EFFECTIVENESS OF MOBILE LEARNING IN DISTANCE EDUCATION

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ABSTRACT

The main aim of this research is to better understand and measure students' attitudes and perceptions towards the importance of mobile learning in distance education. Results of this survey clearly indicate that facilitating mobile learning can improve the entire distance education by enhancing ways of communication among distance learners, tutors and supporting staff. The biggest advantage of this technology is that it can be used anywhere, anytime and its usage is easy access to a larger number of distance learners. This study draws the preferences and the extant to which distance learners in Pakistan are use to mobile learning.

Keywords: Mobile learning; m-Learning; covering problems of distance learning; improving distance learning.

DISTANCE EDUCATION: INTRODUCTION

Distance education takes place when a teacher and student(s) are separated by physical distance, and technology (i.e., voice, video, data, and print), often in concert with face-to-face communication, is used to bridge the instructional gap. A wide range of technological options are available to the distance educators which fall into four major categories:

a) Instructional audio tools which include the interactive technologies of telephone, audio conferencing, and short-wave radio. Passive (i.e., one-way) audio tools include tapes and radio.
b) Instructional video tools which include still images such as slides, pre-produced moving images (e.g., film, videotape), and real-time moving images combined with audio conferencing (one-way or two-way video with two-way audio).
c) Data tools which include computers to send and receive information electronically and computer applications for distance education that include:

- **Computer-assisted instruction (CAI)-uses the computer as a self-contained teaching machine to present individual lessons.**
- **Computer-managed instruction (CMI)-uses the computer to organize instruction and track student records and progress. The instruction itself need not be delivered via a computer, although CAI is often combined with CMI.**
- **Computer-mediated education (CME)-describes computer applications that facilitate the delivery of instruction. Examples include**
- **Electronic mail, fax, real-time computer conferencing, and World-Wide Web applications.**

d) Print material which is a foundational element of distance education programs and the basis from which all other delivery systems have evolved.

Various print formats are available including: textbooks, study guides, workbooks, course syllabi, and case studies.

Research comparing distance education to traditional face-to-face instruction indicates that teaching and studying at a distance can be as effective as traditional instruction, when the method and technologies used are appropriate to the instructional tasks, there is student-to-student interaction, and when there is timely teacher-to- student feedback (Moore & Thompson, 1990; Verduin & Clark, 1991).

USE OF TECHNOLOGY IN DISTANCE EDUCATION

Although technology plays a key role in the delivery of distance education, but effectiveness depends on instructional outcomes, not the technology of delivery.

The key to effective distance education is focusing on the needs of the learners, the requirements of the content, and the constraints faced by the teacher, before selecting a delivery system.

Typically, this systematic approach can result in a mix of media, each serving a specific purpose. For example:

- **A strong print component can provide much of the basic instructional content in the form of a course text, as well as readings, the syllabus, and day-to-day schedule.**
- **Interactive audio or video conferencing can provide real time face-to-face (or voice-to-voice) interaction. This is also an excellent and cost-effective way to incorporate guest speakers and content experts.**
- **Computer conferencing or electronic mail can be used to send messages, assignment feedback, and other targeted communication to one or more class members.**
- **Pre-recorded video tapes can be used to present class lectures and visually oriented content.**
- **Fax can be used to distribute assignments, last minute announcements, to receive student assignments, and to provide timely feedback.**
- **Mobile technology can also be used to increase interaction among students, faculty, facilitators, supporting staff, and distance education administrators.**

GENERATIONS OF TECHNOLOGIES ADOPTED IN DISTANCE EDUCATION

Because the clientele for distance education consists largely of part-time students in full-time employment, distance educators have had to provide teaching-learning resources like printed study guides, audiotapes, videotapes, computer-based courseware, etc of high quality that could be used at a time and in a place convenient to each student. In effect, these "flexible access" technologies (Taylor, 1992) allow the student to turn the teacher on, or off, at will as lifestyle permits. Similarly, access to the Internet facilitates interactivity, without sacrificing the benefits of flexible access, since it can be used to support asynchronous communication.

