# Investigating Mobile Learning Acceptance in Pakistan: The Moderating Effect of Discomfort and Insecurity in Unified Theory of Acceptance and Use of Technology

Nida Akhtar[*] and Kausar Fiaz Khawaja[†]

**Abstract**

*The study aimed to examine the student's intention to use mobile learning (m-learning) in Pakistan. Unified Theory of Acceptance and Use of Technology (UTAUT) constructs was used as a theoretical framework. According to the finding of the study the effort expectancy and performance expectancy have positive significant relationship with intention to use m-learning. The study also tested the moderating effect of technology readiness (TR) inhibitors on these UTAUT constructs.600 Questionnaires were distributed among students.505 filled questionnaires were returned back. SPSS with Process Macro was used as statistical tools for data analysis. Along with this AMOS v21 was used for Confirmatory factor analysis. Various tests were performed for hypothesis testing. Results of research show that discomfort and insecurity significantly moderate the relationship between performance expectancy, effort expectancy and intention to use.*

**Keywords:** Performance expectancy, Effort expectancy, Discomfort, Insecurity

## Introduction

Global expansion of Mobile devices (M-devices) enables users to access information more quickly. Learning via m-devices is the fastest and more modern mode of learning in this century (Ibrahim, 2015). From students' perspective, all individuals utilize their cellular phones, tablets and other portable devices for gathering information (Saunders, 2015). Mobile learning (m-learning) is the latest educational concept. Its attractiveness is increasing in education sector (Mahat et al., 2012). M-learning define as "Electronic learning (E-learning) using m-devices and wireless transmission" (Hoppe et al., 2003; Chang et al., 2003). There are two main features of m-learning: mobility and ubiquity. Through these

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features individuals can access anywhere and anytime to get information and "learning on the go" respectively (Peng et al., 2009).

Virtual university is Pakistan working on m-learning. They provide students access to all courses on cellular phones. In Pakistan United Nations Education, Scientific and Cultural Organization (UNESCO) is also working on m-learning to educate the individuals in remotes areas and this project was sponsored by Nokia, Mobilink and Dhaka Ahsania Mission Pakistan. In Khyber Pakhtunkhwa they perform a project "Mobile-based Post Literacy Programme".

Many individual are not capable or affordable to access the conventional learning system or they are facing issue of gathering knowledge due to the unavailability of educational institutes in their areas. But the rapid development of internet and technologies has overcome this difficulty like m-learning.

People have different perception for accepting a new technology (m-learning) based on their personality. On the basis of personality traits some people accept technology (m-learning) immediately after using it. Another individual may accepts after a long time or never accepts. Therefore, on the basis of given problem this study investigates the moderating role of technology readiness inhibitors between UTAUT constructs (performance expectancy and effort expectancy) and intention to use.

## Literature Review

In 2003, Venkatesh et al. developed, tested and reported UTAUT as the most competent technology acceptance theory. The main constructs of UTAUT are performance expectancy, effort expectancy, social influences, and facilitating conditions.

### *Performance Expectancy*

Earlier models helped in formation of performance expectancy that comprises of perceived usefulness of technology acceptance model (TAM), external motivation of motivation model (MM), outcome expectation of social cognitive theory (SCT) work (Venkatesh et al., 2003; Davis et al., 1989; Venkatesh et al., 2000.) In this study, performance expectancy describes a user's beliefs that use of m-learning gives many advantages and help them in completing their work. Past researchers showed that performance expectancy has significant effect on intention to use (Chang et al., 2007; Venkatesh & Zhang, 2010)

*H1: Performance expectancy has a positive impact on the student's intention to use m- learning system.*

*Effort Expectancy*

According to Carter and Belanger (2004) effort expectancy is the tendency of ease related with the use of the technology. Effort expectancy indicators consent of an ease of use used in TAM, Complexity in PC utilization model. Many researchers studied effort expectancy in UTAUT model and empirically recognized the positive effect of it on intention to use (Chang et al., 2007; Lin & Anol., 2008; Kijsanayotin et al., 2009). The research conducted by Venkatesh et al. (2012) and Pahnila et al. (2011) show that effort expectancy has direct influence on intention to use. So, this study that

*H2: Effect expectancy has a positive impact on the student's intention to use m- learning system.*

