

## **Readiness of Pakistani University Teachers and Students for M-Learning in a Public University**

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This paper explores the availability of mobile phone technologies to the teachers and students of a public university in Pakistan, The purpose of its use and their readiness to learning through mobile phones. The data were collected by administering a survey questionnaire to randomly selected 38 university teachers and 288 students. The data were analyzed using percentages, independent samples t-test and ANOVA. The results show that more male students owned mobile phone and smart phone as compared to female students whereas more female teachers owned a smart phone as compared to male teachers. Forty three percent of the male teachers have used mobile phones for teaching and learning as compared to 68% of the female teachers. The t-test has reported that there is no significant difference in readiness to use m-learning by student gender, whereas, the male teachers showed higher readiness to use m-learning as compared to female teachers. The t-test further confirmed that there are no gender differences in comfort ability to use m-learning for both the students and the teachers. The ANOVA shows that the students from the disciplines of education, mathematics and computer science were equally ready to use m-learning. The ANOVA and a Tukey post hoc test revealed that the students from the disciplines of education and computer science were significantly more comfortable to use m-learning as compared to students from the discipline of mathematics. However, no statistically significant difference is found in comfort ability to use m-learning between students from the disciplines of education and computer science. The results of the study could inform university administrators and faculty members about the possibilities of using m-learning in their classes.

**Key words:** *Mobile phone, M-Learning, gender gaps, teacher-student gaps*

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### **Introduction**

The mobile phone users in Pakistan have increased dramatically from 5.02 million to 139.66 million in last fourteen years (Pakistan Telecommunication Authority (PTA), 2017). The current population of Pakistan is estimated at 200 million. This shows that 69% Pakistanis have access to mobile phones. Similarly, the number of broadband subscribers has increased from 26 thousands to 43.14 million in last twelve years (PTA, 2017). Growth of broadband subscribers by selected technologies is presented in figure 1. Pakistan has highest mobile penetration rate in South Asia region. As far as number of mobile phone internet users is concerned, it stood at 40.568 million in 2017.

Though there is a tremendous growth of mobile technologies, Pakistan literacy rate in Pakistan is 60% (Academy of Educational Planning and Management, 2017) which is lowest in the South Asian region. The higher education enrolls only about 8% of the eligible age group. The low participation in higher education is attributed to various factors including home-university distance, limited capacity of universities for face-to-face learning, etc. The nation has still to develop a consensus weather to provide liberal education to its masses especially to the female population. The extremists groups are still out of the control of the state who burn and blast schools especially those which are dedicated to educate female youth (Hussain, 2015 and Butt, Dogar, Butt & Qaisar, 2015)

In the current scenario of Pakistan, the mobile technologies can be used to educate its masses through the development of mobile apps for learning. The development of brick and mortar schools for the entire school going age population is proved to be impossible for the provincial governments due to lack of financial resources and priorities of political leaderships. The same is the case with university education. Thousands of the college graduates remain out of the universities because of insufficient number of universities and degree awarding institutions. Universities in Pakistan are located in the bigger cities only. The rural populations remain at disadvantage because they have to either travel longer distances on daily basis or reside in hostels. Most of the boarders live in unsafe and unhygienic conditions in the privately managed hostels. Even the hostels managed by the educational-institutions-themselves accommodate more than two students in single rooms. In these conditions, it is the rural female population that remains most affected because many parents, due to local cultural and religious traditions, don't allow them traveling longer distances alone or don't allow them to live in the hostels away from their homes.

The above mentioned story of tremendous growth of mobile technologies in a nation that lack infrastructure and human resource for higher education indicates that m-learning can potentially be used to offer higher education programs. This study is designed to investigate into the readiness of Pakistani university teachers and students for m-learning. Our research intends to respond to the following questions:

1. What mobile devices do university students and teachers possess for accessing and engaging with digital resources?
2. For what purposes the university students/teachers use their mobile phones?
3. Are the university students and teachers ready and comfortable with the idea of learning/teaching by using mobile phones?

El-Hussein, and Cronje (2010) explained that m-learning is defined as learning

through unbroken transmission signals by means of wireless technological devices that can be pocketed. m-learning “involves the use of mobile technology, either alone or in combination with other information and communication technology (ICT), to enable learning anytime and anywhere” (UNESCO, 2016). According to Patten (2015), m-learning is different from e-learning in multiple ways. There is a gap between the learning and practice in m-learning as compared to e-learning. The m-learning involves hand held devices whereas in e-learning involves laptops or desktops. Both the learning environments require different programs. In m-learning, the duration of modules is shorter than e-learning modules.

