ASSESSING THE MODERATING RELATIONSHIP FOR MOBILE LEARNING APPS: A STUDY OF STUDENTS IN COLLEGE CONTEXT

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ABSTRACT

On the verge of information and technology advancement, mobile applications are used creatively in different areas such as learning, communication, networking, banking, entertainment, security etc. In the education, the mobile device has a variety of mobile learning apps to learn the basic concepts and to attain up to date information on different subjects such as marketing, HR, finance, mathematics, computer science, general knowledge etc. The current study was conducted to identify various factors affecting the usage of mobile apps among students for learning purpose. This study explored the impact of content quality, user-friendly and layout and graphic design of mobile apps on perceived self-performance among students in academics. The study also identified the moderating effect of mobile learner's perceived motivation on perceived self-performance in academics. The study tried to find out the difference between gender (male and female) on using all the variables in the current study. Data was collected from students studying in private management institutions. The results were found positive based on the hypothetical model in the current study i.e., content quality, user-friendly, layout design, were taken as an independent variable and perceived self-performance was used as dependent variable and meanwhile the moderating role of perceived motivation was evaluated.

Keywords: Content quality, User-friendly, layout and graphics design, perceived motivation and perceived self-performance.

INTRODUCTION

In the era of innovation and technology, development and usage of mobile apps are increasing quickly in various areas. Due to its applicability, mobile applications have a great contribution in marketing and business campaigns. Mobile application (app) is an interactive software program that runs on the mobile device to perform several tasks for users (Wallace, 2012). In education, mobile applications are rapidly used for learning purposes. It is an innovative and rapidly growing segment in the age of information and communication technology. Since, the mobile application is easy to access, user-friendly, inexpensive and downloadable and runs in most of the mobile phone including inexpensive and entry level phone (Islam, 2010;

Vijaykumar & Babu, 2016). Hence, it has extensive uses for its vast functioning area like calling, messaging, browsing, chatting, social network communication, audio, video, game etc (Islam, 2010; Baruah, 2012; Rachuri, 2013; Perron et al., 2010; Nath & Mukherjee, 2015). Everyone can get facilitate through the usage of mobile apps. Therefore, the mobile applications have a significant influence on daily life, business life as well social life. The usability of mobile applications depends on various aspects such as screen resolution, storage capacity, hardware, connectivity (Menzel, 2004; Duh et al., 2006; Islam, 2010; Moumane, 2016).

In the age of Information and technology advancement, technology plays a significant role to create innovative directions for learning purpose. Now education is not limited to the classroom but, it extended to knowledge sharing platform through mobile learning application. In the education sector, development of mobile learning apps is growing tremendously (Naismith, 2004; Peters, 2007; Pimmer et. al., 2016). Now, apps are replacing notebook and pens. Now, mobile devices are equipped with internet connection which provides an electronic learning platform called as mobile learning (flora et al. 2014.). Through mobile learning application, students can able to access learning resources and online courses, anywhere and at any time (Naismith, 2004). Recently, mobile learning applications provide speech recognition feature which helps users to interact with other.

Due to an increase in mobile learning applications, most of the apps developers have been focused on development for mobile learning apps which facilitate user to get information easily. These types of apps include newspaper apps, learning games app, e-books apps, formulas apps, dictionary apps, newsletters apps, etc. In the recent literature, many researchers focused on the applicability of mobile learning apps in education. Therefore, there is a strong requirement to adopt mobile applications based on learning approaches that provide emphasis to the needs of students in the education system. Hence, to promote m-learning, many companies worked on different types of mobile applications to increase storage capacity, quality of content to learn and functionality of apps. So, the mobile applications become more effective and more usable for the users. This study tried to explore the effect of content quality, user-friendly and layout and graphic design of mobile application on perceived self-performance among students in academics.

Content Quality

Odden 2013 cited Kalvin who said that content is a compilation of information, ideas, and messages that are translated into some kind of written, visual, or audible format for others to consume. Content quality can vary greatly depending on the type of content being produced. It includes specific attributes such as customer centric, usefulness, enjoyable, inspirable, relevance, and accuracy (Cohen, 2014). We can say that high quality of content depends on its objective, practicability, functionality, usefulness and Outcome Orientation.

User-Friendly

User-friendly means easy to use, understand and learn. User-friendly is the degree to which user perceive perception regarding the ease of use better than its substitutes (Roger, 1983). User-friendly apps describe a software interface and have some common attributes such as simple to install, easy to update, easy to navigate, efficient, well-organized, intuitive, reliable (Wallen, 2010; Christensson, 2014). We can say that it is referred to the degree to which a person believes that using a particular app would be free of effort (Davis, 1989).

Layout Design

Layout design is a graphic design that deals in the arrangement of visual elements on a web page or app (Connor, 2014). Layout design is a term refers to the designing of the mobile app content in an appropriate manner with the user-friendly interface. The layout design is stimulator to increase customer satisfaction. It should be created in such a manner to enhance the interest for using it and results in increased satisfaction.

M-Learner Motivation

Motivation is defined as an internal force that activates behavior and gives it direction (Romando, 2007; Singh, 2011). The term motivation theory is concerned with the processes that explain why and how human behavior is activated and directed (Romando, 2007, para.1). It can be described as a state that energizes, directs and sustains behavior. It involves goals and requires efforts to perform goal oriented activities.