*Technology Readiness Index (TRI)*

Technology readiness constructs can be viewed as an overall state of mind resulting from a gestalt of mental enablers and inhibitors that collectively determine a person's predisposition to use new technology. At the measurement level, the TRI was developed to measure people's beliefs about technology (Lin et al., 2007). TRI is defined as individual's tendency to embrace and to achieve the goals by using new technologies (Parasuraman, 2000). TRI is able to exploit the common consumers. It contains 36 items having four dimensions: Optimism, innovativeness, discomfort, insecurity. Optimism and innovativeness both are enablers while discomfort and insecurity both are inhibitors of technology readiness (Parasuraman, 2000). Discomfort is negative feeling towards technology, it view technology as incapable to control and belief being overpowered by it. Insecurity is to be uncertain about technology and uncertainty about its ability to work.

People discomfort in using new technology feel comparatively huge uncertainties (Gefen et al., 2003). They may have tended to anxious feeling related to use of technology. Individual who distrust technology are not comfort to use technology. This results individuals avoiding the use of them due to an innate fear of technology, often driven by perceived difficulties such as privacy and security (Walczuch et al., 2007; Liljander et al., 2006). Similarly, findings exposed that anxious individuals are less likely to try new things and have confidence issues. Individual who are more discomfort their acceptance toward technology become lesser so they have less intention to use technology. So hypothesized that;

*H3a: Discomfort will moderate the relationship between performance expectancy and intention to use such that the relationship will be*

*weaker for individual having high level of discomfort about m-learning.*

*H3b: Discomfort will moderate the relationship between effort expectancy and intention to use such that the relationship will be weaker for individual having high level of discomfort about m-learning.*

People who are highly uncomfortable with technologies believe that they are controlled technology and that technology is not designed for ordinary people (Parasuraman, 2000). Moreover, individuals with low comfort using new technology are associated with great uncertainty complexities. People having high insecurity are more doubtful about technology. Similarly, effort expectancy would be more important for those with low insecurity level to use new technology would encourage them to adopt it and establish confidence afterwards. Similar findings revealed that insecure people are less likely to try new experiences and are more likely to have self-efficacy and self-esteem issues. When faced with new challenges, like learning a new form of technology, there individuals would be more likely to have problems or simply want to avoid the new situation altogether.

*H4a: Insecurity will moderate the relationship between performance expectancy and intention to use such that relationship will be weaker for individual with high level of insecurity about m-learning.*

*H4b: Insecurity will moderate the relationship between effort expectancy and intention to use such that relationship will be weaker for individual with high level of insecurity about m-learning.*

*Research Model*

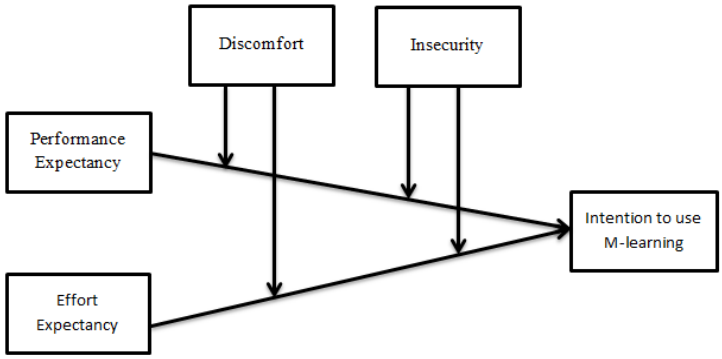



Figure 1: Research Model

## Methodology

This is causal study and cross- sectional in nature. In this study self-reported perception of students is measure.

*Population and Sampling*

The population of the study are students using m-learning in Pakistan. The selection of m-learning student is based on ease and convenience.

*Control Variables*

The demographics in this study include gender, degree and age. By one-way ANOVA it revealed that only one factor is significant that is degree.

*Scales and Measures*

In this study all the scales are adapt from previous studies. Performance expectancy having Cronbach's alpha reliability .92 and have four items, effort expectancy have four items includes and Cronbach's alpha reliability was .91. All instruments were adopted from Venkatesh et al. (2003). TRI items are adopted from Parasuraman and Rockbridge (1999) having sub-dimensions such as 10 items for discomfort and Cronbach's alpha reliability was .79 and 9 items for insecurity Cronbach's alpha reliability was .72. Behavior intention scales are adopted from Taylor and Todd (1995) and 7-likert scales was used from strongly disagreed =1 to strongly agree =7.