At this stage it was appropriate to see how the other nations have progressed as far as m-learning is concerned. M-learning has been around for more than a decade now. Many researchers have invested into exploring how to organizing m-learning at various levels (Martin McGill & Sudweeks, 2013; Motiwalla, 2007; Schwabe & Goth, 2005), keeping in view flexibility it offers (Seppälä & Alamäki, 2003). Recent developments in mobile technologies have made it possible to access the courseware *anytime-anywhere* (Sinen 2015). Ally and Palalas (2011) stated that “Mobile technology is the most ubiquitous devices in the world; it's not an option – we have to use them for the 21century education.” A survey in Canada (Ally & Palalas, 2011) concluded that 62% of the respondents from various sectors started using the mobile technology for teaching and learning during last four years.

Mobile phone technology can not only be used in normal situations but has also proven successful in the after match of disasters. Pakistan has been affected by occasional severe earthquakes and flooding during moon-soon season every year. In such situations, Japan provides a good example of effective use of mobile technology – in the after math of 2011 earthquake – where high school students were provided instruction through m-learning through wifi or 3G, and almost all of the students involved passed their entrance examinations. (ATKearney & GSMA, 2013). Anderson and

Rainie (2014) predicted that internet will become an integral part of people's life. In United States the percentage of Americans age 16+ who owned either an e-book reader or a tablet computer has increased from 6% to 43% during last three years (Rainie & Smith, 2013). According to Rainie and Smith (2013), the percentage of Americans age 16+ who owned a mobile phone was 91% and those who owned a smart phone was 55%. They further reported gaps in mobile phone and smart phone ownership by gender, race/ethnicity, age, education attainment, household income, and urbanity. The percent of cell internet users in US was 57% in 2013 and it has doubled since 2009 (Duggan & Smith, 2013). Sandberg et al. (2011) used a mobile application in the context of learning English as a second language at the level of primary school. A comparison of experimental and control groups revealed that those student groups improved learning the most who used the mobile learning device the longest. Looi et al. (2009) concluded that m-learning could encourage collaborative learning. There are certain studies that support the idea that m-learning improves student-teacher and student-student interaction (Brown and Diaz, 2010; Cochrane, 2010; Motiwalla, 2007 and Rau et al., 2008). Chaka and Govender (2017) conducted a study in three colleges of education in Nigeria and concluded that students had "positive perceptions towards mobile learning and are therefore ready to embrace it" (p. 1). The results of a university based study have reported that Students were ready to adopt the use of mobile devices for learning (Pollara, 2011). There is a small amount of literature that reports on the disadvantages or limitations of m-learning (Sinen, 2015). The most common problems reported as limitations of m-learning are the small size of the devices and difficulty in inputting text using mobile keyboard (Motiwalla, 2007 and Wang et al. 2009), variability and accessibility of mobile devices (Cochrane, 2012 and Corbeil and Valdes-Corbeil, 2007), social and cultural factors (Oller, 2012) and advancement and cost of technology (Corbeil & Valdes-Corbeil, 2007 and Brown and Diaz, 2010). One big issues in adopting m-learning could be the readiness of faculty and students (Sinen, 2015). Embracing on new

technology will require faculty members to put in more time and effort in addition to their normal teaching load that may overwhelm the faculty (Keane et al., 2012). The students on the other hand may not have necessary technological skills (Brown and Diaz, 2010) and they may require additional training to raise their competence in m-learning (Cochrane, 2010; Corbeil and Valdes-Corbeil, 2007).

## Methodology

This survey study was conducted using quantitative methods in a public sector university in the province of Punjab, Pakistan. The province of Punjab houses more than half of the population of the country and also has highest literacy rate among other four provinces. The province has remained comparatively more peaceful than other four provinces during the post 9/11 insurgency in Pakistan. Historically, Lahore has remained the capital of the Punjab province. Lahore has also remained the education capital of the province and it houses 34 universities and degree awarding institutions.

The sample of the study was comprised of 288 students and 38 university teachers. The data were collected in the month of February 2014 by using a survey questionnaire adapted by the researcher and validated through expert opinion and available literature (Ally & Palalas, 2011; Chen & deNoyelles, 2012; Moscow State University, 2013 and The Motif Project, 2013). The survey was comprised of items that were adopted from various surveys (Ally & Palalas, 2011; Chen & deNoyelles, 2012; Moscow State University, 2013 and The Motif Project, 2013) keeping in view the context and nature of the study. In the beginning it was comprised of 29 items, however, 10 items were deleted after the process of validation.. The first two items in the survey questionnaire asked about gender (male and female) and role (student or teacher) of the respondents and the program in which they were enrolled i.e. education, computer science, and mathematics. The next five questions asked about whether the respondents own mobile phone, whether they own a smart phone and whether they have access through wifi or cellular network based internet. The next three

items asked about how often they keep their mobile phones with them, at what place they use the mobile phones, and whether they use mobile phone for learning. Two items asked about the comfortability with the use of mobile phones for communication with teachers. Seven items measured readiness to use mobile phones for