Basically, motivation refers to reasons that underlie behavior that is characterized by willingness and volition (Lai, 2011). It is the act or process of providing a motive that causes a person to take some action. Motivation can be manipulated through certain instructional practices. It can direct behavior toward specific goals and leads to increased effort, energy, initiation, and persistence of activities (Ormrod, 2008; Tohidi & Jabbari, 2011; Amedi, 2013;). Finally, motivation leads to improvement in performance.

M-Learner Performance

Performance can be seen as the output of certain activities over a given period of time. Performance of the learner is to analyze the learning behavior as well as performance improvement which can be achieved from an improvement in individual's behavior. Werner (2015) mentioned that performance evaluation is defined as a continous evalution of outcomes and results, which generates consistent data on the effectiveness and efficiency of programs (Department of State Bureau of Educational and Cultural Affairs).

LITERATURE REVIEW

Nowadays, mobile applications can be rapidly used for business, social networking, shopping, travel, education, banking and network utility. In the literature, mobile applications were classified into communication, games, multimedia, productivity, travel, utilities with respect to

its application area (Islam et al. 2010). Mobile applications have significant contribution in individuals, business and social area (Islam et al, 2010). Due to the user-friendly trait, the uses and popularity of mobile apps are increased tremendously in the place of laptops. Mobile apps provide quick communication, save time and increase productivity, cost saving, and entertainment. This leads to its significant influence on society (Islam et al, 2010). Now, security is also an important concern about mobile applications (Mahmood et al. 2016; Mutchler 2011).

There are various factors affecting the user's satisfaction for users of mobile applications. These factors included user's requirement fulfillment, the usefulness of app, performance improvement, easy to use, security/privacy, social conforming, and influence of peers (Chun et al. 2013).

In the literature, three different approaches such as improvement in graphical icons, use of multi-layered interfaces and augmenting the mobile interface were explored to enhance learn the ability of mobile software applications. If the mobile users have excellent experience while using mobile apps on their mobile device, then the adoption rate of mobile application was increased among the users (Wac et al., 2014)

In the era of communication technology, mobile application's characteristics were classified into three categories such as hardware, software, and communication (Flora et al., 2014). In this, the hardware includes less power, an input mechanism, screen size, startup time, physical parameters, device fragmentation, software including application interaction, application development, application security, and communication include network connectivity (Flora et al., 2014).

Alqahtani & Mohammad (2015) explored the relationships between behavioral factors and perceived usefulness among students who used mobile applications. The result of the study indicated that there was a positive relationship between the mobile application, students' perceived performance, satisfaction, and behavior. The study found that students had high satisfaction and positive attitudes towards the m-learning applications.

Inukollu et al. (2014) classified mobile app development life cycle into different phases such as mobile app requirements and specification, mobile app design phase, mobile app development phase, mobile app testing phase and mobile app maintenance phase.

In the literature, various limitations were explored during the usage of mobile applications such as small screen size, lack of windows, navigation, and speed etc. Various issue related to user's satisfaction were identified in the mobile applications. These issues related to context, interruption, privacy and wireless connectivity (Olubusola, 2015). Furthermore, various consequences of mobile application usage were identified and affected negatively by users habits such as addiction, laziness and so on (Olubusola, 2015). Usability of mobile applications incorporates effectiveness in use, efficiency in use, freedom from risk, context coverage and satisfaction in the use of it (Harrison et al., 2013).
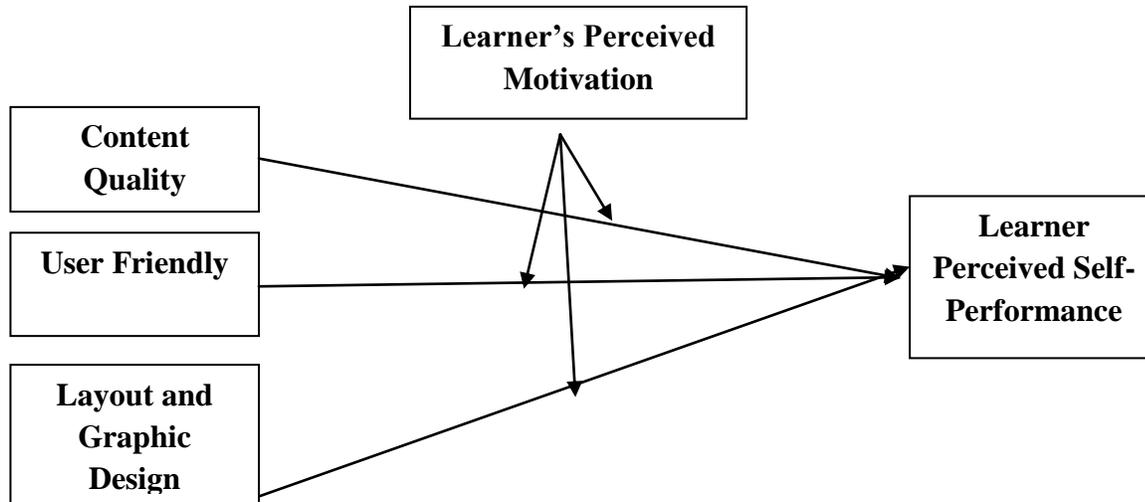
Few researchers were tried to identify challenged regarding the development of mobile applications. Capretz (2013) mentioned the causes of failure of mobile applications consist of an interface, hardware, nonexecutable file, data input, wireless network, mobile database, OS version, and software up-gradation. All these parameters are necessary to establish reliability in the mobile applications available on smart phones.