Table: 1
Generations of technologies used in Distance Education: A Conceptual Framework

Generation of Technology and Associated Delivery Technologies	Characteristics of Delivery Technologies			
	Flexible Access	Flexible Student Progression	Highly Refined Materials	Advanced Interactive Delivery
First Generation - The Correspondence Model □□Print	Yes	Yes	Yes	No
Second Generation - The Multimedia Model □□Print □□Audiotape □□Videotape □□Computer-based learning (e.g. CML/CAL) □□Interactive video (disk and tape) □□Interactive multimedia (IMM)	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes	No No No Yes Yes Yes
Third Generation - The Tele learning Model □□Audio teleconferencing □□Videoconferencing □□Audio graphic Communication (e.g. Smart 2000) □□Broadcast TV/Radio + Audio teleconferencing	No No No No	No No No No	No No Yes Yes	Yes Yes Yes Yes
Fourth Generation - The Flexible Learning Model □□Interactive multimedia (IMM) □□Computer mediated communication (CMC)(e.g. Email, CoSy etc)	Yes Yes	Yes Yes	Yes No	Yes Yes

Such flexibility has a major pedagogical benefit - it allows students' progress at their own pace. Thus varying rates of individual progression can be accommodated, unlike typical conventional educational practices where the whole class tends to progress at the same pace in synchronization with the delivery of information through mass lectures and tutorials. Some of the characteristics of the various generations of technologies used in distance education that are relevant to the quality of teaching and learning are summarized in Table:1

While this trend towards "technology-mediated" flexible learning is perhaps inexorable in a variety of education and training contexts, it is crucial to realize that the use of a range of instructional media does not automatically enhance the quality of teaching and learning.

MOBILE LEARNING

In the word *m-learning* "m" stands for "mobile", representing the back- stage mobile delivery technology. It is obvious that for the expansion of the idea of learning and the creation of learning schemes that are based on the effective use of motivation that arises when a student is faced with the stimuli, mobile devices with Internet access can offer significant advantages. Mobile technology actually offers the appropriate educational environment to assist learning activities both inside and outside the classroom (Fleischman, 2001). Opposite to the limitations of working and learning only in the classroom or in the lab, mobile technology offers access to learning material regardless of location and time. In this framework mobile learning is translated into flexibility in accessing learning materials but also classmates and teachers anytime, anywhere. Mobile learning is the ability to enjoy an educational moment from a cell phone or a personal digital assistant (Harris, 2001).

Mobile learning is defined as the provision of education and training on mobile devices: Personal Digital Assistants (PDAs), smart phones and mobile phones. One of the characteristics of mobile learning is that it uses devices which citizens are used to carrying everywhere with them, which they regard as friendly and personal devices, which are cheap and easy to use, which they use constantly in all walks of life and in a variety of different settings, except education.

Advantages of Mobile Learning

According to Attewell (2005), there are several advantages inherent in mobile learning:

- **helps learners to improve literacy and numeric skills**
- **helps learners to recognize their existing abilities**
- **can be used for independent and collaborative learning experiences**
- **helps learners to identify where they need assistance and support**
- **helps to overcome the digital divide**
- **helps to make learning informal**
- **helps learners to be more focused for longer periods**
- **helps to raise self-esteem and self-confidence**

In various parts of the world mobile learning developments are taking place at three levels:

- **The use of mobile devices in educational administration**
- **Development of a series of 5-6 screen mobile learning academic supports for students**
- **Development of a number of mobile learning course modules.**

Covering problems of distance learner through mobile learning

The common problems of distance learners can be summarized as follows:

- **Lack of personal contact and immediate instructor feedback that some learners prefer (Brown, 1996; Carr, 2000; Garland, 1993; McGivney, 2004)**