**Table 1**

*Students' distribution by degree program and gender*

Discipline	Gender		Total
	Female	Male	
Computer Science	27	55	82
Education	136	22	158
Mathematics	31	17	48
Total	194	94	288

**Data Analysis**

The table 2 shows that percentages of male students who owned a mobile phone, owned a smart phone, had connectivity through wifi or cellular based network were higher than

**Table 2**

*Percentage of mobile phone owners by gender and role who own an ordinary phone or smart phone and have Wifi internet access or cellular network based internet*

Description	Teacher		Student	
	Female	Male	Female	Male
Own a mobile phone	100	100	92	97
Have smart phone	32	29	19	25
Have access to Wifi	48	57	36	37
Have cellular network based internet access	32	43	29	40

The table 3 presents the results regarding how often the respondents keep their mobile phone with themselves. There are more males who keep their mobile phones *always*

**Table 3**

*Percentage of the teachers and students about how often do they keep their mobile phone with them*

Frequency	Teacher		Student	
	Female	Male	Female	Male
Always	68	86	25	3%
Almost always	32	14	47	57
Sometimes	-	-	27	12

The table 4 presents the results of the places where respondents most frequently use their mobile phones. Majority of the students and teachers use their mobile phones when they are at their *homes*. Male teachers more

learning/teaching. Table 1 provides the respondent students' distribution by gender and discipline of study. The student sample was consisted of 194 female and 94 male students. The number of respondent teachers was 38 of which 31 were females.

female students. As far as the teachers were concerned 100% of the respondents owned a mobile phone. However there were more female teachers who owned a smart phone. On the other hand more male teachers had access to internet through wifi and cellular based network.

with themselves as compared to females both for students and teachers. None of the respondents mentioned that they *never* keep their mobile phones with themselves.

frequently use their mobile phones at *home* whereas female teachers more frequently use their mobile phones at *work/university* as compared to their counter parts. This trend is reversed in the case of students.

**Table 4**  
*Percentage of teachers and students regarding places where they use mobile phones most frequently*

Places	Teacher		Student	
	Female	Male	Female	Male
At work/University	45	14	20	29
Home	50	85	65	56
While travelling	3	1	13	14
Others	2	0	2	1

When the respondents were asked about the most common activities they involve in while using mobile phone, they mentioned SMS, and phone calls. Some of the respondents mentioned that that they also use mobile phones for reading, email, entertainment and internet.

more female teachers who use mobile phones for teaching/learning as compared to male teachers. Fifty-seven percent of the male teachers have never used mobile phones for this purpose as compared to 32% of the female teachers. As far as the students are concerned almost equal number of male and female respondents mentioned that they have never employed mobile phones for learning

Table 5 presents the results regarding the current use of mobile phones by the respondents for learning/teaching. There are

**Table 5**  
*Percentage of teachers and students regarding using mobile phones in learning/teaching at lessons and for home work*

Places	Teacher		Student	
	Female	Male	Female	Male
Everyday	19	14	14	18
A few times per week	48	29	53	47
Never at all	32	57	34	35%

In order to examine differences in mean readiness by student gender, an independent samples t-test was conducted. Table 6 shows a violation of Levene’s test for homogeneity of variances,  $F(1, 286) = 15.582, p < .001$ , a t-test not assuming homogeneous variances was calculated. The results of this test indicated that

there was no difference in the mean readiness of male and female students,  $t(155) = -.252, p = .802$ . These results suggest that male students ( $M = 7.16; SD = 3.37$ ) had same readiness to use m-learning as female students ( $M = 7.27; SD = 2.75$ ).

**Table 6**  
*Independent samples t-test for equality of students’ mean readiness by student gender*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							e	e	Lower	Upper
Readiness	Equal variances assumed	15.582	.000	-.270	286	.787	-.101	.372	-.833	.632
	Equal variances not assumed			-.252	155	.802	-.101	.399	-.889	.688

In order to examine differences in mean readiness by teacher gender, an independent

samples t-test was conducted. Table 7 shows no violation of Levene’s test for homogeneity of

variances,  $F(1,36) = 2.519$ ,  $p = .121$ , a t-test assuming homogeneous variances was calculated. The results of this test indicated that there was a significant difference in the mean readiness of male and female teachers,  $t(36) =$

$2.23$ ,  $p = .032$ . These results suggest that male teachers ( $M = 9.86$ ;  $SD = 2.48$ ) had higher readiness to use m-learning as compared to female teachers ( $M = 7.03$ ;  $SD = 3.13$ ).