Joorabchi et al.(2014) mentioned the issue related to the development of mobile applications such as developing apps across multiple platforms, lack of robust monitoring, analysis, and testing tools, and slow emulators, additional features for mobile devices. These issues could be resolved by mobile app's developer to enhance their applicability and usability for the user.

While developing mobile web applications various quality attributes must be considered. The developers must be work on such attributes like increase the usability, suitability, efficiency of apps, wireless network, portability, and apps should support and run on the heterogeneous mobile device (Spriestersbach & Springer 2004). The developers must pay attention towards the application's levels of security which also affect the usability of mobile applications.

Generally, students used mobile application for an ordinary purpose like games, social networking, news, entertainment and education (Bowen & Pistilli, 2012). Most of the students used mobile learning apps to search different course content to clarify the concepts related to their course. Bowen & Pistilli (2012. In addition, it was found that social networking mobile applications were very useful to make communication easier and enhancing the effective flow of information and idea sharing among students. But usage of social networking mobile application had a negative influence on the academic performance of students (Yeboah & Ewur 2014, Jumoke et al. 2015). Students spend most of the time in chatting, music, and mailing which divert their concentration during the study. The various disadvantage of usage of social networking mobile application was found like destroying habit of correct spelling formation and identify grammatical mistakes, the formation of correct sentences, distract students from learning, facing problem to establish balance in between online activities and academic preparation. (Yeboah & Ewur 2014; Jumoke et al. 2015).

PROPOSED MODEL

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        ┌─────────────────────┐
        │ Learner's Perceived │
        │     Motivation      │
        └─────────────────────┘
┌──────────────┐
│   Content    │                              ┌──────────────────┐
│   Quality    │                              │     Learner      │
└──────────────┘                              │ Perceived Self-  │
┌──────────────┐                              │   Performance    │
│ User Friendly│                              └──────────────────┘
└──────────────┘
┌──────────────┐
│  Layout and  │
│   Graphic    │
│    Design    │
└──────────────┘
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OBJECTIVES OF THE STUDY

- ➢ To identify the factors underlying of Content Quality, User-friendly, Layout and Graphic Design, Perceived Motivation and Perceived Self-Performance.
- ➢ To evaluate the relationship between Content Quality and Perceived Self-Performance.
- ➢ To evaluate the relationship between Content Quality and Perceived Self-Performance on taking Perceived Motivation as a moderator.
- ➢ To evaluate the relationship between User-Friendly and Perceived Self-Performance.
- ➢ To evaluate the relationship between User-Friendly and Perceived Self-Performance on taking Perceived Motivation as a moderator.
- ➢ To evaluate the relationship between Layout and Graphic Design and Perceived Self-Performance.
- ➢ To evaluate the relationship between Layout and Graphic Design and Perceived Self-Performance on taking Perceived Motivation as a moderator.
- ➢ To find out the difference between gender on all the variables of the study.

RESEARCH METHODOLOGY

The study was exploratory in nature. Data collection was done based on survey method. The population included students of a private management institute in Gwalior region. An individual student was taken as the sampling element. Non-probability purposive sampling technique was used to collect the data.

The Sample
In this study, total population included two hundred students from different private management institutes in Gwalior, was used to carry out the research study as a sample. Descriptives of the sample included gender (male & female) and mobile applications used for learning purposes, considered as categorical variables. Descriptive of gender consist of 84 male (44%) and 112 female (56%) repondent. The second categorical variable was mobile applications used for learning purpose by college going students. The responses were taken from the students who use mobile applications to enhance their learning in respective subject which were segregated into seven different categories i..e, HR (10%), Finance (19%), Marketing (14%), IT(3.5%), Mathematics (6%), General awareness (4%) and others purpose (33%) included as sample in the present study .

Instrument Used
The questionnaires designed on Likert type scale of 5 points, where 1 stands for strongly disagree and 5 stands for strongly agree to collect quantitative data. The data was analyzed using the PASW 18 for calculating reliability and identified underlying factors of Content Quality, User-Friendly, Layout and Graphic Design, Perceived Motivation, Perceived Self-Performance. Hierarchical Regression was used to evaluate the linear relationship and for evaluating the moderating relationship among independent, moderate, and dependent. Independent T-Test was applied to measure the mean differences between male and female on Content Quality, User-friendly, Layout and Graphic Design, Perceived Motivation and Perceived Self-Performance.

Source of the Questionnaires: Islam R, Islam R, & Mazumder T. A. (2010) measure used for evaluating all the variables.