- **Sense of isolation (Galusha, 1997; Gibson & Graff, 1992; Heverly, 1999; Sweet 1983; Wojciechowski & Palmer 2005)**
- **Requirement of pre-course orientation to help manage courses (Ashby, 2004)**
- **Requirement of the tutor support counseling sessions during course of study (Ashby, 2004)**
- **Improved information and formative advices (Ashby, 2004)**

Mobile learning can provide helps in following dimensions of distance education provision:

- **The provision of course content to off-campus students**
- **The provision of feedback to off-campus students**
- **The provision of student support services to off-campus students**
- **Links to the WWW and other resources**
- **Student-to-student interactivity**
- **Student to tutor and institution interactivity.**

If a lecture, or similar activity, has to be cancelled at short notice the university or college can communicate with the student body concerned by SMS. This is an efficient means of communication, all of the students will receive and read the message, none will turn up and none will be inconvenienced. SMS messages can be sent in this way either to the whole student body, or to students of a faculty, or a department or a class grouping. Hundreds of thousands of these administrative SMS messages have been sent out to students' mobile phones by universities throughout the world.

OBJECTIVES OF THE STUDY

The objectives of the study were as follows:

1. **To explore the perception of distance learners about the importance of mobile learning.**
2. **To draw the students' preferences for mobile learning in distance education.**
3. **To examine what extent the distance learners are used to mobile learning.**

RESEARCH METHOD

Population and Sample

In order to ensure adequate representation of all the areas of Pakistan, a stratified random sampling process was used to select the sample of the study, as Ary *et al.,* (1990) were of view that in stratified sampling one first determines the strata of interest and then randomly draws a specific number of subjects from each stratum. Allama Iqbal Open University, Pakistan operates its functions through its regional offices which were considered as five strata (Sindh, Punjab, NWFP, Balochistan, and Federal) and from each stratum one hundred students of Distance Learning were randomly selected. Therefore, 500 Distance Learning students were considered as sample of study. Out of 500 students 438 students had responded.

Research Tool and Data Collection

The study was survey in nature; therefore questionnaire was used for data collection. Researcher developed questionnaire by using five-point likert scale called as Survey of Mobile Learning in Distance Education (SMLDE) on the basis of literature and related researches. Instrument was reviewed twice, one by a panel of experts in educational setting for determining its face validity, and second administered on the

same kinds of respondent with a small number of sample for determine the internal consistency of the questionnaire. A split-half reliability was calculated according to Spearman Brown prophecy formula and was found 0.73 at 5% level confidence.

Procedure

Researcher collected the data from the respondent through coordinators of Allama Iqbal Open University. Scoring was done after the collection of data. Since SMLDE was a five point rating scale therefore the score of all positive statements ranged from 5-1 for different response categories viz. Strongly agree, Agree, Undecided, Disagree and Strongly Disagree. The data was analyzed in terms of percentage and mean scores.

FINDINGS

The findings drawn out from the data analysis are as under:

Table 2
Opinions about importance of Mobile learning in Distance Education

Sr. #	Statement	Responses	Level of Agreement					Mean
			SA	A	UNC	DA	SDA	
1	Mobile learning provides immediate support in Distance Learning	N	119	254	15	16	34	3.9
		%	(27)	(58)	(03)	(04)	(08)	
2	Mobile learning provides new opportunities of Distance learning	N	162	231	10	21	14	4.2
		%	(37)	(53)	(02)	(05)	(03)	
3	Mobile learning is available anytime, anywhere	N	141	241	16	17	23	4.1
		%	(32)	(55)	(04)	(04)	(05)	
4	Mobile learning improves the communication between student ant tutor	N	109	233	08	54	34	3.8
		%	(25)	(53)	(02)	(12)	(08)	
5	Quick feed back in Distance learning is possible through mobile learning	N	120	236	22	23	37	3.9
		%	(27)	(54)	(05)	(05)	(08)	
6	Mobile learning is affordable for distance learner	N	89	112	66	34	137	3.0
		%	(20)	(26)	(15)	(08)	(31)	
7	AIOU promotes mobile learning	N	185	114	14	47	78	3.6
		%	(42)	(26)	(03)	(11)	(18)	

Results of Table 2 indicates that majority of respondents (85%) opined in favor of the statement (mean score 3.9) that mobile learning provides immediate support in Distance Learning.

