

Stimulating Unceremonious Mobile Learning: An Empirical Study of Business Students of Sindh, Pakistan

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Abstract

Educational Technology has been increasingly used by teachers and students to achieve educational objectives. Such an increasing trend has been paid focus limitedly by researchers in the field of education, particularly in the context of Pakistan. This experimental study attempts to explore the impact of mobile learning (m-learning technology) accessibility on student academic achievement. The study utilized the quantitative research method to evaluate the performance of business school students before and after having mobile learning accessibility. Inferential analysis was conducted to determine the performance of business school students before and after their exposure to internet-oriented lectures. The results found in the study suggest that the performance of students was significantly improved after the exposure to internet-based lectures (after having mobile learning accessibility). The study concludes that technology aids in the students' performance. Access to mobile-like devices such as iPad, laptops, tabs etc. provides students with the opportunity of academic achievement.

Keywords: Mobile Learning-Students' Performance-Technology Supported Classroom

1. Introduction and Problem for Investigation

The method of education and learning has been improved with the advancement in educational technology and its implementation in the educational industry. The technology has been increasingly utilized by lower to higher educational institutions. Connections between formal and informal learning have been created by the use of mobile devices such as laptops, iPad, tablets, notebooks e.tc Interestingly these devices are a lot easier to use and cheaper as compared to the desktop computers. They provide access to millions of educational databases around the world. The use of mobile devices in present classrooms from preschool to higher education level has become increasingly evident. Mobile devices refer to the devices,

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which are easily movable and can be easily carried from one place to another. It allows students to access educational material during travelling or anywhere at any time they want.

The features of these devices include wireless connectivity to the internet, applications to facilitate and monitor learning experiences and connections with the educational community around the globe. However, it is challenging to develop such applications, which can meet the increasing needs of business school students. Research is required in this area to evaluate the impact and mobile technology and to provide directions for future improvements (Traxler, 2007). Conducting study on the effectiveness of mobile learning to be integrated into the higher education while comparing the context of developing and developed countries, Kaliisa, Palmer, and Miller (2019) conclude that “mobile learning in higher education in developed and developing country contexts is still at an experimental stage with students using mobile devices in pedagogically limited ways” (p. 1).

Similarly, the results of a systematic review to explore the inclusion of mobile learning into the higher education and its need, Kaliisa and Picard (2017) point out that “the absence of empirical studies reporting on existing mobile learning projects in higher education institutions in Africa implies that mobile learning has not become mainstream in this context. Therefore, further research in this field is needed to explore its impact as the proliferation of mobile devices in Africa increases” (pp. 10 – 11). The institutions expect technological improvements to fulfil the increased demands of teachers and students. Studying the context of developing countries, Chen and Denoyelles (2013) explores that mobile learning characteristically occurs outside the classroom having limited guidance for students from their instructors.

To explore the Pakistani context, Waqar (2014) states that “M-learning developers should design effortless applications that are compatible with students’ needs” (p. 235). This reveals that despite the widely use of mobile devices by students and instructors the need of its inclusion in the higher education still exists. This is particularly because students usually expect to recognize the benefits of m-learning on their overall learning performance. From this perspective, the aim of this study is to explore whether the use of mobile devices can bring positive changes in terms of student's subject knowledge and achievement levels in business schools of Pakistan. Since the methods of teaching in the Pakistani context has also undergone rapid changes due to technological advancement. The technology has resulted in a paradigm shift from traditional classrooms to more interactive technology-based classrooms. With mobile learning experiences, it has become a lot easier for students and teachers to measure student performance in terms of academic learning. Considering the theoretical background and the purpose of the study, the question which comes up predominantly reads as ‘to what extent does the mobile learning experiences impact students’ performance in business school students?

2. Literature Review

2.1. Use of Mobile Technology Over the years

In the 21st century, mobile technology has been increasingly used by students and teachers to increase the effectiveness of teaching-learning practices. However, there is a dire need of research, to find out the effectiveness of technological advancement in education and its impact on students' performance. Several theories have also emphasized on technological acceptance within the classrooms including Bandura's Social Cognitive Theory (Bandura, 2001), Delone and McLean's System by Success Model (Delone & McLean, 2003), Davis's Technology Acceptance Model (Davis, 1989), Vallerand's Motivational Model (Vallerand, 1997) and Hofstede's Cultural Dimension Theory (Hofstede, Hofstede & Minkov, 2010). The present study has developed the conceptual framework based on these theories to explore the impact of mobile technology for educational purposes. Numerous higher educational institutions imply mobile learning for providing students with an opportunity for flexible learning experiences.

