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# M-Learning: A New Learning Experience at the Tunisian Institute

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**ABSTRACT:** Given the rapid emergence of mobile technologies and the growth of its use in several application areas. The recent development of these technologies reflects the emergence of many pedagogical applications. The corresponding domain is called "M-Learning" or mobile learning.

In this article, we will introduce m-learning in its generality, starting with the different aspects that contribute to its emergence. We will present important definitions, advantages and disadvantages of using mobile devices in learning. Finally, we will discuss a case study of mobile learning in our institute.

**KEYWORDS:** Mobile devices, M-learning, Teaching, Mobile technology.

## I. INTRODUCTION

According to estimates by the International Telecommunication Union, 7.4 billion mobile subscriptions were made at the end of 2016, for a penetration rate of 99.7% [1]. Based on this figure the recent years have seen a great evolution in mobile technology (Tablet PC, PDA, mobile phone, smartphone, ...) and communications such as GSM, GPRS, UMTS, WiFi, Bluetooth, 3G, and 4G that offer increased portability of information and mobile communications [2]. As a result and following these changes, new trends in Learning and education are to provide a solution that uses mobile devices for learning anywhere and anytime.

In his search Kinshuk (2003) [3], concludes that the real potential of e-learning as "anytime, anywhere" has finally begun to be implemented with the start of m-learning.

In the last decade where mobile technology began its impact on society, the field of m-learning has evolved rapidly and begins to change the nature of learning. Students can use their devices inside or outside the classroom to learn in all possible situations; in a bus, in a coffee, or in other locations, to which a wireless connection is sufficient to look at the course from their mobile phone.

## II. FROM E-LEARNING TO THE M-LEARNING

The e-learning is a process of d-learning based on multimedia resources, which allows one or more people to learn from their computer.

The multimedia used can contain text, graphics in 2D or 3D, sound, image, animation and even video.[4] Many authors (Nyíri 2002 [5], 2005 [6]; Sharma and Kitchen, 2004 [7], Hosseini and Tuimala, 2005 [9], Laouris and Eteokleous, 2005 [10]) see m-learning as the natural evolution of e-learning, which completes the missing factor mobility of the e-learning solution, or as a further step of d-learning and e-learning (eg, Georgiev, et al., 2004 [8]), who described as a subset appartennet to e-learning together which in turn holds a subset in the set-learning.

Historically, distance learning (d-learning) has more than a hundred years experience and tradition. Its main characteristic is the separation, in time and in space, of the learner and the teacher. The e-Learning provides new methods distance learning based on computer and internet technologies. On the other side the m-learning is a part of the e-Learning and therefore part of d-Learning. [8]

Figure 1 illustrates the positioning of m-learning by comparing to e-learning and d-learning.[12]

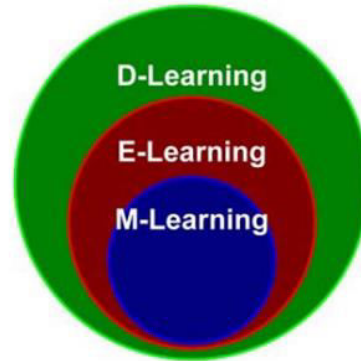


Fig 1. Popular perspective of learning techniques. [12]

The MLearn community, however, has a slightly different view of these relationships. Rather than considering them as subsets, the community view Correctly form their three overlapping sets. In this view none these set s are a subset of each other, but each set is little intersect with each other sets. Figure 2 illustrates this point of view. [12]

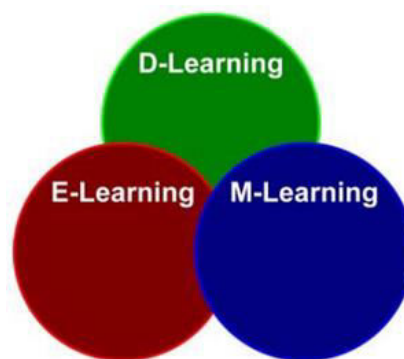


Fig 2. The MLearn community Perspective [12]

### III. DEFINITIONS OF M-LEARNING

In the literature, there are different definitions for m-learning concept. Most focus on mobile devices, like Quinn (2000) [13] and Pinkwart and al. (2003) [14] that Defined m-learning as "e-learning that uses mobile devices".

