Students' Perception About Mobile Learning in Morocco: Survey Analysis

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***Abstract*—Given the emergence of new mobile devices (tablet, PDA and smart phone), and the growth that knows that part of the ICT, integrating these new technologies into the learning system was imposed, and a new way of learning was born. Mobile learning or "m-learning" is providing great opportunities for learners, especially to learn anytime and anywhere without limitations. There is a new generation of students who grew up using technology and who are easily related to new mobile devices. We discuss the identity of mobile learning and aim to measure the interest of students on it through a survey. This survey seeks to promote mobile learning within the student's community for a possible adoption in Moroccan higher education. Qualitative and quantitative approaches are endorsed. The results are analyzed, conclusions and perspectives presented at the end of this paper.**

***Index Terms*—M-learning, survey, mobile devices, framework.**

I. INTRODUCTION

The use of mobile devices has "exploded" over the past decade. According to ITU (The International Telecommunications Union, 2012), the number of subscribers to mobile telephony has increased from 2.9 billion in 2006 to 6.5 billion (94.2% of the world population) until mid-July 2012. Similarly, International Data Corporation (IDC) released in July 2012 that the percentage of smart phones sold increased by a rate of 61.7% between 2011 and 2012 against an increase of 11.1% for other types of mobile devices and a decrease of 0.1% of the number of desktops sold during the same period [1]. These statistics demonstrate the expansion of mobile technologies, against fixed devices which is almost obsolete these days.

The impact of this great development on education and learning was inevitable. However, the learning needs have also evolved due to this impact, since the so-called traditional learning "face to face", to distance learning, giving part in several models such as e-learning, blended learning, or mobile learning and serious game.

M-learning is one of the most visible models today; several studies describe mobile learning as an extension of its predecessor e-learning and limit it as a complement of the latter. Between complementarities and differences, the identity of M-learning is seen controversial and especially with its many new fields of applications that are emerging.

M-learning is an embodiment of Mark Weiser's vision, who thinks that the operation of mobile devices gave birth to a new term "pervasive mobile learning" [2]. His vision for the 21st century was "The most profound technologies are those that disappear. They blend into the fabric of everyday life until it merges with them "[3]. He predicted that the technology itself becomes invisible and integrated into our daily lives. The hardware to support ubiquitous computing was not available at that time. But still, he envisioned a future where tiny devices will be integrated into environments making the ubiquitous learning a reality. And now the incredible growth of mobile technology has filled his vision [4].

In this paper, section 2 describes the controversial identity of mobile learning clearing the two opposite scientific currents, section 3 explain the big impact mobile learning has made in pedagogy, section 4 details the questionnaire done among the university students to measure enthusiasm about m-learning to determine whether a possible adoption is conceivable or not, section 5 presents a new mobile learning framework, the last section conclude this study and describes our perspectives in future works.

II. THE CONTROVERSIAL IDENTITY OF M-LEARNING

The arrival of M-learning has revealed a great controversy within the scientific community. In dissecting the M-learning literature there are two main schools of thought shown in Figure below.

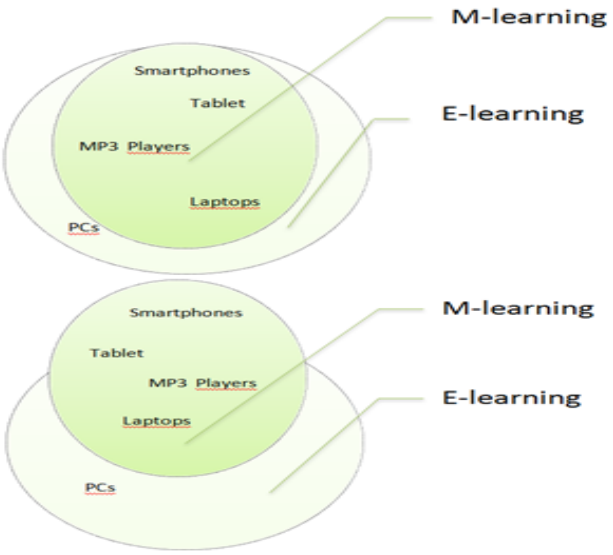

Figure 1. Representation of both scientific currents

A. M-learning depends on e-learning

Mobile Learning is a type of e-learning, in distance or face to face, which uses mobile technology; it's designed to respond appropriately to the mobility of students and their modern preferences [1]. Mobile learning is seen as the natural evolution of e-learning. M-learning is e-learning through a mobile device and a wireless transmission. [5]

According to Harris, M-learning is the point where mobile computing and e-learning intersect to produce a learning experience anywhere and anytime [6].

