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MOBILE LEARNING - THE NEW APPROACH OF THE ELECTRONIC LEARNING BASED SYSTEMS

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***Abstract**: As the technology evolves, new ways of learning based systems are ascending. Nowadays, there are several Mobile Learning based program which are already adopted by different institutions all over the world. The Mobile Learning based system is a derivation from the well integrated electronic learning system. The new learning approach tries to fill in several gaps which are found in the classical and electronically types of learning. In this paper, the author has the intent to analyze and present several advantages which can be found in the methodology of Mobile Learning. Among them, new ideas are pointed out such as wireless classrooms learning based systems, and industrial trainings based on mobile communication devices.*
Another purpose of this paper is to briefly examine the existing devices and technologies available on market, which are capable in supporting Mobile Learning as a new path of the progress derived from electronically supported learning.

***Keywords:** M-Learning, mobile learning, wireless classroom*

I. INTRODUCTION

New opportunities for learning and collective interaction were materialized when the wireless technology was available on the market. There are many terms used for the new wireless learning approach, but the most common is Mobile Learning (M-Learning). In the beginning, after launching on the market of wireless smart devices, the implementation of Mobile Learning was slow and quite failed to touch these high expectations. One reason was the fail in building a reliable infrastructure required to make the technology very effective. Nowadays, the state of the art technology makes possible to adopt and implement with success, several learning programs based on wireless systems.
There is a diversity of factors which increased the desire to adopt M-Leaning in the prejudice of traditional and/or electronically supported learning. Figure 1 presents some of these characteristics, and the demarcation line between M-learning and E-Learning.

These attributes, such as spontaneous, portable, informal, light weight, etc are compensating the advantages of using typically E-learning based systems. With the growing of technology's features, new characteristics, such as live videos based on 3G technology, video player, GPS, etc, are making more and more attractive the idea of learning using wireless smart devices.

The paper is structured as follows. Section II presents a review of existing work. Section III provides an enumeration of the most common and usable hand-held devices available on the market and used in M-learning approach. Also, in this section are presented the most important advantages and disadvantages which M-Learning brings. Section IV presents the integration of M-Learning into the academically and industrial sectors. This section describes some of the most successful programs adopted by universities and companies. In section V are presented the conclusions and some limitations of the paper's subject. Section VI enumerates the references used in this paper.

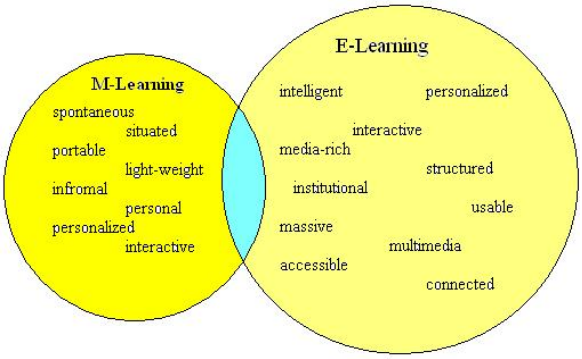

Figure 1. Attributes of M-learning and E-Learning [7]

II. RELATED WORK

Mobile Learning is a heavily researched subject, so there are many papers which present pros and cons, limitations and/or exploration of this topic. There are several papers used in this document. One of them is "Mobile Learning Update" [4] which presents the integration of M-Leaning into the USA academic and industrial segments with an emphasis on already working programs. Another paper is "Are you ready for learning?" [1] by Joseph Rene Corbeil and Maria Elena Valdes-Corbeil which describes in detail the advantages and disadvantaged of the most used hand-held devices available on the market. "MIT.EDU: M-learning Applications for Classroom Settings" [2] paper presents the successful implementation of a mobile learning program inside the MIT University. Other papers such as [3], [2], [5], [6] describe principles and ideas for implementing M-Learning, on which this document was based on.