2.2. Mobile Phones

There are several functions and features on the mobile phone which enables learner-friendly environment which makes the use of the mobile phone in education easier. Various applications are available for achieving educational outcomes. Neumann (2106) in his study reveals that educational application Martha Speaks Dog Party helps improve the vocabulary of three to seven years old children. In another research which analysed the use of mobile phones for educational purposes inside and outside the classroom revealed that students effortlessly grasp the subject knowledge by using technology. Moreover, the students were more motivated and actively engaged when they were taught with the applications could be used via mobile like devices. While referring to the tablet and handheld computers, mobile phones, Mp3 players, and smartphones, being commonly used mobile devices in teaching and learning processes, Mehdipour and Zerehkafi (2013) state that mobile devices offer innovative ways to enrich learning experiences of students.

Moreover, a change from the use of electronic to mobile devices in education is considered as a paradigm shift in educational technology (Lehner, Nosekabel, and Lehmann, 2003). Lehner, Nosekabel, and Lehmann (2003) described that students can utilize the technology for educational purposes anytime, anywhere through mobile devices which have taken a generation to the next levels of education and learning. As described by Uzunboylu, Cavus, and Ercag, (2009) Mobile learning is a method to build connections with the educational community around the world, getting the world in their hands. The main difference between electronic learning and mobile learning according to them is learning outside the classrooms, computer labs or even the campus since mobile technology can be taken and used anywhere. However, mobile learning is nowadays considered as an advanced form and complementary tool to electronic learning experiences of students (Uzunboylu, Cavus, & Ercag, 2009).

2.3. Contents of Mutual Communications

The communication between students and peer tutoring has also become easier with the use of mobile learning. It is now more convenient for the students' to get access to educational libraries, educational

materials, online books, research papers, research journals, lectures, assignments, course-related information, notes, and students' performance records. Most of the educational forums on the internet provide mobile supported applications and documents. Analyzing the accessibility of mobile learning applications, Kim, Mims, and Holmes, (2006) researched mobile learning experiences of university students who were enrolled in accounting classes. The study aimed to explore whether there is any difference in time consumed in accounting assignments in students who use mobile devices for learning as compared to traditional learners. The flexibility of place and time, linkages to the worldwide educational community, interactional activities and lectures for better acquisition of knowledge through mobile learning experiences have also found evidence in various researches (Liu, Zhao, Zheng, & Jin, 2008; Liu, Li, & Carlsson, 2010).

2.4. Benefits of Mobile Learnings

Kukulska-Hulme (2009) defines the benefits of mobile learning for technological fields such as archaeology and environmental studies since mobile devices have features for data accuracy, effective data recording, better navigation, and speed. Kukulska-Hulme & Traxler (2005) conducted a project named as MyArt Space targeting a school educational visit to the museum in which children shared videos, pictures, recording, and information about the museum with their peers through the use of mobile devices. It was observed that it led to the increased interest of students in museums and the initiation of educational discussion regarding museum has been established. It has not only facilitated collaborated learning experiences but has increased motivation levels of students. The students were actively involved in the experience and got better knowledge about the museum. The study described mobile phones as a bridge for establishing communication between different educational forums.

2.5. Delivery of Learning Resources and Libraries

Another project was initiated to explore the delivery of learning resources by libraries through the course management system. The use of mobile learning was found highly evident and its importance has been highlighted for effective course management systems. Mobile learning was also found beneficial for addressing the retention problems and persistence of students to achieve educational objectives. However, the researchers also indicate technological segregation between students who cannot afford mobile devices and students who are financially sound for affording such devices. This has created a need to address the issue of accessibility of technological resources. Researchers refer to this problem as the digital divide which requires attention and measures to resolve. Moreover, the importance of technological knowledge in the medical field has also been discussed in the literature. Modern health care system persuades doctors, nurses and other medical-related professionals to adapt technology to meet the elevated health care challenges in more effective ways. Medical instructors are also facilitated by medical resources that support mobile learning (Kenny, Van Neste-Kenny, Park, Burton, & Meiers, 2009). Through various studies as referred above in the preceding paragraphs, it has also been hypothesized that in Pakistan, business students perform better with technology supported classrooms.

3. Research Methodology

3.1. Experimental Research

According to Kirk (2007), the experimental research design is used where the researcher is to identify the dependent, independent, and nuisance (an unwanted variable) variables. In this study design, the researcher aims to indicate a way in which statistical aspects and randomization of an experiment are carried out. Kirk (2007) further explains that by utilizing the experimental design, a researcher aims to establish a causal connection between the dependent and the independent variables. Furthermore, this research study design is also used to extract the maximum amount of information by minimizing the expenditure of resources.