M-learning is derived from e-learning (a way of learning which has the support and improvement made by computing and through various communication techniques) which, in turn, comes from distance learning [7].

B. M-learning: a new form of learning

Mobile learning is different from e-learning because it is not only electronic, it is mobile [8]. M-Learning is: Any sort of learning that happens when the learner is not at a predetermined fixed location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies [4].

The controversy that surrounded the identity of M-learning appeared since the early 2000s and it's not yet finished. The second scientific current, think that M-learning is a concept designed for a new learning community oriented to learning free of all temporal and geographical limitation.

We believe that with mobile learning, the learning phase is no longer bound to a place with specific characteristics, learning becomes downright ubiquitous. For example, delays train stations or subway traveling become potential learning moments. In general, a time that would be "wasted" otherwise or that before couldn't be enriched with educational content, has become a point of learning potential through mobile learning.

III. REPERCUSSIONS OF MOBILE LEARNING

Various types of learning are progressing as long as the mobile learning, offering many options and opportunities to this new learning method to be more present and more effective in our learning environments.

A. Learning methods

- Informal and situated learning: learning is supported in a context or in a real.
- Constructivist learning: learners build from their own knowledge in an immersive environment that can be offered by the mobile device or mobility itself.
- Collaborative learning: social interaction which is very present and accessible via mobile devices stimulates and reinforces learning.
- Support for learning: mobility is not necessarily used for learning and can be used to support the learning activity.

There are many others learning methods more or less adapted to mobile learning. But we think that the efficiency can only happen when the two major actors (student and instructor) are fully engaged in the learning activity.

B. Advantages

Learning can be enhanced with intelligent environments and context awareness. The information on the context of the learner is obtained from the learning environment that is integrated with sensors, labels and so on. While the learner moves with his mobile device, the system supports dynamic learning by communicating with embedded systems in the environment. These environments can be constructed either by integrating models of a specific environment in dedicated computers, or using computers to learn, identify, search and dynamically build models [9].

Rapprochement between teachers and students, mobile learning gives instructors more freedom with students through social Medias or multimedia and especially in a specialized environment to each student.

Mobile learning can popularize some content that may seem boring in a classroom.

The implication of students can be enhanced with mobile learning knowing that they can have content at any time and any place.

IV. ANALYSIS OF THE SURVEY

The purpose of this study was to explore the use of mobile learning in Moroccan higher education system, and then examine student's perceptions. To meet this goal, these following questions were asked:

- Do students use mobile devices in general? What kind of devices they use? And where and when do they use them?
- Is it fair financially for all students to use mobile learning?
- What are student's impressions of mobile learning?

To answer these questions, a questionnaire was done among a random population of 130 undergraduate students from HASSAN II university of Casablanca. 86 responses were registered.

A. The survey

The survey was designed to collect both qualitative and quantitative data. The first main question was divided into multiple questions. 1-"Do you have a mobile device?" The choices given were: « Yes » or « No ». 2- "What are the mobile devices used?" The choice list was: « GSM », « Tablet », « Laptop », « Other ». 3-"How often do you carry your device with you? » The choices given where: « Never », « Rarely », « Sometimes »,« Always ».

In line with the second question, a statement was given in order for us to measure student's impressions on a 5 level Likert scale from 1 to 5 where : 1 represents « Strongly Agree », 2 represents « Agree », and 3 represents «Not sure», 4 represents «Disagree», 5 represents «Strongly Disagree». It was:" The adoption of mobile devices in learning can be unfair for students." This will show us the real feasibility of a possible adoption of mobile learning in Morocco.

In view to answer the last question, we asked students:

1-"Do you think that accessing your educational materials (courses, slides, quiz ...) via your mobile at all times and places would be beneficial to your learning?" The responses given were: « Yes », « Yes Probably », and «Not sure», «Probably Not», and «No». 2- "Are you comfortable with the idea of interacting with your professor via your mobile device?" The responses given were: « Completely comfortable », « Comfortable », «Not sure», «Uncomfortable», and «Completely uncomfortable ». 3- "Do you think the use of certain mobile learning software could improve the success of one of the courses you are taking now? For this question open comments were requested to give us the qualitative part of the data.

Other questions were asked in this survey in order for us to gather more data not specifically important to this study. Bellow is given some of the questions asked:

1. "What is the operating system of your mobile device?"
2. "Which services do you regularly use on your device?"

The collected data can be exploited to conduct further research.

B. *Results: Quantitative Synthesis*

The survey revealed that the great majority of students 98.8% do use mobile devices. Fig 2 shows the big popularity of Smartphone versus the other devices like tablet or laptop among students.

Fig 3 shows how often students carry them mobile devices with them, the results gave us an idea about the eventuality of the adoption of mobile learning , as 93% of students answered that they always have them mobile devices on them.