**Table 7**

*Independent samples t-test for equality of students' mean readiness by teacher gender*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							e	e	Lower	Upper
Readiness	Equal variances assumed	2.519	.121	2.23	36	.032	2.825	1.268	.254	5.396
	Equal variances not assumed			2.59	10.81	.026	2.825	1.092	.416	5.234

In order to examine differences in mean *comfortability* to use m-learning by student gender, an independent samples t-test was conducted. Table 8 shows no violation of Levene's test for homogeneity of variances,  $F(1, 286) = .041$ ,  $p = .839$ , a t-test assuming homogeneous variances was calculated. The

results of this test indicated that there was no difference in the mean *comfortability* of male and female students,  $t(286) = .786$ ,  $p = .443$ . These results suggest that male students ( $M = 4.15$ ;  $SD = .855$ ) had same *comfortability* to use m-learning as compared to female students ( $M = 4.07$ ;  $SD = .846$ ).

**Table 8**

*Independent samples t-test for equality of students' mean comfortability by student gender*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							e	e	Lower	Upper
Comfortability	Equal variances assumed	.041	.839	.768	286	.443	.082	.107	-.128	.292
	Equal variances not assumed			.765	182	.445	.082	.107	-.129	.293

In order to examine differences in mean *comfortability* by teacher gender, an independent samples t-test was conducted. Table 9 shows no violation of Levene's test for homogeneity of variances,  $F(1, 36) = 2.777$ ,  $p = .104$ , a t-test assuming homogeneous variances was calculated. The results of this test indicated

that there was no difference in the mean *comfortability* of male and female teachers,  $t(36) = -.046$ ,  $p = .963$ . These results suggest that male teachers ( $M = 3.86$ ;  $SD = 1.069$ ) had same *comfortability* to use m-learning as female teachers ( $M = 3.87$ ;  $SD = .619$ ).

**Table 9**  
*Independent samples t-test for equality of students' mean comfortability by teacher gender*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2- tailed)	Mean Differenc e	Std. Error Differenc e	95% Confidence Interval of the Difference Lower Upper	
Comfertab ility	Equal variances assumed	2.777	.104	-	36	.963	-.014	.299	-.620	.592
	Equal variances not assumed			-	6.934	.975	-.014	.419	-1.007	.979

Table 10 presents the One-Way Analysis of Variance of readiness to use m-learning by students discipline of study. There was not a significant difference in the mean readiness to use m-learning by students discipline of study,  $F(2, 285) = 2.846, p = .060$ . It means that the

students who were studying the disciplines of education ( $M = 7.45; SD = 2.74$ ), mathematics ( $M = 6.31; SD = 2.79$ ) and computer science ( $M = 7.36; SD = 3.36$ ) were equally ready to use m-learning.

**Table 10**

*One-Way Analysis of Variance of readiness to use m-learning by students discipline of study*

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	49.171	2	24.585	2.846	.060
Within Groups	2462.242	285	8.639		
Total	2511.413	287			

Table 11 presents the results of One-Way Analysis of Variance of comfortability to use m-learning by students discipline of study. There was a statistically significant difference between groups as determined by one-way ANOVA,  $F(2, 285) = 5.203, p = .001$ . A Tukey post hoc test revealed that the students from the disciplines of education ( $M = 4.11; SD = .811; p$

$= .011$ ) and computer science ( $M = 4.29; SD = .793; p < .001$ ) were significantly more comfortable to use m-learning as compared to students from the discipline of mathematics ( $M = 3.71; SD = .944$ ). There was no statistically significant difference in comfortability to use m-learning between students from the disciplines of education and computer science ( $p = .231$ ).

**Table 11**

*One-Way Analysis of Variance of comfortability to use m-learning by students discipline of study*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.406	2	5.203	7.563	.001
Within Groups	196.063	285	.688		
Total	206.469	287			

**Discussion and Implications**

The study was aimed at exploring the students and teachers readiness to use m-learning at university level. The results showed that all the teachers and majority of the students were ready for m-learning as far as owning of a mobile phone is concerned. A higher number of

male students had access to mobile phones as compared to female students. Only one third of the university teachers and less than a quarter of the university students owned a smart phone. The percentage of respondents who hold smart phones is much less than other countries (Rainie & Smith 2013). The gender gaps in terms of owning a mobile phone, smart phone, access

through wifi and cellular based network were in favor of male students. This showed that male university students were more ready for mobile learning as compared to female students as far as access to m-learning technologies is concerned. These findings support the findings of previous studies GSM (2015).