A similar definition is presented by Trifonova and Ronchetti (2003) [15], they think it There is a common agreement that m-learning is e-learning by devices mobile.

Naismith L. et al (2004) [16] defines mobile learning more broadly as "learning away from its normal learning environment, or Learning involving the use of mobile devices".

Sharma and Kitchen (2004) added [7] "Learning supported devices mobile, ubiquitous communication and intelligent user interfaces". This Definition is more detailed than the others.

Georgiev et al. [8] thinks that the definition of m-learning should include the ability to learn everywhere and every time without permanent connection to networks wired. This can be achieved through the use of mobile and portable devices. They must have the ability to connect to other computer peripherals, to present information and to exchange information between the students and the teacher.

Another definition widely used for m-learning is proposed by Shahid Islam et al. (2008) [17] which has the defined as an evolved form of E-Learning takes the advantage of the learning potential offered by the Internet and mobile technologies.



The most general and significant definition of mobility is that proposed by O'Malley, et al. (2003) [18]: "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".

#### IV. RISE OF MOBILE TECHNOLOGY

The last years have seen an exponential growth of mobile technology, gradually increasing the use of mobile devices in all sectors of education, and through the worlds developed and under development. The statistics are staggering:

- At the end of 2016, 7.4 billion mobile subscriptions were purchased, for a penetration rate of 99.7% according to estimates by the International Telecommunication Union [1]
  - In 2016, 1.47 billion mobile phones were sold worldwide, see FIG 4. [19]
  - More than 70% of the world's population now owns a mobile phone children are more likely to own a mobile phone than book 85% of children own a phone while only 73% of books Clean at home. [20]
  - In 2009, the percentage of people aged 16-24 who have mobile phones is more than 90%. [21]
- So the vogue of mobile technologies is already a motivating factor for exploit in learning.

Thus, Jones et al. [22] also suggested 6 reasons for using mobile devices for mobile and informal learning:

- Informal learning: The learners are often find their most motivating informal learning to formal learning, such as in schools where they have less freedom define the tasks and activities associated with their objectives. Learning becomes therefore more personal.
- Personal control: Mobile devices seem to give their users a very strong sense of control and ownership that was highlighted in the motivation for their use.
- Collaborative learning: The mobile devices facilitate communication between learners to enable collaborative activities and a socialized construction of knowledge.
- Leisure: Mobile devices are used by young people for leisure and more natural use for learning.
- Learning in context: Mobile devices allow learners to find resources and information in the context where they are needed and useful, including sharing them with others.
- Portability: Mobile devices can provide continuity between different environments so that the information or resources that have been captured in a context are available in another.

#### V. MOBILE DEVICES

A mobile device is a portable computing device, which often has a screen and an input output interface with the necessary interaction devices or accessories.

The realization of m-learning is based the use of mobile devices. They vary significantly in their abilities, sizes and price. The main types of mobile devices used in the education are: [8]

- **Mobile phones** (either handheld or cell phones). They characterized by low storage capacity and data transfer rate. Cell phones upper class can be used to access the Internet through technologies WA P,GPRS, 3G and 4G. They may also Be used to send and receive multimedia messages (MMS).
- **PDAs** (personal digital assistants), they have small sizes and a Power of the processor. The new models recognize handwriting and can play different types of multimedia files. The Main operating systems used are Palm and Microsoft Pocket PC.
- **Tablet**, This is one of the latest mobile devices. They also have the Full range of capabilities than personal computers. Some of them Do not have a keyboard but a software to recognize handwriting.
- **Smartphones**, they are hybrid devices that combine the capabilities of Cell phones and PDAs. They can recognize handwriting. They use Android, Windows Mobile or other operating system. As they Have Internet browsers, they have the potential to be used successfully in mobile multimedia education [8].
- **Notebook computers (Laptops and NoteBooks)** On one hand, they have abilities such as desktop personal computer; On the other hand, they have small sizes and supports wireless communications.

Today, there are several communication technologies that are used in mobile devices such as (GSM, WAP, GPRS, 3G, 4G, Bluetooth, WiFi, etc).

· **Global System for Mobile (GSM):** Is a leading Digital cellular systems. It uses the narrow band TDMA (Time Division Multiple Access). It provides built-in voice mail, High-speed data, fax, short message services capabilities, as well as Than secure communications.