About the student's fear that the adoption of m-learning can be unfair for some students, the great majority strongly agreed or agreed and only 3.5% thought the opposite. This fear can be explained by several economic and social factors in a society such as the Moroccan one. Some students are hardly becoming familiar with mobile devices, this is what we observed when we asked them how long did they start using their devices. 45% are using it for less than 1 year against 33.7% who are using a device more than 2 years. More than that, mobile technologies are still considered expensive for a large part of the population, especially when the average monthly salary is between 2800 MAD and 4000 MAD. Table 1 show a comparison between the most important features of mobile devices including the price in Morocco.

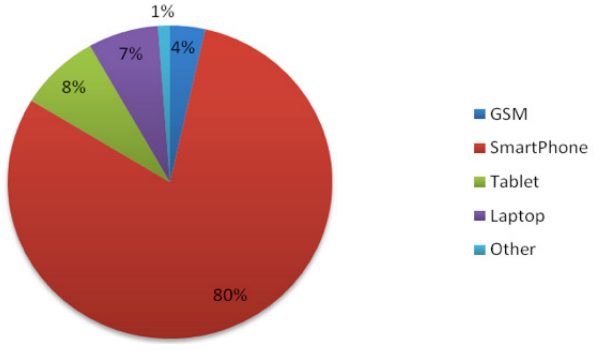

Figure 2. Student's usage of mobile devices

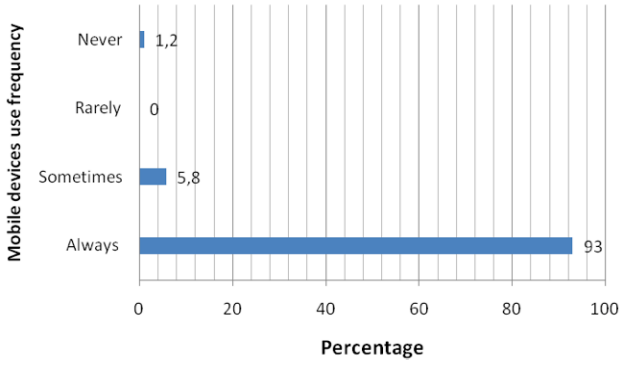

Figure 3. The usage frequency of mobile devices among students

Fig.4 reveals that most of the students think that mobile learning can be beneficial to their learning. The results are in line with the student's comments which are very positive and supportive to mobile learning in general.

Most of the students wonder if it's more effective or not interacting with the professor trough a mobile device, especially when the topic taught is technical. So when asked, a lot of students responded that they are completely comfortable or at least comfortable to the idea as shown in fig 5.

C. *Qualitative results: Qualitative Synthesis*

Open comments were invited in line with question "Do you think the use of certain mobile learning software could improve the success of one of the courses you are taking now? If so, specify which one" Most of the responses were positive and surprisingly the majority of students specified foreign languages as a subject of improvement with mobile learning. Some technical courses were mentioned too. Here are some examples of the student's responses:

TABLE I.
COMPARISON OF TYPICAL PARAMETERS OF MOBILE DEVICES

	Notebook	**Tablet**	**Smart Phone**
Price	14 990 MAD	7 700 MAD	2749 MAD
Weight	1.58 kg	0.272 kg	0.112 kg
Screen resolution	2560 x 1600 pixels	2048 x 1536 pixels	1280 x 720 pixels
Memory	8 GB	1 GB	1.5 GB
Battery	10h	10h	10h
Communication Technologie	Wi-Fi, Bluetooth	UMTS, Wi-Fi, Bluetooth	UMTS, GPS, Wi-Fi, Bluetooth