A significant majority (90%) of the respondents agreed that mobile learning new opportunities of Distance Learning. Mean score 4.2 also supported the statement. A sufficient majority of respondents (87% with mean score 4.1) agreed that mobile learning being flexible is available anytime and anywhere.

Similarly, a sufficient majority of respondents (78% with mean score 3.8) supported the statement that quicker feedback in distance learning is possible through mobile learning.

Table: 3
Students' preferences for Mobile Learning in Distance Education

Sr. #	Area of preference	Responses	Level of Agreement					Mean
			SA	A	UNC	DA	SDA	
1	Feedback about assignments	N	176	171	27	23	41	4.0
		%	(40)	(39)	(06)	(05)	(09)	
2	Information regarding assignment submission	N	211	194	10	09	14	4.3
		%	(48)	(44)	(02)	(02)	(03)	
3	Schedule of Tutorial meetings	N	141	241	16	17	23	4.1
		%	(32)	(55)	(04)	(04)	(05)	
4	Schedule of Workshops	N	275	95	25	08	35	4.3
		%	(63)	(22)	(06)	(02)	(08)	
5	Results from tutors	N	216	137	16	45	24	4.1
		%	(49)	(31)	(04)	(10)	(05)	
6	Results from university offices	N	316	79	12	24	07	4.5
		%	(72)	(18)	(03)	(05)	(02)	
7	Print material and study guides	N	198	136	16	42	46	3.9
		%	(45)	(31)	(04)	(10)	(11)	

Mobile learning was declared affordable for distance learner by 46% respondents and negated by 39% respondents whereas mean score found was 3.0 for this statement. There were 68% respondents admitting that AIOU promotes mobile learning whereas 29% could not convey supportive response in this regard. The mean score was found to be 3.6 for this statement.

It is obvious from table 3 that a sufficient majority of respondents (79% with mean score 4.0) showed their preference for mobile learning to be utilized for receiving feedback about assignments in distance learning. A prominent majority of 92% respondents preferred mobile learning for obtaining information regarding assignment submission, whereas mean score of 4.3 also confirmed the trend.

A majority of 87% respondents with mean score 4.1 favored their preference to use the mobile learning for receiving schedule of tutorial meetings in distance learning. The preference for use of mobile learning for receiving the schedule of workshops in distance learning was shown by a sufficient majority of respondents i.e. 85% and the mean score 4.3 also favored the same result.

A majority of 80% respondents conveyed their preference for receiving results from tutors through mobile devices whereas the mean score obtained was 4.1 in this regard. A prominent majority of 90% respondents declared their preferences about use of mobile devices for receiving their results from university offices. The mean score 4.5 very efficiently conveys their preferences in this area.

Mobile learning was preferred for receiving print material and study guide by 76% of respondents with mean score of 3.9 whereas 21% did not preferred this mode in this area of application.

Table: 4
The extent to which distance learners are used to mobile learning

Sr. #	Areas of usability	Responses	Level of Agreement					Mean
			Always	Frequently	Occasionally	Seldom	Never	
1	SMS	N	236	151	23	16	12	4.3
		%	(54)	(34)	(05)	(04)	(03)	
2	Voice mail	N	103	272	16	19	28	3.9
		%	(24)	(62)	(04)	(04)	(06)	
3	MP3	N	62	74	104	123	75	2.8
		%	(14)	(17)	(24)	(28)	(17)	
4	MMS	N	37	42	62	173	124	2.3
		%	(08)	(10)	(14)	(39)	(28)	
5	Recording	N	49	72	77	133	107	2.6
		%	(11)	(16)	(18)	(30)	(24)	

It is evident from table 4 that majority of respondents (89% with mean score 4.3) were found used to SMS usage for handling their activities among distance learning. 86% respondents reported that were used to Voice mail usage while the mean score 2.9 also indicated the same result. MP3 usage of mobile learning among distance learners was declared by 31% as always/frequently 24% occasionally and 45% used it never/seldom.