III. SECTION

Clark Quinn, professor and a world leader in learning technology approaches, has his own definition of Mobile Learning [1]. He describes it as the bridge between the new, portable and wireless devices, and E-learning. He predicted few years back that Mobile Learning would became a way of learning which is time and place independent, and would be supported by portable devices capable of powerful facilities such as interactivity or connectivity.

3.1. Devices available on the market

The most common mobile devices which are available on the market are listed in the following paragraph [1]:

- iPod, a portable media played device produce by the Apple Company, provides different functions such as download and usage of music, audio books, photos, video, etc. The device can be used by students to download lectures in audio and/or video format. With the new improved versions of iPod, which offer a bigger screen, users can download and read electronic books (e-books). Besides these basic functions, students can exchange between them files, share their homework and reviews or collaborate on projects. Advantages of iPod are various: very popular, easy to use, many built-in or downloadable add-ons. As disadvantaged, we can enumerate the cost of the device, which can not be supported by all the students, or the limitation of device technology in order to be used with some complex applications.
- MP3 Player, a digital audio player device, can be used by students in listening audio lectures. Some models have the voice recorder build-in function, so it can be used to

record in audio format file, the lectures. The biggest advantage of this device is that is compact and really easy to be used, with an increased level of the battery life. The two important drawbacks are the lack of interactivity with other devices, and a poor level of build-in or download-able functions.

- Personal Digital Assistant (PDA) is one of the best M-Learning devices from the market. It combines different facilities such as Internet and network access with a calendar, address book, text editor. Equipped with a Wi-Fi connector and Bluetooth technology, supplies a touch pen style interface. It has various functions such as audio, video and flash player, editing text documents, access to Web content, etc. A huge advantage is the big screen which make easier to read files. The advantage can be considered as a drawback from the size point of view. It can not fit in a standard pocket size compartment.
- E-Book Reader is a device specialized in reading all kind of electronic files, from the e-books to newspapers. It can be used by students in downloading, storing and/or reading lectures, homework, reviews, etc. The biggest advantages the device brings, is the easy reading facility due to the size of the screen. The drawback is that the device is providing little functionality.
- Smart Phones are the most popular devices on the market. It incorporates telephone functions with the PDA, camera, video, MP3 player features. It can be used by students in downloading audio/video/flash files, editing text documents, accessing Web content, etc. The advantages are various, but the main drawback comes with the size of the screen of most of the devices available on the market, which makes the text reading difficult.

The new mobile wireless devices bring new opportunities both for students and teachers. From the teacher point of view, the upcoming benefits have to be supported by new pedagogies and ways of instructions.

The advantage from the student view is that, the learning process can be achieved anywhere and anytime. Also, the teacher can have access and interact with his/her students in any moment and any place.

3.2. Division of Learning systems

The learning systems are divided into several categories, i.e. conventional learning, instructional learning, electronic learning and mobile learning [3]. In Figure 2 is presented the structure of learning systems area. All types of learning based systems have both advantages and disadvantages, with a remark that mobile learning can address to many of the drawbacks of the other types of leaning.

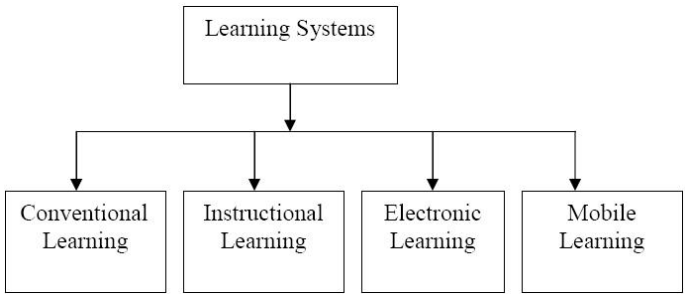

Figure 2. Learning systems [4]

The next section looks into the advantages and disadvantages of M-learning type of system.

3.3. Pros and Cons

There are many and different advantages and disadvantages of implementing and usage of M-Learning based systems. In the next paragraph, we briefly describe the most important ones as follows [8].

