Mobile Learning Aspects and Readiness

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ABSTEACT

This paper provide the aspects of mobile learning by presenting the differences techniques and aspects of using mobile devices in education according to the perspective of researches and studies in this area, it offers a comparison between e-learning and m-learning, a classification of education by mobile devices, and shows the categories of mobile learning. The paper also provides the readiness of mobile learning by presenting the results of study conducted at faculty of Computer Science and Information Technology at Al-Zaiem Al-Azahri University in Sudan.

General terms

Computer application, ICT in education, E-learning, M-learning

Keyword

e-learning, m-learning, learning, mobile, distance learning,

1. INTRODUCTION

Universities over the past few years have either used the internet to enhance the learning, by providing online access to lecture notes, assignments and additional course related resources, or used it as medium of implementing virtual classroom, due to the revelation of IT technologies and internet attending virtual classroom lecture from remote became possible and available.

Popularity of such distance learning programs highlights the importance of flexibility in education system .Mobile devices and their use in education have extended the idea of flexibility to new frontiers .Mobile learning has different interpretations by several communities. The distinct interpretation is in its focus on learning across contexts and learning with handheld or portable devices(phones,Palms, PDA,Windows CE machaines and iPODS). Thus, mobile learning decreases limitation of learning location with the mobility of general handy devices. Learning with portable technologies, where the focus is on the technology; learning across contexts, where the focus is on the mobility of the learner, interacting with portable or fixed technology. Because most students today have some sort of internet-enabled mobile device (3G cell phone or PDA, smart phone)[14]. M learning means "acquisition of any knowledge and skill through using mobile technology anytime, anywhere that result in alteration of behavior"(Gedden S.J.) Mobile learning is convenient in sense that it is accessible virtually from anywhere, which provides access to all different materials available. M learning also bring strong portability for learning contents[3].

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In this paper we are going to study the used of mobile technologies in education, the study will covers the aspects and the readiness of using mobile technologies in education (m-learning).

2. RELATED WORKS

Mobile learning recently received considerable attention from researchers. The researches in this area came in diversity, some of them concerning about the possibilities and obstacles, some on the impact of m-learning on education, some concern about the technologies, some about the educational environments, and some on the readiness. This study focus on two areas, the technology and the readiness, in concerning with these two areas there are considerable recent researches work; for example [4], [9], [12] and [13] in the area of using mobile technologies in education, and [1], [5], and [10] in the area of readiness and case study.

The contribution of this study is that; the study presents the technologies and aspects of the mobile learning from different point of views, it provides these aspects from comparison between m-learning and e-leaning point of views, and also it provides these aspects from categorization points of views. Also the study examines the readiness of m-learning by providing a case study include experiment and survey work. Another contribution of this study is that; it's the first study in, it used one of the Sudanese University as a case study (there are more than 32 high education instituted distributed over 1,800,000 sq. km.), which can conceder it as reference work for this region and "may be" for the under developing countries.

3. M-LEARNING Vs E-LEARNING

M-learning also seen as an extension of e-learning where the focus is on the use of mobile devices. Laouris and Laouri (2006) classified the move from e-learning to m-learning as a revolution, because it implies change of mindset when designing and planning learning environments and goals, in additional to implies the change in terminology [8].

According to the scientific conference in m-learning (MLEARN 2004) the relation between m-learning and elearning can be summarized as[11]:

- m-Learning is a sub-set of e-Learning
- m-Learning is a means to enhance the broader learning experience.
- m-Learning is a method for engaging learners on their own terms especially nontraditional learners or for students who cannot participate in classroom[11].

Table 1: Table 1: Differences between e-learning and m-learning environments with respect to methods of terminology and technology

E-learning	M-learning
Computer	Mobile
Bandwidth	GPRS, G3, Bluetooth
Multimedia	Objects
Interactive	Spontaneous
Hyperlinked	Connected
Collaborative	Networked
Media-rich	Lightweight
Distance learning	Situated learning
More formal	Informal
Simulated situation	Realistic situation
Hyper learning	Constructivism,
	situationism, and
	collaborative

From communication point of view mobile learning in addition to asynchronous communication provides synchronous communication mechanisms and tools. Table 2 shows differences between e-learning and m-learning in respect of communication