There were 45% respondents that have not used MMS to gain any help within distance learning and the mean score obtained was 2.3 in this regard. There were 54% respondents that were not found used to recording utilities of mobile devices within distance learning whereas mean score found was 2.6 for this category.

DISCUSSION

The use of new technology for educational purposes has always been focused by distance learning approach. Technology-supported teaching and learning has helped in covering the physical distances between teachers and students, to enable the flexible delivery of education at a distance, anyplace and anytime. Today, the use of mobile devices to enhance distance learning systems is being utilized. The emerging technologies, such as Mobile learning can be an effective tool for learning or enhancing the teaching-learning process, because it increases access and do provide strong support to underpin different types of learning (Naismith, *et.al.*, 2005).

Similar to e-Learning, mobile technologies can also be interfaced with many other media like audio, video, the Internet, and so forth. Mobile learning is more interactive, involves more contact, communication and collaboration with people (Vavoula, 2005). The increasing and ubiquitous use of mobile phones provides a viable avenue for initiating contact and implementing interventions proactively. For instance, Short Message Service (SMS) is highly cost-effective and very reliable method of communication. It is less expensive to send an SMS than to mail a reminder through regular postal mail, or even follow-up via a telephone call. Further, no costly machines are required (which is clearly the case in terms of owning a personal computer).

Besides SMS, distance learners can use mobile phones/ MP3 players to listen to their course lectures, and for storage and data transfer. New technologies especially

mobile technologies are now challenging the traditional concept of Distance Education. Keeping in view the problems of distance learners enrolled in AIOU programmes and covering these problem areas through mobile learning, distance learners of AIOU conveyed the importance of mobile learning to play a more central and effective role in providing students with much needed information – i.e., provision of immediate and new opportunities for distance learning. Majority of respondents in this study confirmed the importance of mobile devices for its flexible availability, improving the communication between students and tutor, gaining feed back of assignments (Table: 2).

Mobile learning can also provide good support to inform various schedule of university, and other relevant information related to their studies. The order of their preferences regarding use of mobile devices in distance learning on the bases of mean scores was for receiving results from university offices, information regarding assignments submission, schedule of workshops, schedule of tutorial meetings, results from tutors, feed back on assignments and receiving print material and study guides(Table 3). In present study majority of the respondents preferred the effective use of mobile technology in promotion of distance learning whereas Traxler and Riordan (2003) also support the findings of the study.

People can learn more effectively if 'information' is broken down into smaller, more easy-to-comprehend units (Habitzel, *et.al*, 2006). It is observed here that majority of students were found use to SMS and Voice mail, whereas it is also suggested here, that mobile learning as an ideal medium may be promoted via use of MMS, pre-recorded MP3 files, and so forth new mediums. Training sessions for effective use of mobile devices in distance learning should be organized at both levels of students and tutors of distance education.

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CONCLUSION

Mobile technologies are perceived by the participants in this study to be an effective tool in improving communication and learning. Mobile technologies such as mobile phones, however, do hold tremendous potential of flexible mode of communication, which can be strategically used to support and improve student retention. Mobile technologies do appear to have a great future in developing countries.

Indeed, mobile phones are one of the less expensive, most accessible and popular media among distance learning students of all ages. Flexible and low cost mobile technologies can be used to maintain and enhance contact with students and teachers, and, by arranging training effective use can be enhanced in distance learning.

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