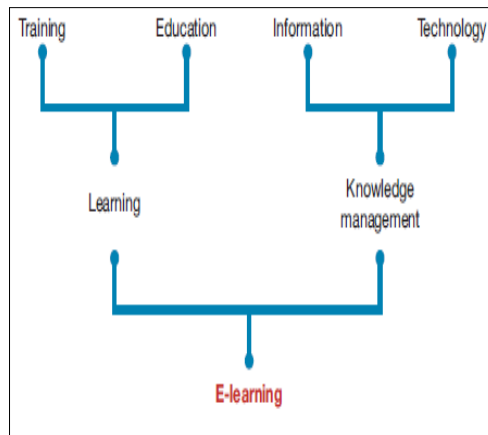


Fig 1: Merging Language and fields Of Study

A. Advantages of E-learning

Student living in the suburbs might opt to attend class through a webcam from home rather than commuting for an hour to an institute location. The same option could exist for somebody with a physical disability. It can also let the universities tap into international experts that might otherwise be inaccessible. Professors could conceivably be shared in an inter-university environment, freeing up knowledge resources, reducing travel time and expense, and even alleviating the need for classroom space. Some major advantages are:

- Self-paced
- Time and location flexible
- Cost effective
- Global teaching phenomenon
- Large knowledge domain to choose
- Life time learning options
- More streamlined and focused
- Diversified field to select from
- Sharing of knowledge is easier
- Labor savings: Save in training salaries
- Access to large amounts of information can be obtained at low incremental cost.
- Enhance academic productivity
- Systematic.

B. Disadvantages of E-learning

- Not immediate feedback
- More load for faculty to prepare instructions
- Infrastructure requirements
- More confusion due to lack of direct interaction
- Requires more maturity and self-discipline
- Dropout rates are more; a lonely way to study



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- Not all aspects of training can be covered using E-learning techniques, e.g. Discipline.
- Lack of social impact of peer group in learning and personal development.

III. M-LEARNING ADVANTAGES COMPARING TO E-LEARNING

The M-learning advantages comparing to E-learning are:

- It can be used everywhere at every time;
- most of mobile devices have lower prices than desktop PCs;
- smaller size and light weight than desktop PCs;
- Ensures bigger students' engage as M-learning is based on modern technologies, which students use in everyday life;
- Using GPS technology the M-learning can provide location dependent education.

IV. ABOUT M-LEARNING

In the term **M-learning**, *m* stands for *mobile*, and the same concept is also often simply referred to as *mobile learning*. **M-learning** is any kind of learning that takes place via a portable, hand-held electronic device. Though the term immediately conjures up images of smart phones, it in fact also refers to learning via other kinds of mobile devices, such as tablet computers, net books, and digital readers.

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.^[1] In other words, with the use of mobile devices, learners can learn from various locations. The objective of M-learning is to provide the learner the ability to assimilate learning anywhere and at any time^[2].

V. MOBILE COMPUTING

The term "Mobile computing" is used to describe the use of computing devices which usually interact in some fashion with a central information system while away from the normal, fixed workplace. Mobile computing technology enables the mobile worker to: (a) create; (b) access; (c) process; (d) store; and (e) communicate information without being constrained to a single location.

Mobile computing is a generic term used to refer to a variety of devices that allow people to access data and information from where ever they are.

In other word, Display, collect, and transfer information from a mobile device to an information system using one or a combination of various data transfer methods.

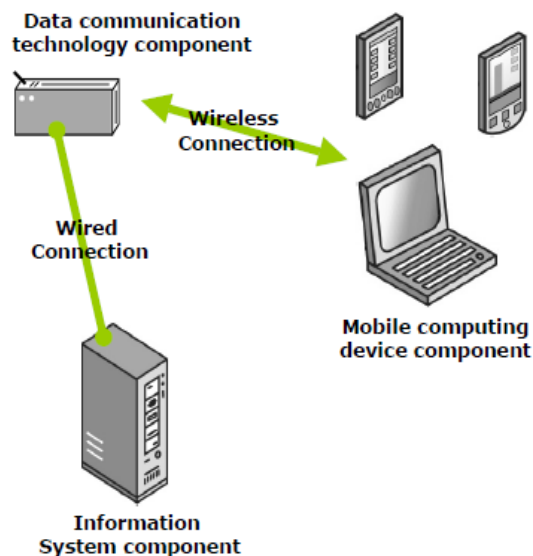


Fig 2: Data Communication Technology Components



ISSN: 2319-5967

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VI. M-LEARNING TECHNOLOGY

The reality of mobile learning is impossible without use of the mobile devices. They vary significantly in their abilities, sizes and prices. The common ability which united them is their mobility and possibility to make wireless connections. The main types of mobile devices used in the education process are:

- **Notebook computers.** From one hand they have such abilities as desktop personal computer; from the other hand they have small sizes and support wireless communications. Their prices are still high.

- **Tablet PC.** These are one of the newest mobile devices. They also have full range of abilities as personal computers. Some of them haven't keyboard but have software to recognize handwritten text. It is relatively expensive.

- **Personal Digital Assistant (PDA).** They have small sizes and significant processor power. New models support more than 65000 colors, recognize handwritten text and can play different types of multimedia files. The main operating systems used are Palm and Microsoft Pocket PC.

- **Cellular phones.** The low class devices mainly can be used for voice communication and sending and receiving of text messages (SMS). Some of their disadvantages are low memory capacity and low data transfer rate. The cellular phones from the higher class can be used to Internet access via WAP or GPRS technologies. They also can be used to send and receive the multimedia messages (MMS). Their prices continuously decrease.

- **Smart Phones.** They are hybrid devices which combine the abilities of cellular phones and PDA. They have smaller sizes than PDA and bigger than cellular phones. Typically they haven't full sized keyboard and can recognize handwritten text. They use Symbian, Windows Mobile or other operating system. As they have Internet browsers they have potentiality to be successfully used in the mobile multimedia education.

Today there are several communication technologies which are used in mobile devices. Their abilities vary vastly as well as data transmission range and range^[3].

- **Global System for Mobile Communications (GSM)** is one of the leading digital cellular systems. It uses narrow band TDMA (Time Division Multiple Access). Originally a European standard for digital mobile telephony, GSM has become the world's most widely used mobile system in use in over 100 countries. GSM networks operate on the 900 MHz and 1800 MHz waveband in Europe, Asia and Australia, and on the MHz 1900 waveband in North America and in parts of Latin America and Africa. It provides integrated voice mail, high-speed data, fax, paging and short message services capabilities, as well as secure communications. It offers the best voice quality of any current digital wireless standard.

- **General Packet Radio Service (GPRS).** A packet-linked technology that enables high-speed wireless Internet and other data communications. GPRS provides about four times greater speed than conventional GSM systems. Currently 288 operators around the world have commercial GPRS services.

- **IEEE 802.11** is a type of radio technology used for wireless local area networks (WLANs). It is a standard that has been developed by the IEEE (Institute of Electrical and Electronic Engineers). Wi-Fi (802.11) is composed of several standards operating in different radio frequencies: 802.11b is a standard for wireless LANs operating in the 2.4 GHz spectrum with a bandwidth of 11 Mbps; 802.11a is a different standard for wireless LANs, and pertains to systems operating in the 5 GHz frequency range with a bandwidth of 54 Mbps. Another standard, 802.11g, is for WLANs operating in the 2.4 GHz frequency but with a bandwidth of 54 Mbps.

- **Infrared Data Association (IrDA).** This association defined a suite of protocols for infrared (IR) exchange of data between two devices, up to 1 or 2 meters apart (20 to 30 cm for low-power devices). IrDA devices typically have throughput of up to 115.2Kbps or 4Mbps. Smart phones, many PDAs, printers and laptop computers use IrDA protocols.

VII. CONCLUSION

Mobile learning has a promising future as a field of study. In mobile technology, both, Mobile h/w and networking application, is a necessary component for the enhancement of M-learning and Mobile computing. The enhancement of M-learning and Mobile computing is useful in technical education system. M-learning makes the merge and connection between technology and technical system possible. The paper has discussed the background of M-learning and Mobile computing and how they can be used to enhance the whole technical learning system.

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ISSN: 2319-5967

ISO 9001:2008 Certified

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