Table 2: Differences between e-learning and mlearning environments with respect to methods communication

Respect in	E-learning	M-learning	
	Time-delayed	Instant delivery	
	(students need	of e- mails or	
Communicati	check e- mail	SMS, voice	
on between	Web sites)	communication,	
instructor and		and social	
student		applications	
		(wasapps, viber,	
		etc)	
	Passive	Instant	
	Communication	Communication	
	Asynchronous	Synchronous	
	Scheduled	Spontaneous	
	Face-to-face	Flexible and	
		collaborations	
		through	
Communicati		communication	
on between		application and	
student and		social network	
student		tools	
	Audio-	Audio and	
	teleconference	video-	
	common	conference	
		possible	
	Private location	No geographic	
		boundaries	
	Travel time to	No travel time	
	reach Internet	since wireless	
	site	connectivity	
	Dedicated	Flexible	

time for	timings on
Poor	communication
communication	Rich due to
due to	one-to-one
group	communication,
consciousness	reduced
	inhibitions

In m-learning we can used varieties of methods to evaluate students, for example we can use real-life cases, site experiments, online presentation , pre-test, post-test, and group discussion . Table 3 shows differences between elearning and m-learning in respect of the methods of students evolutions

Table 3: Differences between e-learning and mlearning environments with respect to methods of evaluation

E-learning	M-learning		
1-to-1 basis possible	1-to-1 basis possible Both		
Asynchronous and at	asynchronous		
times delayed	and synchronous		
Mass/standardized	Customized		
Instruction	Instruction		
Benchmark-based grading	Performance &		
	improvement-based		
	grading		
Simulations & lab based	Real-life cases and on the		
experiments	site experiments		
Paper-based	Less paper, less printing,		
	lower cost		

4. MOBILE LEANING CATEGORIES AND TECHNOLOGIES

According to Kukulska-Hulme and Traxler [6],[7], mobile learning can be categorized according to

- Technology-driven mobile learning,
- Portable e-Learning .
- Connected classroom learning .
- Informal, personalised, situated mobile learning .
- Mobile training, performance support .
- Remote, rural or development mobile learning .
- Inclusion , assistivity and diversity
- Large –Scale implementation

Table 4 provide a summary to these categorizes with their technologies.

Software and applications, that has been used in mobile education growth increasingly, now a day most of desktop application has mobile phone versions for example Moodle, Blackboard, Office ... etc., beside that many mobile application and software tools can be used to enhance the educational process. Table 5 show examples of mobile applications that can be used in m-learning.

Aspect of mobile	Networks	Technology	Technology Characteristics	Device	Content	Activities
Portable e-learning		Cable	Direct wired connection. Least complicated, least flexible.	PDA, iPad, Smartphone, flash drive	Instructional material along with audio and video lectures, word documents, email, internet or wikis etc.	Tasks, Learning, Assessment
		GSM	Global System for Mobile - the major telephone and data standard used in World			
Classroom learning		WiFi	IEEE standard 802.11 for wireless networking, with several current or coming standards.	laptop computer PDA's, mobile	Lecturer Regular, emails, forum discussion,	Quizzes and assignments,
	Local- Area Networks, rally	IR	Infra-Red light - Inexpensive, but increasingly out of favor as it requires line of-Sight	Phones cell phones	photography, audio and video recording	Students/learner Collaboration
	internet	Bluetooth	An increasingly common networking standard found in many devices. Costs continue to go down and capability goes up, but it does have power requirements.			
Rural mobile learning	Wide- Area Networks	WiMax GPRS GSM	A promised wireless, broad- reach, broadband network. Code Division Multiple Access Global System for Mobile -	Palms, 3G cell phone PDA, mart phone and iPODS	multimedia format course, segments to lectures, Flash-card trainer, internet or wikis	Interact students to each other and with the teacher, off –line course, Quizz, Assignment
			the major telephone and data standard used in World			Exam

Table 4: Mobile learning categories and their technologies

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Table 5 : Examples of mobile applications that can be used	n be used
in m-learning	