According to Gribbons (1997), experimental studies are used to address evaluation questions associated with the impact and effectiveness of a specific program. In the present study, the experimental design is used to understand the impact and effectiveness of mobile learning on the academic achievement of students. Nevertheless, there are two commonly used categories of the experimental research study designs among various types, including true experimental and quasi-experimental designs. Gribbons (1997) states that the true experimental design “includes more than one purposively created group, commonly measured outcome(s), and random assignment. Note that individual background variables such as sex and ethnicity do not satisfy this requirement since they cannot be purposively manipulated in this way” (p. 1).

Since the random assignment seemed to be difficult for the present study, the researcher chose the comparative research design. According to Campbell and Cook (1979), the comparative research design is conducted in the settings where random assignment is impossible to assess the effectiveness or impact of treatment such as an educational intervention. The educational intervention in the present study was the exposure of mobile learning of business students. Within the comparative research design, the researcher used the Pre - Test and Post - Test Design, in which the dependent variable (the academic performance of Business Students) was measured once before the educational intervention (the training of faculty members to convert their traditional classes into the technologically oriented classrooms via mobile learning access) and once after the implementation of the technologically oriented classrooms within their classes. Ramos-Alvarez, Moreno-Fernandez, Valdes-Conroy, and Catena (2008) figure out that the pre-test and post-test design is like a within-subjects experiment where each participant is tested, initially under a control condition and subsequently under a designed treatment (for the present study ‘educational intervention’) condition.

3.2. Sampling Technique and Target Population

This study aimed to target students currently enrolled in any of the purposely selected business schools ($n = 05$) in Sindh as the population without concerning to their academic levels such as PhD, MPhil/MS, MBA, or BBA. From this perspective, the number of fifty ($n = 10 \times 5 = 50$) faculty members currently servicing in the selected business schools were approached to prepare online Google classroom – a minimum of one class in which they are currently teaching for the complete semester. Each of the faculty

members was requested to deliver the class lectures with the assistance of Google Classroom. According to the ACT Government (2019), “Google Classroom brings students and teachers together. Teachers can share resources with you, even post announcements and assignments for you to complete all online in a web browser. Your classes all have their own stream for you to collaborate and share ideas with your classmates. Your assignments can also be stored, completed and submitted online” (p. 3).

3.3. Criteria to Include Business Schools

Following criteria was set to consider the university/ degree awarding institute eligible for the participation of the present study:-

- The business schools of all types currently operational in any region in Sindh Province of Pakistan.
- The university/ degree awarding institute must have a separate business department/ school.
- The Business School should be accredited by National Business Education Accreditation Council (NBEAC), which is a professional body under the administrative control of the Higher Education Commission (Pakistan) (Tufail, 2019)

3.4. Criteria to Include Faculty Members

Following criteria was set to consider the faculty members eligible for the participation of the present study:

- The faculty members should be in service, either full time or visiting capacity, in any of the selected business schools.
- Each of the selected faculty members should be teaching a minimum of two courses.
- Each of the selected faculty members should be taking courses in consecutive semesters

3.5. Criteria to Include Students

Following criteria was set to consider the business students eligible for the participation of the present study:

- The students should be enrolled in a business programme among PhD, MS/ MPhil, MBA, or BBA.
- The students should be currently enrolled in the chosen Business Schools and taking courses from the chosen faculty members.
- The students should take courses with the same faculty members in upcoming semester and should not be enrolled in first semester of any business programme.

3.6. Data Collection Tool & Procedure

The data was collected into two phases. In the first phase, the selected faculty members were asked to share the existing results of their students in terms of percentage. From this perspective, the faculty members shared the results of their students in two formats including midterm scores and final term scores. Both of the terms either carried 100 as total marks or calculated as 100 using the formula “ $50 \times 2 = \text{total marks} / \text{obtained marks} \times 2 = \text{midterm score}$ ”. Once the midterm scores were received, the faculty members were provided with the workshops related to the Google Classroom to convert their class lecturers into it.