DATA ANALYSIS

After collecting data through the instruments used in the present study the Cronbach's alpha reliability test was applied to check the reliability of the questionnaires i.e., Content Quality,

User-Friendly, Layout and Graphic Design, Perceived Motivation and Perceived Self-Performance. Factor analysis was applied to determine the underlying factors of the used variables. All the assumptions of regression were checked through Linear Functional form, Independent observations, Normality of the residuals or errors, No autocorrelation of the errors, No outlier distortion, Representative sample and proper specification of the model, No Multi-Collinearity. Hierarchical Regression was used to evaluate the relationship among Independent variables, moderator, and dependent variables. Wherein, Content Quality, User-friendly, Layout, and Graphic Design, were taken as an independent variable, Perceived Motivation was taken as moderator and Perceived Self-Performance was treated as a dependent variable. Independent T-Test was also applied to measure the mean differences between male and female on Content Quality, User-Friendly, Layout and Graphic Design, Perceived Motivation and Perceived Self-Performance.

RELIABILITY TEST

Reliability coefficient was applied by using PASW 18 software on questionnaires of Content Quality, User-Friendly, Layout and Graphic Design, Perceived Motivation and Perceived Self -Performance. The reliability test values of all questionnaires were given below:

S.No.	Variable Name	Cronbach's Alpha	No. of Items
1.	Content Quality	0.826	09
2.	User Friendly	0.795	05
3.	Layout and Design	0.808	10
4.	Perceived Motivation	0.835	06
5.	Perceived Self-Performance	0.718	04

The reliability value from the above table indicated that the reliability coefficient Cronbach's alpha value was more than 0.5 for all the questionnaires of the study indicating that the reliability of the questionnaire was high and it was suitable for the study. Peterson (1994) pointed out that acceptable value of Cronbach's Alpha can vary between 0.5 and 0.95 depending on the type of research.

KMO and Bartlett's Test of Sphericity

S.No.	Variable Name	KMO Test of	Bartlet's Test of Sphericity (Chi	Significance

		Adequacy	Square Value)	Level
1.	Content Quality	0.862	430.447	0.000
2.	User Friendly	0.792	283.041	0.000
3.	Layout and Design	0.895	622.05	0.000
4.	Perceived Motivation	0.838	384.805	0.000
5.	Perceived Self-Performance	0.755	139.856	0.000

KMO and Bartlett's Test of Sphericity: Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was an index used to evaluate the appropriateness of factor analysis. High values (between 0.5 and 1.0) indicated factor analysis was appropriate. Values less than 0.5 implies that factor analysis may not be suitable. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy value of Content Quality, User-Friendly, Layout and Graphic Design, Perceived Motivation and Perceived Self-Performance was 0.862, 0.792, 0.895, 0.838 and 0.755 indicating that the sample was adequate to consider the data suitable for factor analysis.

Bartlett's Test of Sphericity: Bartlett's Test of Sphericity was a test of statistic that used to examine the null hypothesis that the population correlation matrix was an identity matrix. The Bartlett's Test of Sphericity was tested through Chi-Square value with 0.000 level of significance. In all the cases, the value of chi square was respectively found as 430.447, 283.041, 622.05, 384.805 and 139.856 with 0.000 level of significance. Therefore, the hypothesis of Bartlett's test of Sphericity was rejected which indicated that collected population was not an identical in nature and the data were suitable for factor analysis.

ASSUMPTIONS OF LINEAR REGRESSION

1. **Linear Functional form**: In the current study, all the equation of relationship were found to be linear relationship through the result of curve fitting between independent and dependent variables shown in the following table:

Table - Linear Relationship through curve fitting

Independent Variable	Dependent Variable	R Square Value	F Value	Level of Significance
Content Quality	Performance	0.272	74.070	0.000
User Friendly	Performance	0.157	36.805	0.000
Layout and Graphic	Performance	0.198	48.768	0.000

Design				
Motivation	Performance	0.303	85.986	0.000

2. **Independent observations**: In the present study, the responses given by respondent on the used variables were not influenced and which was ensured through questionnaires design and data collection method.

3. **Normality of the residuals or errors**: In the current study, normality of the residuals was tested through one sample K-S test and the result of one sample K-S test was found as for Layout and Graphic Design where the value of Z was found to be 1.156 significant at 13.8% level of significance; for perceived motivation the value of Z was found to be 1.193 significant at 11.6% level of significance and for perceived self-performance, the value of Z was found to be 1.308 significant at 6.5% level of significance, indicating that the data for above-mentioned variable were found normally distributed respectively. Whereas, for content quality, the value of Z was attained 1.426 significant 3.4% level of significance; the result of user-friendly the value of Z was found 1.748 significant at .4% level, indicating that data for content quality was found very close to normally distributed. Whereas, the data of user-friendly was not found normally distributed.

4. **No autocorrelation of the errors**: In the current study, collected data was found to be free from autocorrelation. Durban-Watson test was applied To check the autocorrelation and results indicated that if the Values of Durban-Watson lies between 1and 3 then it is acceptable and the results given in the following table:

<h3 style="text-align:center">No autocorrelation of the errors</h3>

Independent Variables	Dependent Variable	Durbin Watson
Content Quality and Motivation	Performance	1.610
User Friendly and Motivation	Performance	1.591
Layout and Graphic Design and Motivation	Performance	1.621

5. **No outlier distortion**: In the present study, the model was checked to remove outliers under descriptive analysis in SPSS. The results indicated that there was no outlier among independent, moderating and dependent variable.