Category	Examples
Mobile learning management software	MLE, MLE-moodle, MDroid, LearnEM, Classbook, Blackboard, Blackboard Mobile, Blackboard Collaborate etc.
Delivery tools	Polaris office, officeSuite(Word document, Pdf,) video, photoetc
Voice and message communication applications	Skype, Viber, Line, Voice Recorder, Assistant, WhatsApp, etc
Self learning	Language learning (ex. learning Japanese, learning Chinese, etc), Quran Learning, maps,etc.
Virtual Classrooms	Virtual Classrooms, E3 Virtual Classrooms, Splashtop, Classroom, Perculus etc.
Blogs	Blogger, WordPress, Feedlyetc

5. MOBILE LEARNING READINESS

Mobile technologies can be one of the suitable technologies for developing and delivering the education process hence; mobile learning can be any educational interaction delivered through mobile technology, it is not limited in mobile applications that designed specifically for learning purposes, but also those designed for other used such as maps, geological, data access, self learning tools,... etc. Accordingly using mobile in learning will enhance the learning systems and provide more advantages for the educational environments by bringing the benefit of these technologies to the educational fields.

The question arises here; are the technology and the people ready to move towards mobile learning?

This section tests the readiness of using mobile in learning from two points of views:

- 1- The availability and the capability of the technologies in implementing educational processing (readiness of the hardware and the software).
- 2- The readiness of teacher and students in using mobile in learning.

5.1 Readiness of the technology:

From the previous sections we can conclude that there are varieties of mobile technologies and applications that can be used in implementing m-learning. These technologies are became more available and more usefully, it became a familiar part of the lifes, most of peoples now a day using mobile phone in talking, sending messages, chatting, taking photograph or and accessing information.

In a survey conducted on sample of 96 students from the faculty of Computer Science and Information Technology at Al-Zaiem Al-Azhari University in Sudan, we found that 100% of the student has mobile phone (cell phone) 85% of these mobiles phones are smart phones, 20% of these students in additions to mobile phone has PDA, or iPad. The survey shows that the students are familiar in using these

technologies. The survey also shows that students are used mobile in many university activities such as time table, instance messages, courses materials and group discussion.

The survey almost gave the same result when it conducted to sample of 51 teachers in same faculty.

5.2 Readiness of the teachers and students

The paper used the faculty of Computer Science and Information Technology at Al-Zaiem Al-Azhari University in Sudan as case study for examines the readiness of the teachers and students towards using mobile technology in learning.

5.2.1 Study methodology:

The study conducted into two ways or mechanisms:

• In the first mechanism we prepare m-learning model using MLE software (figure 1) and implement this model in teaching undergraduate students. The feedback from students shows that 85% of the Students liked the technology and enjoyed the experience.

The feedback from teachers (51) shows that 72% of them saw that these methods of teaching is useful and it will succeed, the rest of them (27%) saw there is still limitation in using mobile phone in learning such as the limitation in memory size, battery life, and speed.

• In the second mechanism we surveyed all the staff (instructors, teaching assistance, lecturers, assistant professors, and associate professor) at the Faculty of Computer Science and Information Technology at Al-Zaiem Al-Azhari University in Sudan, the total number of the survey population is 51.



Figure 1: Snapshots of MLE model used in teaching undergraduate students (course lang. is Arabic)

The authors have analyzed the answers to the qualitative questions in the surveys in an attempt to gain an understanding of how current teachers view the use of mobile devices in learning environments and are they willing to do that? (teachers readiness). The analysis of teacher's perception on m-learning points to the fact that mobile learning is widely embraced by teachers community. The majority of teachers supported the notion that the mobile technologies increase the flexibility of access to resources in learning and that they could work independently of variable resources and mlearning activities can much better engage students in the learning process. Table 6 shows summary of the survey result.