## Result and Discussion

A total 600 questionnaires were distributed among different universities and received 501 filled questionnaires. The response rate was 83.5%. The sample consisted of male respondents 48.7% and 257 female respondents 51.3%. Respondents were categorized into different qualification or degree of the students including bachelor, master, M Phil or MS, PHD etc. The respondents of Master degree were 36.5%, bachelor degree holders 31.7% were M.Phil/MS degree holders and 23% remaining were diploma holders.

Table 1: Reliability

| Variables | Cronbach's Alpha | N of Items |
|---|---|---|
| Performance Expectancy | .78 | 4 |
| Effort Expectancy | .78 | 4 |
| Intention to Use | .84 | 3 |
| Discomfort | .82 | 8 |
| Insecurity | .88 | 9 |

*Correlation*

In below table the values of intention to use m-learning and performance expectancy indicates they are positive correlated and also highly significant (r=.524, p<0 .01). Intention to use and effort expectancy are positively and are significant (r=.676, p<0.01).

Table 2: Correlations

| Variables | Mean | SD | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| 1. PE | 5.42 | 1.24 | (.78) | | | | |
| 2. EE | 5.57 | 1.09 | .631** | (.78) | | | |
| 3.DIS | 2.67 | 1.12 | -.042** | .002** | (.82) | | |
| 4.INSE | 2.66 | 1.33 | -.002** | .004** | .881** | (.88) | |
| 5. Inten | 5.6 | 1.36 | .524** | .676** | -.067** | -.088** | (.84) |

*Confirmatory Factor Analysis*

Confirmatory factor analysis is discriminant validity of variables. We compared a two factor model with single factor according to the guidelines suggested by Anderson and Gerbing's (1988). Result is illustrated in table 3

Table 3: Factor Analysis

| Measurement Model | | CMIN | DF | CMIN/DF | RMSEA | GFI |
|---|---|---|---|---|---|---|
| CFI | .92 | 440.35 | 227 | 1.93 | .06 | .87 |
| PE- DIS | .74 | 1100 | 76 | 14.47 | .29 | .68 |
| PE- DIS | .60 | 1647 | 77 | 21.39 | .54 | .52 |
| EE- DIS | .75 | 1066 | 76 | 14.02 | .16 | .68 |
| EE- DIS | .61 | 1593 | 77 | 20.69 | .19 | .60 |
| EE- INS | .52 | 2639 | 77 | 34.27 | .25 | .58 |
| EE- INS | .44 | 3063 | 77 | 39.77 | .27 | .52 |
| INT-PE | .95 | 76.71 | 13 | 5.9 | .37 | .96 |
| INT-PE | .81 | 279.9 | 14 | 19.99 | .37 | .83 |
| INT-EE | .99 | 20.73 | 13 | 1.5 | .03 | .98 |
| INT-PE | .94 | 99.05 | 14 | 7.07 | .37 | .93 |

*Regression*

In study of hypothesis regression analysis have been used. In step 1 control variable is added, while in step 2, independent variable is entered. The result shows positive beta value of PE (β=.095, P<0.01) which means that performance expectancy and intention to use are positively related and are significant. Furthermore, R square change value is .593 which means that performance expectancy is explaining 0.59 variations in intention to use. Similarly, effort expectancy result shows positive beta value (β=.470, P<0.01) which means that effort expectancy and intention

to use are positively related and are significant. Furthermore, R square change value is .593 which means that PE is explaining 0.59 variations in intention to use.

Table 4: Regression

| Dependent Variables Intention to use Predictor | β | $\Delta R^2$ |
|---|---|---|
| Step 1 | | |
| Control | | 0.17 |
| Degree | .018 | |
| Step 2 | | |
| PE | 0.95* | .593 |
| EE | .479*** | .593 |

N= 501, Control variable Degree. P<.10, *P<.05, **P<.01, ***P<.001

**Moderation Regression**

By using the Hayes process of moderation regression the moderating effect of discomfort on performance expectancy and intention to use m-learning system was conducted .Result for this moderation analysis are shown in table below revealed that the interaction term (discomfort x performance expectancy) was significant (β= -.1618, p <.05,$\Delta R^2$ = .023). Simple slope test showed that slope was significant at high (β= -.4210, p<0.05) and low ((β= -.7841, p <.05) levels of discomfort. Therefore, hypothesis3a is supported that discomfort moderate the relationship between performance expectancy and intention to use m-learning such that the relationship is stronger for individual having low level of discomfort. The interaction plot was plotted as given on fig 1 that indicates that relationship between performance expectancy and intention to use was slightly stronger when discomfort was low.