6. **Representative sample and proper specification of the model:** In the current study, the proposed model included all the independent and moderating variables verified through review of the literature.

7. **No Multi-Collinearity**: In the present study, multicollinearity was checked through variance inflation factor (VIF) = $1/1- R^2$. The results indicated that the values of VIF were found to be lies between 1 to 10 which represents no multicollinearity in the data. The results are shown in the following table:

Independent Variables	Dependent Variable	VIF
Content Quality and Motivation	Performance	1.299
User Friendly and Motivation	Performance	1.300
Layout & Graphic Design and Motivation	Performance	1.4771

FACTOR ANALYSIS

Principal component factor analysis with varimax rotation was applied to find out the underlying factors on the collected data of the content quality, user-friendly, layout, and graphic design, perceived motivation and perceived self-performance. In the present study, factor analysis converged all the statements of the variable into single factor i...e Content Quality converged into a single factor. Similarly, remaining all variables i..e User-Friendly, Layout, and Graphic Design, Perceived Motivation and Perceived Self-Performance also converged into single factor only.

REGRESSION ANALYSIS

H01: There is no cause & effect relationship between Content Quality & Perceived Self-Performance.

H02: There is no cause & effect relationship between Content Quality & Perceived Self-Performance on taking Perceived Motivation as a moderator.

A hierarchical regression was applied to investigate the relationship based on the above-mentioned hypothesis for testing the proposed model in the current study. The H01 indicated that there was no relationship between content quality and perceived self-performance in which content quality was taken as an independent variable and perceived self-performance as a dependent. The H02 indicated that there was no cause & effect relationship between content quality and perceived self-performance when perceived motivation act as moderator.

CONTENT QUALITY

MODEL SUMMARY

Model		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
dimension0	1	.470	.221	.217	.88508144	
	2	.546	.298	.290	.84267345	1.610

a. Predictors: (Constant), Zscore (Content Quality)
b. Predictors: (Constant), Zscore (Content Quality), Zscore (Perceived Motivation)
c. Dependent Variable: Zscore (Perceived Self-Performance)

The Model summary indicated the variances explained by the independent variable on the dependent variable. In the present study, in order to test the H01, between content quality and perceived self-performance whereas, the content quality explained 22.1% variance (change) on perceived self-performance.   In order to evaluate the H02, in which perceived motivation was treated as a moderator between content quality and perceived self-performance so that 29.8% variance explained by after integrating content quality and perceived motivation on perceived self-performance. The result of model summary indicated that when perceived motivation was used as a moderator along with the content quality so the variance was increased on perceived self-performance.

ANOVA TABLE

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	39.777	1	39.777	50.777	.000
	Residual	140.223	179	.783		
	Total	180.000	180			
2	Regression	53.602	2	26.801	37.743	.000
	Residual	126.398	178	.710		
	Total	180.000	180			

a. Predictors: (Constant), Zscore (Content Quality)
b. Predictors: (Constant), Zscore (Content Quality), Zscore (Perceived Motivation)
c. Dependent Variable: Zscore (Perceived Performance)

The results of ANOVA table indicated the goodness of model. In the present study, there were two results of ANOVA and the first result of ANOVA was tested through the F value found to be 50.777 significant 0.000 at 5% level of significance. Hence, the model showed that the relationship between content quality and perceived self-performance was appropriate. In the same line, the second result of ANOVA table again tested through the F value found to be 37.743 significant 0.000 at 5% level of significance. Now, if the both the results were compared then, it could be concluded that when the first model was tested which include content quality

as independent variable and perceived self-performance as dependent variable then, the F value was significantly high but as perceived motivation was applied as moderator with content quality on perceived self-performance then, the F value was significantly reduced. It indicated that perceived motivation with content quality had weak the relationship with perceived self-performance.

COEFFICIENTS TABLE

Model	Un standardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1(Constant)	-1.040E-15	.066		.000	1.000		
Zscore(Content Quality)	.470	.066	.470	7.126	.000	1.000	1.000
2(Constant)	-2.297E-16	.063		.000	1.000		
Zscore(Content Quality)	.319	.072	.319	4.452	.000	.770	1.299
Zscore (Perceived Motivation)	.316	.072	.316	4.412	.000	.770	1.299

Dependent Variable: Zscore (Perceived Self-Performance)

The results of Coefficients table showed as the beta value which was found 0.470. It indicated that the content quality was having 47.0% sensitization over the perceived self-performance which was tested through the value of t. The t value was found to be 7.126 significant at 0.000 level of significance. Hence, the null hypothesis indicated that there was a significant relationship between content quality and perceived self-performance at 5% level of significance.

Another relationship also represented through the Coefficients table whereas, the motivation was applied as moderator with content quality. Here the beta value was found 0.319 which was tested through t value. Value of t was found to be 4.452 significant at 0.000 level of significance. While, when a moderator (integration of perceived motivation with content quality) effect was evaluated on perceived self-performance, then a beta value was found 0.316 that was significantly less from the previous relationship which was tested through t value. Value of t was found to be 4.412 significant at 0.000 level of significance.

H$_{03}$: There is no cause & effect relationship between User-Friendly & Perceived Self-Performance.
H$_{04}$: There is no cause & effect relationship between User-Friendly & Perceived Self-Performance on taking Perceived Motivation as a moderator.