The results further showed that all the teachers and majority of the students keep their mobile phones with themselves almost all the time. Majority of the teachers and students use their mobile phones while they are at their homes. Many of the respondents use mobile phones for SMS, and phone calls. Some of the respondents mentioned that they also use mobile phones for reading, email, entertainment and internet. A small number of students also use mobile phones while travelling. The respondents carry their mobile phones with themselves almost all the time and they have been using them while at work/university, at home or during travelling.

More than three-fourths of the male and female students mentioned that they would be comfortable allowing their teachers to contact them through their mobile phone. More female teachers as compared to male teachers mentioned that they would be comfortable allowing their students to contact them through their mobile phone. Almost one-third of the male teachers mentioned they would be uncomfortable allowing their students contacting them through mobile phones. Since more than 70% of students at the university were females, and there are cultural and religious constraints that restrict communication between males and females, hence response from the male teachers may be attributed to these factors. Almost three-fourths of the male and female students responded that they would be comfortable receiving grades through text messaging. On the other hand almost half of the female teachers showed their discomfort regarding giving grades through text messaging. Further investigations may be carried out in order understand why females are hesitant to award grades through text messaging.

The respondents were asked to mention whether they would like to use mobile technologies for learning and teaching. Almost all the male teachers mentioned that they would like to use mobile devices for teaching; they want to teach anywhere and anytime; want to use mobile phones as learning tool and would invest personal time in learning mobile technologies. They further agreed that teaching can benefit by making course materials available through mobile phones. They also felt that overall success of students can be improved through m-learning. Almost 75% of the female teachers felt the same way. This showed that male university teachers were more ready for m-learning as compared to female teachers. Similar differences were also evident when they were asked about the type of mobile phones they owned as well as their connectivity through wifi and cellular based networks. These findings are in accordance with an earlier study by Anderson (2017). More than eighty percent of the male and female students were ready for m-learning as far as use of m-learning and their willingness to spent personal time in learning mobile applications are concerned. A large majority of the students felt that their overall success can be improved by the use of some kind of mobile learning software. This shows that both the Pakistani university teachers and the students are ready for m-learning both in terms of availability of mobile phones and their willingness to learn mobile based learning technologies. These findings of the study matches the findings of another study conducted by Nawi, Hamzah and Rahim (2015)

Government of Punjab has been distributing laptops to the university students free of cost. Laptops become difficult to carry and require more energy as compared to smart phones and tabs. Keeping in view the portability and energy efficiency, the governments may wish to distribute tabs or smart phones instead of laptops. Since tabs cost less as compared to laptops, a larger student body can benefit from this technology initiative. Since the connectivity through wifi and cellular based networks is very low in both the cases of teachers and students, the governments may also plan to provide wifi solution on reduced costs or free of cost in order



to facilitate m-learning. Since there is a wider gender gap as far as ownership of mobile phones are concerned. This factor should be kept in mind while distributing m-learning tools so that all the citizens could equally benefit from the latest learning technologies.

This study was conducted in the context of urban Punjab. This paper has added to the exiting knowledge by finding out the kind of mobile phones available with the faculty and students, the kind of connectivity they have, the purposes for which the mobile phones are currently being used. This paper has also added in the knowledge of confortability in using m-learning in the local context. This paper has also made us understand the readiness of local students and faculty members in using m-learning for academic purposes.

## Conclusion

This study shows that Pakistani university teachers and students are prepared technologically and are willing to spent time and money in learning mobile based learning applications. This provides an opportunity to the universities, policy makers and provincial government to invest in designing course material which can be made accessible anywhere and anytime through mobile tools. The provincial governments may wish to freely distribute tabs and smart phones instead of laptops enabling students to learn, enrich or practice while away from the classrooms. The higher education institutions in Pakistan have not grown in accordance with the rapid population growth. In near future the public sector will not be able to expand to meet the needs, therefore it is imperative to launch programs through m-learning. We need to catch up with other nations who have successfully implemented m-learning.

This study has certain limitations. One limitation is that it has relied on opinion of respondents, whereas the readiness could have been studies by giving various tasks and then by observing by using rubrics how ready they are. The next studies could be designed using qualitative or mixed method approach in order to

develop deeper understanding regarding for what purposes the mobile phones are being used by the faculty and students. An experimental studie could be conducted in order to explore the effect of m-learning on students understanding and achievement in various disciplines.

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