Subsequent to the workshops, the faculty members were asked to deliver the lectures with the Google Classroom for the next complete semester (Iftakhar, 2016). At the end of the next semester, the faculty members were asked to share the results of their students for the next semester in terms of percentage. The faculty members shared the results of their students in two formats including midterm scores and final term scores. Both of the terms either carried 100 as total marks or calculated as 100 using the formula " $50 \times 2 = \text{total marks} / \text{obtained marks} \times 2 = \text{midterm score}$ ". In this way, the gathered data can be found in the following format:

- Pre Technology Oriented Class Mid Term Scores
- Post Technology Oriented Class Mid Term Scores
- Pre Technology Oriented Class Final Term Scores
- Post Technology Oriented Class Final Term Scores

4. Data Analysis: Results and Findings

4.1. Descriptive Analysis

As suggested by Stone, Sidel, Oliver, Woolsey, and Singleton (2008), the descriptive analysis in the quantitative research study is used to describe the characteristics of the participating individuals. From this perspective, Table 1 describes the characteristics of the participating faculty members.

Table 1: Descriptive Statistics of Faculty Members

Age		
	Frequency	Per cent
41-45	10	20.0
45-50	15	30.0
50+	25	50.0
Gender		
Female	21	42.0
Male	29	58.0
Owned Technological Devices		
laptop	2	4.0
Smart Phone	44	88.0
other	4	8.0
Preferred Device		
Cellular network	4	8.0
Wired Ethernet connection	2	4.0
Wifi	44	88.0
Wi-Fi Connection Provided By Institute		
Yes	50	100.0
Preferred Device For Teaching		

Tab	4	8.0
laptop	10	20.0
Smartphone	34	68.0
Other	2	4.0
Total	50	100.0

Table 2 describes the characteristics of the participating students, in terms of their gender, educational level etc.

Table 2: Descriptive Statistics of Students

Age		
	Frequency	Per cent
20-25	829	80.3
26-30	197	19.1
31-35	6	.6
Gender		
Female	471	45.6
Male	561	54.4
Educational Level		
BBA	435	42.2
MBA	559	54.2
Other	38	3.7
Owned technological devices		
Smart Phone	895	86.7
laptop	71	6.9
Tab	17	1.6
other	49	4.7
Preferred device		
Cellular network	274	26.6
Wifi	734	71.1
Wired Ethernet connection	24	2.3
Total	1032	100.0

4.2. Testing Hypothesis

Paired Samples T Test was applied using SPSS to test the Hypothesis (In Pakistan, business students perform well with technology-oriented classrooms). From this perspective, Table 3 presents the mean value along with Standard Deviation and Standard Error Mean of each received score including pre-test score for midterm ($n = 1032$, mean = 54.65, Std. Deviation = 12.375, and Std. Error Mean = .385), post-test score for midterm ($n = 1032$, mean = 73.39, Std. Deviation = 16.378, and Std. Error Mean = .510), pre-

test score for final term ($n = 1032$, mean = 59.15, Std. Deviation = 12.373, and Std. Error Mean = .385), and post- test score for final term ($n = 1032$, mean = 77.63, Std. Deviation = 18.595, and Std. Error Mean = .579).

Table 3: Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test score for mid term	54.65	1032	12.375	.385
	Post- test score for mid term	73.39	1032	16.378	.510
Pair 2	Pre-test score for final term	59.15	1032	12.373	.385
	Post- test score for final term	77.63	1032	18.595	.579

Table 4 presents the output of Paired Samples Test, which can be stated as follows:

- $t(1031) = -29.29$, $p < 0.0005$ "the scores received by students in midterm examination"
- $t(1031) = -28.03$, $p < 0.0005$ "the scores received by students in final examination"

The obvious difference between the mean values in the scores of both examinations (Pre-test score for midterm and Post- test score for midterm as well as Pre-test score for final term and Post- test score for final term) demonstrates a statistically significant increase in the academic performance of the business students subsequent to their exposure to the m-learning classes. For instance, the academic performance of students increased from mean = 54.65 (having Std. Deviation as 12.375) to mean = 73.39 (having Std. Deviation as 16.387) in the midterm examinations and from mean = 59.15 (having Std. Deviation as 12.373) to mean = 77.63 (having Std. Deviation as 18.595) in the final term examinations. Therefore, the findings supports the stated hypothesis i.e. In Pakistan, business students perform well with technology oriented classrooms.

Table 4: Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval				
					Lower Bound	Upper Bound			
Pair 1	re-test score for	-18.75	12.375	.385	-20.00	-17.49	-29.29	1031	.000

	midterm – Post-test score for midterm								
air 2	re-test score for final term – Post-test score for final term	- 18.490	2 1.190	0 .660	- 19.780	- 17.190	- 28.030	1 031	0 .00

5. Discussion

5.1. Applications of Mobile Technology

It is very evident that mobile technology has found beneficial for various fields such as medical, engineering, banking, commerce, media and library sciences, economics and other pure science subjects. The advantages of mobile learning have also reached the field of education and educational research. This study also provides evidence about the benefits of mobile learning technology in the field of education. Bano suggests that students are supported in classrooms by the use of educational technology. Mobile learning can give access to updated knowledge and learning. It facilitates student convenience and ease of learning.