USER-FRIENDLY

Model Summary

Model		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
dimension0	1	.387	.149	.145	.92482868	
	2	.503	.253	.245	.86886137	1.591

a. Predictors: (Constant), Zscore (User Friendly)
b. Predictors: (Constant), Zscore (User Friendly), Zscore(Perceived Motivation)
Dependent Variable: Zscore (Perceived Self-Performance)

The Model summary indicated the variances explained by the independent variable on the dependent variable. In the present study, in order to test the H03, between user-friendly and perceived self-performance whereas, the user-friendly explained 14.9% variance (change) on perceived self-performance. In order to evaluate the H04, in which perceived motivation was treated as a moderator between user-friendly and perceived self-performance so that 25.3% variance explained by after integrating user-friendly and perceived motivation on perceived self-performance. The result of model summary indicated that when perceived motivation was used as a moderator along with the user-friendly so the variance was increased on perceived self-performance.

ANOVA TABLE

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.900	1	26.900	31.450	.000
	Residual	153.100	179	.855		
	Total	180.000	180			
2	Regression	45.624	2	22.812	30.218	.000
	Residual	134.376	178	.755		
	Total	180.000	180			

a. Predictors: (Constant), Zscore (User Friendly)
b. Predictors: (Constant), Zscore (User Friendly), Zscore (Perceived Motivation)
c. Dependent Variable: Zscore (Perceived Self-Performance)

The results of ANOVA table indicated the goodness of model. In the present study, there were two results of ANOVA and the first result of ANOVA was tested through the F value found to be 31.450 significant 0.000 at 5% level of significance. Hence, the model showed that the relationship between user-friendly and perceived self-performance was appropriate. In the

same line, the second result of ANOVA table again tested through the F value found to be 30.218 significant 0.000 at 5% level of significance. Now, if the both the results were compared then, it could be concluded that when the first model included user friendly as independent variable and perceived self-performance as dependent variable was tested then, the F value was significantly high, but as perceived motivation was applied as moderator with user friendly on perceived self-performance then, the F value was significantly reduced. It indicated that perceived motivation with user-friendly had a weak relationship with perceived self-performance.

COEFFICIENTS TABLE

Model		Un standardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1	(Constant)	-8.777E-16	.069		.000	1.000		
	Zscore (User Friendly)	.387	.069	.387	5.608	.000	1.000	1.000
2	(Constant)	3.199E-17	.065		.000	1.000		
	Zscore (User Friendly)	.210	.074	.210	2.842	.005	.769	1.300
	Zscore (Perceived Motivation)	.368	.074	.368	4.980	.000	.769	1.300

a. Dependent Variable: Zscore (Perceived Self-Performance)

The results of Coefficients table showed as the beta value which was found 0.387. It indicated that user-friendly was having 38.7% sensitization over the perceived self-performance which was tested through the value of t. The t value was found to be 5.608 significant at 0.000 level of significance. Hence, the null hypothesis indicated that there was a significant relationship between user-friendly and perceived self-performance at 5% level of significance.

Another relationship also showed through the Coefficients table whereas, the motivation was applied as moderator with user-friendly. Here, the beta value was found 0.210 which was tested through t value. Value of t was found to be 2.842 significant at 0.000 level of significance. While, when a moderator (integration of perceived motivation with user-friendly) effect was evaluated on perceived self-performance then, a beta value was found to be 0.368 that was significantly less from the previous relationship which was tested through t value. Value of t was found to be 4.980 significant at 0.000 level of significance.

H05: There is no cause & effect relationship between Layout and Graphic Design & Perceived Self-Performance.

H06: There is no cause & effect relationship between Layout and Graphic Design & Perceived Self-Performance on taking Perceived Motivation as a moderator

LAYOUT AND GRAPHIC DESIGN

Model Summary

Model		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
dimension0	1	.396	.156	.152	.92099048	
	2	.494	.244	.236	.87420113	1.621

a. Predictors: (Constant), Zscore (Layout and Graphic Design)
b. Predictors: (Constant), Zscore (Layout and Graphic Design), Zscore (Perceived Motivation)
Dependent Variable: Zscore (Perceived Self-Performance)

The Model summary indicated the variances explained by the independent variable on the dependent variable. In the present study, in order to test the H05, between layout and graphic design and perceived self-performance whereas, the layout and graphic design explained 15.6% variance (change) on perceived self-performance. In order to evaluate the H06, in which perceived motivation was treated as a moderator between user-friendly and perceived self-performance so that 24.4% variance explained by after integrating layout and graphic design and perceived motivation on perceived self-performance. The result of model summary indicated that when perceived motivation was used as a moderator along with the layout and graphic design so the variance was increased on perceived self-performance.