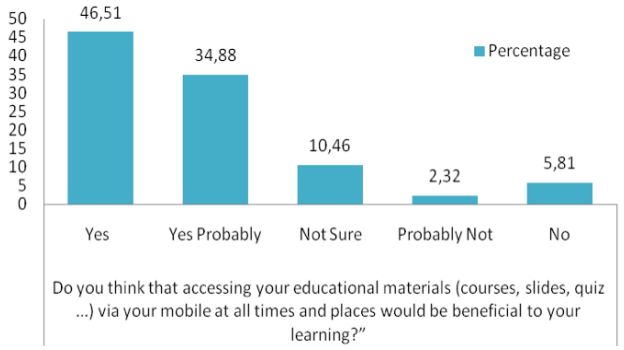

Figure 4. Student's impressions about M-learning

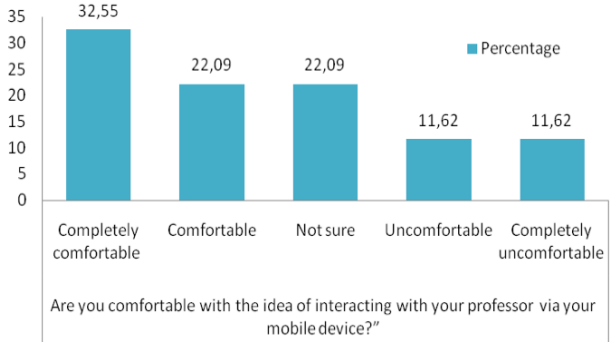

Figure 5. Reaction of students to m-learning interaction

1. Yes, i partially adhere to it, because the role of the teacher will be very essential when it comes to technical courses.
2. Language lessons for example.
3. Yes, IT courses and languages.
4. Yes, Tax System courses and accounting.
5. Yes, courses during which we use different items and different references would require mobile applications that include all the documents for an overview and to be able to browse them more easily.
6. Yes, 3D anatomic imaging, organic chemistry, biochemistry, embryology.
7. Yes, public health courses or anatomy.
8. I'm not really sure; i find that making mobile QCMS has no real bonus if it is to know our results without correction. However, if it's a course, i think it is a good idea so we can review it at any time of the day.

D. *Additional data*

Some additional data were collected in this survey, like the mobile operating system and the mobile services most used by students.

Table II shows the near dominance of the android system to iOS and Windows Phone. Because they are more affordable, android devices are increasingly used, taking over 60% of the students' market share.

Among all services that mobile devices can offer, Table 3 shows that social Medias and web browsing next to texting are topping the list. Students engage also in emailing and gaming through mobile devices but lesser than what they would normally do with a laptop.

E. *Summary of results*

1. The most popular mobile devices used among students are Smart phones, tablets and laptops.
2. Some students think that mobile learning may not be democratic towards all students.
3. The great majority of students are positives about m-learning.
4. Android is the most used operating system among students.
5. Social Media, web browsing and texting messages top the list of the most used services on mobile devices.

Given all this positive results, we think that mobile learning can be an effective method of learning. This study results are in line with many other studies conducted in several universities in other countries [10][11][12].

V. M-LEARNING FRAMEWORK PROPOSAL

In order for mobile learning to be effective and competitive with all the other form of learning already used, it should be guided through a framework that consider all aspects that come into play when speaking about learning environments using technology.

Mobile learning as shown in fig 6 happens when we define and combine the following components:

- Pedagogy – The learning method or the way that learning is conducted, for example: traditional learning collaborative learning, problem based learning.
- Content – The material meant to be taught to students.
- Mobile Technology – Smartphone, tablet or laptop, 3G transmission, 4G or WIF, the parameters are different and yet how to convey and think learning through it.
- Learning environment – Contexts in which students will be learning.
- Learner's profile – learning is constructed in a specific way or customized to match each student.

VI. CONCLUSION AND PERSPECTIVES

The growing interest of learners, as well as the phenomenal growth of mobile technology supports the idea that mobile learning will have its own identity and will not be limited anymore.

This study sought to show the interest and perception of Moroccan students toward mobile learning. The quantitative and qualitative results of this survey indicate that Moroccan students are mainly positive about m-learning which leads to believe that a possible adoption of mobile learning model in Moroccan higher education should be very welcomed.

Our future works will focus on mobile learning pedagogy frameworks and integration designs. The framework presented in this paper will assist us for further development.

TABLE II.
MOST USED MOBILE OPERATING SYSTEMS

Mobile operating system	Percentage
Android	70
iOS	24
Windows Phone	5
BlackBerry OS	0
Other	1

TABLE III.
MOST USED SERVICES ON MOBILE DEVICES

Services regularly used on a mobile device	Percentage
Social Medias	85
Emailing	37
Short text messages	62
Games & Entertainment	31
Web Browsing	73
Other	5

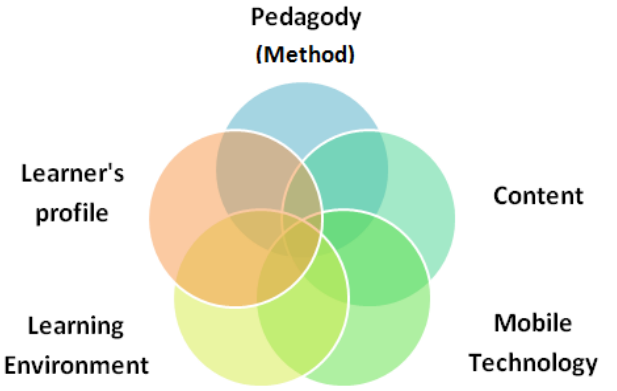

Figure 6. Five axes framework for m-learning design

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