The opportunity of learning anytime and anywhere enables students to achieve educational objectives effectively. When the methods of traditional teaching and mobile learning methods were compared it was found that technology-oriented learning is a powerful tool in terms of students' success and performance. Students in business classes achieved better scores via mobile learning experiences. The reason behind the features of mobile phones that are more convenient for business students. Better and faster tools for data collection, recording, video recording, and other educational applications saves a lot of time and energy of students in business schools.

As Neumann (2106) in his study reveals that educational application Martha Speaks Dog Party helps improve the vocabulary of three to seven years old children. Similarly, Deaton, Herron, and Deaton (2018) indicate that mobile learning can increase students' involvement and motivation for studies. He analyzed the

students experience with the use of mobile learning inside and outside the classroom. He found students both motivated and engaged in learning experiences through the use of mobile learning both inside and outside their classrooms. Mehdipour and Zerehkafi (2013) define mobile learning as the method to support learning by handheld devices such as tablets, iPods, smartphones, MP3 players and palm computers.

5.2. Findings of Study

The findings of this study are similar to the studies presented in the literature (Kutluk and Gulmez, 2014; Sarraf, Elgamel, and Aldabbas, 2012; Kim, Mims, and Holmes, 2006; Uzunboyulu, Cavus, and Ercag, 2009; Lehner, Nosekabel, & Lehmann, 2003). For instance, Kutluk and Gulmez (2014) in his study describes that user can obtain wireless communication for educational practices from any location. Resources can be amended dynamically with the use of multimedia, smartphones and other mobile devices.

The option of 4G in technology provides faster bandwidth which is very advantageous in terms of mobile engagement, quality service and authentication. However, some studies have also pointed towards the negative aspects of mobile technology. Kutluka and Gulmez (2014) describe that all universities do not have the technical support for mobile learning due to which they discourage the use of mobile technology. Students in such universities spend less time for lectures on mobile and are more prone to the traditional methods of learning despite that most of students have positive perceptions about the use of mobile learning as they found it more accessible and convenient to achieve educational goals.

6. Conclusions & Recommendations

6.1. Conclusions

In the light of the results obtained from the experiment conducted in this study with an alignment to the reviewed literature, it can be said that educational system encourages the use of mobile learning technology for effective teaching-learning process as it allows continuous and mobile access of learners to the learning materials via the use of smartphone, iPad, iPhone, and other devices. The mobile-oriented classrooms give an opportunity for students to access educational materials anytime from any location. The comparison between the business scores in technology-oriented classes and business scores of regular classes exposed that the scores of business students enrolled in technology-oriented classes achieve better scores. They are also more likely to maintain their good academic performance. The reason behind this lies in the functionalities of mobile technology. The functionalities and features of mobile phones make it easier for the students to engage in educational activities and self-monitor their performance.

Mobile learning enables access of the learners to the modern ways of learning. Learning through handheld devices such as smartphones, iPods, tablets etc. makes learning, connection to educational materials and maintaining interest in educational activities easier. The mobile phone accessibility features allow learners to connect to educational activities and grasp knowledge through these connections. The

innovative computing features of mobile phone devices allow learners to get their self-updated with the latest knowledge, lectures, notes, emails, lectures and student-related materials. It also provides with a sharing feature through which learner can share the gained information within seconds by the use of smartphone sharing applications.

The influence of m-learning oriented class on academic performance of business students is positive for the performance of the learners. They tend to perform better academically when they are exposed to such devices. The finding concludes that it is safe for the students to expose to M-Learning technology in their classrooms. Moreover, this exposure to m-learning technology also leads towards increased perception and adaptation towards M-Learning faculty members and students in business schools of Karachi.

6.2. Recommendations

The use of mobile devices is effective for Pakistani business school students according to our research. Therefore, the following pointers have been recommended to the policymakers, decision-making departments and stakeholders in the education department of Business School in Pakistan

- The adaptation of m-learning technology in business schools of Pakistan is very effective for the learning and teaching process.
- The students in technology-oriented classrooms tend to achieve higher scores and improve their performance as the features in the mobile allows learners to easily engage in educational activities.
- The concept of M-Learning is comparatively new in the context of Pakistan and has not been fully adapted. It requires measures so that the performance of the educational system of business schools can be improved. The increase in the number of mobile phone users has increased in Pakistan but there is a need to utilize this technology in the field of education.

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