ANOVA TABLE

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	28.168	1	28.168	33.208	.000
	Residual	151.832	179	.848		
	Total	180.000	180			
2	Regression	43.967	2	21.984	28.766	.000
	Residual	136.033	178	.764		
	Total	180.000	180			

a. Predictors: (Constant), Zscore (Layout and Graphic Design)
b. Predictors: (Constant), Zscore (Layout and Graphic Design), Zscore (Perceived Motivation)
Dependent Variable: Zscore (Perceived Self-Performance)

The results of ANOVA table indicated the goodness of model. In the present study, there were two results of ANOVA and the first result of ANOVA was tested through the F value found to be 33.208 significant 0.000 at 5% level of significance. Hence, the model showed that the relationship between layout and graphic design and perceived self-performance was appropriate. In the same line, the second result of ANOVA table again tested through the F value found to be 28.766 significant 0.000 at 5% level of significance. Now, if the both the results were compared then, it could be concluded that when the first model included layout and graphic design as independent variable and perceived self-performance as dependent variable was tested then, the F value was significantly high but as perceived motivation was applied as moderator with layout and graphic design on perceived self-performance then, the F value was significantly reduced. It indicated that perceived motivation with the layout and graphic design had a weak relationship with perceived self-performance.

COEFFICIENTS TABLE

Model	Un standardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1 (Constant)	-3.224E-16	.068		.000	1.000		
Zscore (Layout and Graphic Design)	.396	.069	.396	5.763	.000	1.000	1.000
2 (Constant)	3.039E-16	.065		.000	1.000		
Zscore (Layout and Graphic Design)	.191	.079	.191	2.410	.017	.677	1.477
Zscore (Perceived Motivation)	.360	.079	.360	4.547	.000	.677	1.477

a. Dependent Variable: Zscore (Perceived Self-Performance)

The results of Coefficients table showed as the beta value which was found 0.396. It indicated that the layout and graphic design was having 39.6% sensitization over the perceived self-performance which was tested through the value of t. The t value was found to be 5.763 significant at 0.000 level of significance. Hence, the null hypothesis indicated that there was a significant relationship between layout and graphic design and perceived self-performance at 5% level of significance.

Another relationship also represented through the Coefficients table whereas, the motivation was applied as moderator with the layout and graphic design. Here, the beta value was found 0.191 which was tested through t value. Value of t was found to be 2.410 significant at 0.000 level of significance. While, when moderator (integration of perceived motivation with the layout and graphic design) effect was evaluated on perceived self-performance then, a beta value was found 0.360 that was significantly less from the previous relationship which was tested through t value. Value of t was found to be 4.547 significant at 0.000 level of significance.

INDEPENDENT T-TEST FOR GENDER DIFFERENCES

The t-test was applied to find the differences between male and female students on Content Quality, User-Friendly, Layout and Graphic Design, Perceived Motivation and Perceived Self-Performance.

GROUP STATISTICS

	Gender		N	Mean	Std. Deviation	Std. Error Mean
Content Quality	dimension1	1.00	81	35.5926	4.80827	.53425
		2.00	100	35.6200	4.80694	.48069
User Friendly	dimension1	1.00	81	20.8148	2.84214	.31579
		2.00	100	20.8800	3.13108	.31311
Layout and Graphic Design	dimension1	1.00	81	39.6420	5.22807	.58090
		2.00	100	40.8500	6.05593	.60559
Perceived Motivation	dimension1	1.00	81	23.9506	3.44202	.38245
		2.00	100	24.4000	4.16576	.41658
Perceived Self-Performance	dimension1	1.00	81	15.5432	2.34547	.26061
		2.00	100	15.8800	2.46298	.24630

LEVENE'S TEST FOR EQUALITY OF VARIANCES

		F	Sig.	t	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Content Quality	Equal variances assumed	.188	.665	-.038	.970	-.02741	.71865	-1.44553	1.39071
	Equal variances not assumed			-.038	.970	-.02741	.71867	-1.44601	1.39119
User Friendly	Equal variances assumed	.905	.343	-.145	.885	-.06519	.44926	-.95171	.82134
	Equal variances not assumed			-.147	.884	-.06519	.44470	-.94280	.81243
Layout and Graphic Design	Equal variances assumed	.055	.816	-1.418	.158	-1.20802	.85218	-2.88964	.47360
	Equal variances not assumed			-1.440	.152	-1.20802	.83916	-2.86398	.44793
Perceived Motivation	Equal variances assumed	4.871	.029	-.779	.437	-.44938	.57688	-1.58774	.68897
	Equal variances not assumed			-.795	.428	-.44938	.56551	-1.56531	.66654

Perceived Self-Performance	Equal variances assumed	.193	.661	-.934	.351	-.33679	.36043	-1.04803	.37445
	Equal variances not assumed			-.939	.349	-.33679	.35858	-1.04451	.37093

Levene's Test for Equality of Variances was checked through F value. The value of F was found to be 0.188 significant at 0.665 indicating that the groups form on the basis of gender having equal variances. The t-test value of equal variances assumed was -0.038 significant at 0.970 indicating that there was no significant difference between male and female respondents on content quality of mobile learning apps. The group statistics table indicated that females have slightly higher perception regarding the content quality of mobile learning apps than males indicated by a mean value of females 35.6200 in comparison to mean value of males i.e. 35.5926.

Levene's Test for Equality of Variances was checked through F value. The value of F was found to be 0.905 significant at 0.343 indicating that the groups form on the basis of gender having equal variances. The t- test value of equal variances assumed was -0.145 significant at 0.885 indicating that there was no significant difference between male and female respondents on user-friendly. The group statistics table indicated that females have slightly higher perception regarding the user-friendly feature of mobile learning apps than males indicated by a mean value of females 20.8800 in comparison to mean value of males i.e. 20.8148.