Table 5: Moderation

| Moderator: Discomfort | B | $\Delta R^2$ | LLC1 | ULCI |
|---|---|---|---|---|
| Step 1: | | | | |
| Discomfort | -.0230 | | .1193 | .0733 |
| Performance Expectancy | .6026*** | .3193 | .4905 | .7147 |
| Step 2: | | | | |
| Dis X Pe | -.1618*** | .023 | -.2603 | -.0633 |

Note. N=501 *p<.05,** p <.01,***p< .001

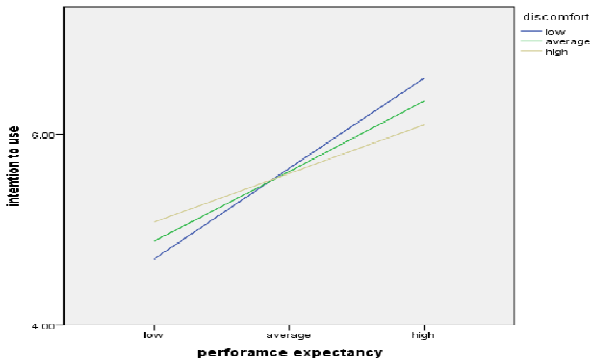



Fig 1

In $H_{3b}$ the moderating effect of discomfort on effort expectancy and intention to use m-learning system was conducted .Result for this moderation analysis are shown in below table revealed that the interaction term (discomfort x effort expectancy) was significant(β= -.1311, p <.05,$\Delta R^{2=}$ .0131). Simple slope test showed that slope was significant at high (β= -67, p<0.05) and low ((β= -.96, p <.05) levels of discomfort. Therefore, hypothesis 3b is supported that discomfort moderate the relationship between effort expectancy and intention to use m-learning such that the relationship is stronger for individual having low level of discomfort. The interaction plot was plotted as given in fig 2 that indicates that relationship between effort expectancy and intention to use was slightly stronger when discomfort was low.

Table 6: Moderation (Discomfort)

| Moderator: Discomfort | B | Change $R^2$ | LLC1 | ULCI |
|---|---|---|---|---|
| Step 1: | | | | |
| Discomfort | -.0597 | | -.1474 | .0280 |
| Effort Expectancy | .8223*** | .474 | .7076 | .9370 |
| Step 2: | | | | |
| Dis X EE | -.1311*** | .0131 | -.2264 | -.0358 |