Advantages:

- Access of lessons (video, audio and/or text files) from anywhere including public places or moving trains, cars, etc.
- Students can access the M-Learning System at any time 24/7, creating his/her own study schedule.
- Interaction with other students/instructors.
- portability
- Lower prices for hand-held devices comparing with the traditional systems.
- Saving money regarding studying materials or commuting costs.

Disadvantages:

- Limited storage capability of the hand-held device
- Limited wireless bandwidth
- The screen size of most of the devices makes electronic files to be hard to read.
- The short battery life and often changes of this are big inconveniences.

IV. IMPLEMENTATION OF M-LEARNING

According to [5], Mobile Education (M-Education) is a new approach in using the wireless mobile technologies for education, by expanding access to an online desktop based virtual environment to hand-held devices such as smart phones or PDA's.

Nowadays, many academically institutions have embraced the new mobile learning way. One of the strongest examples from the academic area is the Massachusetts Institute of Technology which adopted Mobile-It Education (MIT.EDU) classroom application in order to prove the benefits which come with the new technology [2]. The MIT.EDU applications were developed inside the institute, in order to fill some gaps such as flexibility, extensibility which were encountered in their typical classrooms. The project was started by the end of the 1990s, and between 2001 and 2004 was fully ported on the new wireless technology. The project provided evidence of the new effective way of learning. Hoping that other people will found some usefulness in this project, all the tools and MIT.EDU code was made public.

Besides MIT University, many schools have adopted courses and trainings based on mobile devices. Among them, we briefly present some of most successful programs: Abilene Christian University (ACU), a private university from Texas, USA, was the first university which gave to all freshman students a free Apple iPhone or an iPod Touch for academic purposes; Montclair State University from New Jersey, USA, started a program in which, each student received a GPS based phone for communication reasons, but was extended to include learning support; Wake Forest University from North Carolina, USA, implemented a Pocket PC program in order to extend and improve students' social and academic lives.

From the industrial area, there are many companies which have embraced successfully the new mobile learning path. Among them, Merrill Lynch Company, one of the world's leading financial management companies, has adopted with huge success a mobile based application named GoLearn. Initially, this application was build only for BlackBerry mobiles and provided three online courses. With the success of its original GoLearn pilot, Merrill Lynch broaden the training topics and included new courses such as ethical decision-making, performance management, market abuse, etc.

Chrysler, another world successful company, has adopted several online courses for mobile phones and wireless PDA devices. They are building a search portal and a Learning Management System (LMS) for mobile users, in which they can provide information and answers to frequently asked questions and not only.

There are many other examples of companies which adopted the new M-Learning way with outstanding results. We briefly present some of them: Sun Microsystems implemented a video learning system for employee and partners based on Wi-Fi hand-held devices; Microsoft Corporation

uses a mobile courses project for employees; 3Com Company offers training and support to internal and external employees based on use of Palm mobile devices.

Apart from the academically and industrial sectors, there are some special segments which adapted the new M-Learning ways to their own needs. A good example is the military sector from USA which developed several programs such as Vcommunicator Mobile LC which has the purpose to ease the communication between soldiers and local Iraqi population; Army Excellence in Leadership (AXL) program which increases the leadership skills, etc.

V. CONCLUSIONS

Although Mobile Learning is present on the market using state of the art technology and devices, there is a long way in order to be fully integrated in academically and industrial sectors. The paper presents the wireless technologies and the most common hand-held devices available on the market. Also, the author describes several programs which were efficient adopted by top universities and world successful companies. There are also some limitations of the new technology due to the low performance of the devices comparing with the classical Personal Computer (PC) / Laptop devices, limitation which somehow decrease or limit the ways of implementing Mobile Leaning approach. Future work should analyze and research new ways of improving performance of integrating M-Learning into the new technologies. Nevertheless, the technology advances every day, so the new hand-held devices will be more powerful which will lead to a more successful implementation of learning based on wireless systems.

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