Levene's Test for Equality of Variances was checked through F value. The value of F was found to be 0.055 significant at 0.816 indicating that the groups form on the basis of gender having equal variances. The t-test value of equal variances assumed was -1.418 significant at 0.518 indicating that there was no significant difference between male and female respondents on the layout and graphic design. The group statistics table indicated that females have slightly higher perception regarding the layout and graphic design of mobile learning apps than males indicated by a mean value of females 40.8500 in comparison to mean value of males i.e. 39.6420.

Levene's Test for Equality of Variances was checked through F value. The value of F was found to be 4.871 significant at 0.029 indicating that the groups form on the basis of gender having equal variances. The t-test value of equal variances assumed was -0.779 significant at 0.437 indicating that there was no significant difference between male and female respondents on perceived motivation. The group statistics table indicated that females have higher perceived motivation than males indicated by a mean value of females 24.4000 in comparison to mean value of males i.e. 23.9506.

Levene's Test for Equality of Variances was checked through F value. The value of F was found to be 0.193 significant at 0.661 indicating that the groups form on the basis of gender having equal variances. The t-test value of equal variances assumed was -0.934 significant at 0.351 indicating that there was no significant difference between male and female respondents

on perceived self-performance. The group statistics table indicated that females have slightly higher perceived self-performance than males indicated by a mean value of females 15.8800 in comparison to mean value of males i.e. 15.5432.

The result of independent t test indicated that there was no significant difference between male and female students regarding content quality, user-friendly, layout and graphic design of mobile learning applications as well as their perceived motivation and perceived self-performance in academics. The result also indicated that female students give slightly higher preference for content quality, user-friendly and layout and graphic design of mobile learning apps as compared to male students. The finding indicated that female students had higher motivation and performance compared to male students regarding mobile learning applications.

DISCUSSION

M-learning has been an integral part of today's education system which was confirmed in the current study with the help of used hypothesis. The Relationship between mobile content quality and perceived self-performance was checked and found a significant positive relationship in the study. The result of the current study has been found in line with Kutluk & Gulmez (2014). They found in their study that the students recognize well organized and easy to navigate content in the mobile applications which make content quality as an attractive feature for students. The current result was also found in line with Bekele (2010); Kamaruzaman & Zainol (2012); Kim et al. (2005). They also found that good content quality has a significant influence on learning behavior of learners. Thus, learning content must provide the expected material that accesses learner to quickly attend the needed information and it affects positively performance of the students.

Since the advancement of new technology provides a user-friendly environment to the learners. Therefore, good interface design and ease of use induce learners to learn through mobile learning applications. In this study, the relationship between user-friendly and perceived self-performance was checked and found positively significant. The result of the current study has been found in-line of Abu-al-Aish et al. (2013); Davis (1989); Alqahtani & Mohammad (2015). They explored in their study that the ease of use has a positive influence on the m-learning behavior of the users which helps to improve their performance in academics.

Layout design can incorporate typographic elements on the mobile screen. While graphic design can incorporate elements such as columns, margins, and icons should be placed on the screen consistently. In mobile-learning applications, the learning content display on the

standard screen size which can be divided into a menu, navigation area, and the content area (Darcey and Conder, 2012). In this study, the relationship between layout and graphic design and perceived self-performance was checked and found positively significant. The result of the current study has been found in line with Kamaruzaman & Zainol. (2012); Kim et al., (2005); Jairak (2009); Alqahtani & Mohammad (2015). They explored that the attractiveness of the interface layout and use of appropriate colors to provide needed information have a significant and positive impact on learners behavior towards m-learning. Thus, Layout and graphic design is an essential feature to attract learners to use mobile learning applications for study.

In the present study, gender does not have a significant influence on the usage of mobile learning applications. The result of the study was supported by Wei-Han Tan et al. (2012). Therefore, male and female learners have almost same perception toward mobile learning usage.

CONCLUSION

Due to easy availability of the variety of mobile learning applications in mobile devices, students think that they are free to learn anywhere and anytime through these applications. But, the result of the study indicates only the availability of mobile learning apps in mobile devices does not improve learning of the students.

The result of this study concluded that content quality, user-friendly and layout & design have significant relation with the usage of mobile applications to improve student's perceived self-performance in academics. Students use learning apps on the basis of good content provided in the application, clarity of concepts in content, the user-friendly feature to which facilitates students to use it easily as well as layout and design to attract students for learning.

But, when we use perceived motivation among students as a moderator, then we found that it reduced the relationship of content quality, user-friendly and layout & design with student's perceived self-performance. This indicated that content quality, user-friendly and layout & design are not able to motivate students for learning and improving their perceived self-performance. It indicates that students faced difficulty to learn anything through mobile application because of small screen size, they are not able to concentrate for learning as compared to books.

The result of independent t test indicated the male and female students have same perception regarding content quality, user-friendly, layout and graphic design of mobile learning applications as well as their perceived motivation and perceived self-performance in academics. The result also indicated that female students give slightly higher preference for content quality, user-friendly and layout and graphic design of mobile learning apps as compared to male students. The finding indicated that female students have higher motivation

and perceived self-performance compared to male students regarding use of mobile learning applications.

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