Item	Questionnaire	Strongly	Agree	undecided	Disagree	Strongly
No	Indicator	agree				Disagree
1	M-learning helps me in my lessons delivery	42%	27%	10%	18%	3%
2	I advise my colleagues to use m- learning in their class	35%	15%	40%	5%	5%
3	I see that teaching productivity can be enhanced by the use of mobile phone in and outside the classroom.	40%	22%	28%	5%	4%
4	M-learning could help college students to remember their course details	46%	34%	14%	4%	1%
5	Mobile learning can be an effective method of learning as it can give immediate support	27%	46%	20%	5%	2%
6	With m-learning, students can achieve more success	29%	37%	20%	10%	4%
7	Mobile technology can help educators in test preparations	42%	40%	17%	1%	0
8	Mobile learning will bring new opportunities of	40%	28%	29%	3%	0%
9	Mobile learning is a quicker method of	32%	32%	33%	1%	2%
10	M-learning encourage collaborative work	31%	37%	19%	19%	3%
11	Using M-learning will encourage my class activities	32%	25%	28%	9%	6%
12	I believe that M-learning has a lot of opportunities for active learning	52%	42%	5%	2%	0%
13	I belief that, if my college use M- Learning, it will increase the students chances of getting a better grade	42%	37%	14%	5%	2%
14	Mobile learning cannot be used in Sudan for learning due to expensive costs.	31%	37%	15%	22%	2%

Table 0. A summary of teacher reaumess survey result	Table 6: A	summary	of teacher	readiness	survey	results
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6. RESULTS

This paper presents the differences techniques and aspects of using mobile devices in education according to the perspective of researches and studies in this area. The paper provides:

- 1- A comparison study between e-learning and m-learning.
- 2- A classification of education by mobile devices.
- 3- The categories of mobile learning.

The paper also provides the readiness of mobile learning by presenting the results of a study conducted at faculty of Computer Science and Information Technology at Al-Zaiem Al-Azahari University in Sudan.

The paper shows that mobile technologies are ready and available for implementing m-learning, and there is a considerable readiness from the peoples to used mobile in learning. The study shows that 85% of the student enjoyed the experiment. The survey shows that teachers attitudes toward m-learning were high they are willing to do that (Table 7 and figure 2 and 3 show some statistical results for the survey) These results are consistent with Alwraikat, Mansour A. and Al Tokhaim, Hiam results he [2].

Table 7: statistical results for teachers' survey

#	Question	mean	std	rank
1.	M-learning helps me in my lessons delivery	3.7	1.39	High
2.	I advise my colleagues to use m-learning in their class	3.2	1.31	High
3.	I see that teaching productivity can be enhanced by the use of mobile phone in and outside the classroom.	3.4	1.32	High

	M-learning could help			
4.	college students to	3.0	1.11	High
	remember their course	5.7		Ingn
	details			
	Mobile learning can be an			
5	effective method of	3.6	1.06	High
5.	learning as it can give	5.0	1.00	Ingn
	immediate support			
6	With m-learning, students	35	1 1/	High
0.	can achieve more success	5.5	1.14	Ingn
	Mobile technology can help			
7.	educators in test	3.5	1.27	High
	preparations			
	Mobile learning will bring			
8.	new opportunities of	4	1.14	High
	Learning.			
	Mobile learning is a quicker			
9.	method of getting feed back	3.1	1.20	High
	in learning			
10	M-learning encourage	39	1 10	High
10.	collaborative work	5.7	1.10	mgn
	Using M-learning will			
11.	encourage my class	3.5	1.29	High
	activities			
	M-learning allows			
12	information to be accessed	4.4	0.80	High
	at anytime and anywhere		0.00	1
	for learning and real tasks			
13.	I believe that M-learning			
	has a lot of opportunities	3.8	1.17	High
	for active learning			
	Mobile learning cannot be			Medi
14.	used in Sudan for learning	2.9	1.32	um
	due to expensive costs.			



Figure 2: The Mean of teachers' survey



Figure 3: The Standard Deviation of teachers' survey

7. CONCLUSION

The paper concludes that the mobile technologies can be one of the suitable technologies for developing and delivering the education process hence; there are varieties of mobile technologies and applications that can be used in implementing m-learning. The study state that these technologies are became more available and more usefully, it became a familiar part of the life, hence, most of peoples now a day using mobile phone in talking, sending messages, chatting, taking photograph or and accessing information.

The paper concludes that using mobile in learning will enhance the learning systems and provide more advantages for the educational environments by bringing the benefit of these technologies to the educational fields.

The study also concludes that mobile technologies are perceived as an effective tool in improving communication and learning. In developing countries (Sudan as a case study)

Finally we can conclude that mobile technologies and its applications are became important part of our life it is involved in most of our life activities and enhance these activates by the advantages of these technologies, therefore using mobile technologies in educational process will be essential to keep pace with the constant evolution and experience the reality.

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