· **Wireless application protocol (WAP):** The service is free, protocol Without a license for wireless communications. It makes it possible to create Advanced communications services and access to Internet pages from a cell phone. WAP is a de facto standard supported by a large Number of suppliers. WAP devices understand the WML language (An application of XML) which is optimized for small screens and the Navigation without keyboard.

· **Gene ral Packet Radio Service (GPRS):** A packet technology that allows connection to high speed wireless Internet and other communications data. GPRS provides about four times faster than Traditional GSM.

· **Third generation of mobile telephony (3G):** 3G offers broadband speeds in excess of 144 kbit/s, thus opening the door to multimedia uses such as video transmission, videoconferencing or broadband internet access. 3G networks use different frequency bands from the previous networks: 1885-2025 MHz and 2110-2200 MHz.

· **Fourth generation of mobile telephony (4G):** 4G technology is the next generation of telephone exchanges in the process of expansion worldwide. Whereas in the 3G network, Internet data and telephone conversations were separated, the flow must then be shared among the connected users, and 4G brings together all of these data. This ensures better data transfer. The data rates range from 100Mb/s to 1GB/s.

· **Bluetooth wireless technology** is a short-radio technology scope. Bluetooth makes it possible to transmit signals over short distances Between computers, phones and other peripherals, thus simplifying the Communication and synchronization between devices.

· **Wi-Fi (IEEE 802.11)** Is a type of radio technology used for local area networks Wireless (WLAN). This is a standard that has been developed by the IEEE (Institute of Electrical and Electronics Engineers). Wi-Fi (802.11) is composed of Several standards for operating different radio frequencies: 802.11b is A standard for wireless local area networks operating in the 2.4 spectrum GHz with a bandwidth of 11 Mbps. 802.11a is a different standard for wireless local area networks, and Systems operating in the 5 GHz frequency range with one Bandwidth of 54 Mbps. Another standard, 802.11g, is for WLANs Operating in the frequency of 2.4 GHz, but with a bandwidth of 54 Mbps.

## VI. THE ADVANTAGES OF M-LEARNING

Sharples, 2003. [23] at considers that educators must find ways to exploit the potential of Mobile technologies to enable them to benefit from their learning.

The main advantages:

- Learners can interact with each other and with the practitioner instead to hide behind large screens.
- It is much easier to adapt multiple mobile devices in a classroom than several desktop computers.
- PDAs, Tablet PCs are lighter and less cumbersome than bags full of files, papers and textbooks, or even laptops.
- Writing with the pen is more intuitive than using the keyboard and mouse.
- Mobile devices can be used anywhere, anytime; to the house, on the train, in the hotels.
- These devices engage learners; Young people who have lost interest in education, such as mobile phones, gadgets and gaming devices.
- The size of these devices is smaller and lighter than PCs.
- Most mobile devices have lower prices than PCs; [8]
- Using GPS technology, m-Learning can provide teaching dependent on location. [8]

## VII. THE DISADVANTAGES OF M-LEARNING

Despite the benefits provided by the use of mobile devices in Learning, they have potential limitations that can be:

- Readability of mobile device screens (small mobile displays and PDAs) Which limits the amount and type of information that can be displayed. [24]
- Autonomy of devices: Batteries must be Reloaded regularly, and data may be lost if this is not done correctly.
- They may be less robust than desktops.
- It is difficult to use animated graphics, especially with mobile phones, although 3G and 4G will allow it.
- Bandwidth may degrade with more users when of the use of wireless networks.

## VIII. RESULTS AND DISCUSSION

For our research, we collect data from 100 students of a Tunisian higher institute. The data is retrieved using an online form.

Students are motivated by m-learning and 70% wanted to participate in m-learning. Of this 70% some expressed a preference for learning:

- Using mobile devices (90%)
- With laptop computers (82%)
- With collaborative groups in social networks (76%)
- With desktop computers (70%)
- At institute (50%)

## IX. CONCLUSION

This paper revealed that students can continue their courses outside their classes at any time, provided a network connection is available. The m-learning becomes a technique that can be applied throughout many fields of study. Finally, m-learning has several advantages over traditional learning methods and it is a technology that is evolving according to the software and hardware progression of mobile devices.

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