Note. N=501 *p <.05, ** p <.01, ***p< .001

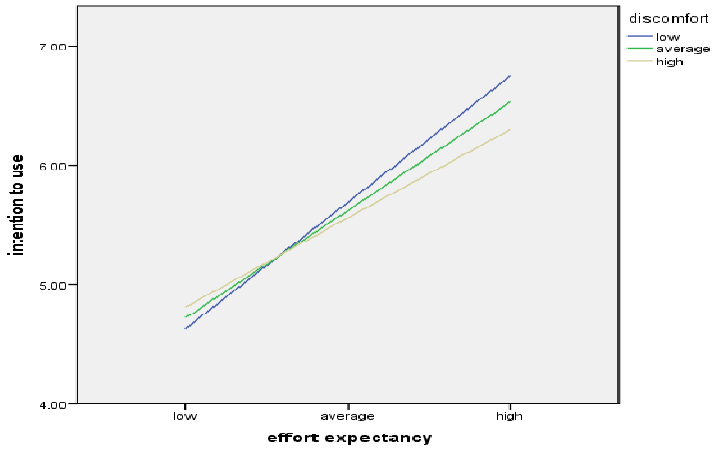


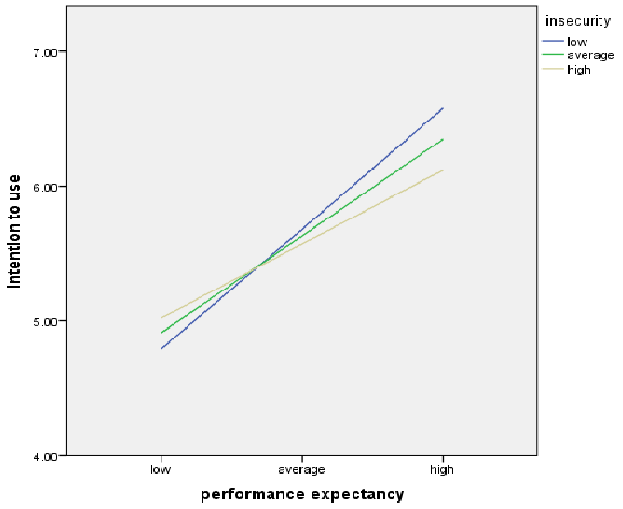

Fig 2

In $H_{4a}$ the moderating effect of insecurity on performance expectancy and intention to use m-learning system was conducted .Result for this moderation analysis shown in table below revealed that the interaction term (insecurity x performance expectancy) was significant (β=-.1061, p <.05,$\Delta R^{2=}$.0115). Simple slope test showed that slope was significant at high (β= -.0412, p<0.05) and low ((β= .5938, p <.05) levels of insecurity. Therefore, hypothesis 4a is supported that insecurity moderate the relationship between performance expectancy and intention to use m-learning such that the relationship is stronger for individual having low level of insecurity the interaction plot was plotted (as given in fig 3) that indicates that negative relationship between performance expectancy and intention to use was slightly stronger when insecurity was low.

Table 7: Moderation (Insecurity)

| Moderator: Insecurity | B | Change $R^2$ | LLC1 | ULCI |
|---|---|---|---|---|
| Step 1: | | | | |
| Insecurity | -.0412 | | -.1256 | .0431 |
| Performance Expectancy | .5938*** | .3083 | .4761 | .7116 |
| Step 2: | | | | |
| Ins X Pe | -.1061* | .0115 | -.2025 | -.0098 |

Note. N=501. * p <.05, ** p <.01, ***p < .001.




ig 3

In $H_{4b}$the moderating effect of insecurity on effort expectancy and intention to use m-learning system was conducted .Result for this moderation analysis revealed that the interaction term (insecurity x effort expectancy) was not significant (β= -.1311, p >05,$\Delta R^{2=}$ .0131). Therefore, proposed hypothesis was rejected.

**Discussion**

This study explored the influence of inhibitor of technology readiness on performance and effort expectancy for the acceptance of m-learning. Total 6 hypotheses were proposed out of which two hypotheses were for main effects. Results of the current study revealed that performance expectancy (β=.095, P < 0.05) and effort expectancy (β=.479, P < 0.05) has the positive influence on the student's intention to use mobile learning. It illustrates that when the technology is believed to benefit in attaining his/her goal and is easier to use; it will possess positive intention to use m-learning. According to the Carlsson (2006) effort expectancy is "*The expected benefits gained by using m-services"* by comprising the elements of time and flexibility. These results are similar to the previous finding (Venkatesh et al., 2003; Davis et al., 1989; Venkatesh et al., 2000) of the researchers.

Results show that discomfort significantly moderate the relationship between performance expectancy, effort expectancy and intention to use; whereas insecurity only moderates the relationship between performance expectancy and intention to use. High discomfort individual appears to be more anxious, so he/she will feel insecure in the attempt to use a new technology. People with discomfort and insecurity in using new technology feel comparatively huge uncertainties (Gefen et

al., 2003). So, individual who distrust technology are not comfort to use technology.

**Limitation and Future direction**

Firstly, this study has used convenience sampling technique; in future the researchers can use stratified, quota sampling techniques in order to avoid any recurrence. Secondly, data has been gathered in one point whereas future researchers can go for longitudinal study.

**Implication**

The present study explored technology readiness inhibitors as moderator between performance expectancy and effort expectancy on intention to use. This study will give cohesive model of technology adoption and practice that will improve marketer "understanding of the relationship between psychographic characteristics and technology-based service adoption intention". The research has identified important individual traits and has examined their effects on intention.

**Conclusion**

The study was conducted to analyse the effect of performance expectancy and effort expectancy of students' acceptance toward m-learning and also studied the moderating role of inhibitor technology readiness. The study was basically conducted on the universities of Pakistan. The study is cross-sectional in nature. The results of the study depicted that performance expectancy and effort expectancy has significant impact on IU m-learning. While the moderating role of TRI only inhibitor of technology readiness is proved.

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