

Impact of Technology Quality, Perceived Ease of Use and Perceived Usefulness in the Formation of Consumer's Satisfaction in the Context of E-learning

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Abstract

The purposes of this research is to find out the impact of technology quality, perceived ease of use and perceived usefulness in the formation of consumer's satisfaction in the context of E-learning. Data was collected by using online questionnaire form 1338 students of virtual education system universities. It was concluded that that consumers perceive a high quality e-learning system to be useful with respect to their needs and they also consider a high quality technology easy to use. The results imply that if an e-learning system is useful, then the customer would be satisfied. Consumers have favourable feeling of satisfaction with e-learning when it is perceived to be useful and easy to use. This study provides a valuable insight and sound ground for academicians who are interested in studying technology quality, perceived ease of use and perceived usefulness in context of E-learning. It also presents valuable insights for practitioners and policy makers and it has revealed important findings and implications for aforementioned context.

Key words: Technology quality, perceived ease of use and perceived usefulness, E-learning

The profound changes in the recent market trends have shaped the powers of market actors, the nature of competition, their priorities and orientations. These changes are the result of consumer empowerment through which consumers have become an independent and active force in the market place (Ali, 2007; Barrutia & Charterina, 2006; Economist, 2005). According to Mackay, (2008); Barrutia and Charterina (2006); Stolle and Micheletti (2005); and Smith and Sivakumar (2004) ease of communications across the globe, developments in information technology, wide exposure to media and entertainment, widespread affluence, and education are accountable for the aforementioned transformations in consumer behavior. Consequently, the research on consumer behavior has become a matter of dire importance for both academia and practitioners.

In an era of rapidly growing globalization, marketing managers are faced with wide range of challenges and opportunities in developing a suitable marketing plan and strategy for customers of different geographies and characteristics. In the modern business, the competition is transformed from price to non-price which requires that not only markets but the tools of marketing must also be thoroughly researched.

The core responsibility and a challenging task for marketer is to understand the basis on which consumers take decision between different available alternatives (Huang, Lurie, and Mitra, 2009; Lin, Wang, and Hwang, 2010). Since the consumer gather and process information in fundamentally different ways, resultantly, there is a significant difference in adoption of a product/services. Difference in adoption of a product/service is not only due to the characteristics of the product/services itself, but also due to the distinctive behavior and characteristics of the consumer. Informational sources, hence play an important role in behavior of a consumer. Product or service attributes are key factors in the formation of consumer attitude and behavior. Product attributes may include price, quality, efficacy, performance, functionality etc (Zeithaml & Valarie, 1988).

In the current era of e-commerce, besides a wide array of products and services, consumers also have to deal with huge amount of information. Service quality is one of the core concepts of marketing for developing customer satisfaction (Han & Ryu, 2009). Customer satisfaction is the focal point of the marketers since it is the prerequisite of customer loyalty for instance word of mouth repurchase intentions (Liu & Jang, 2009). Consequently, in intensely competitive market, service quality is a key for gaining competitive advantage (Han & Ryu, 2009).

The tumultuous growth of internet provides a wide space for electronic services like e-learning. E-learning is one of the emerging paradigms of modern education as it is a tool for delivering information for training and education. E-learning network models provide freedom in interaction between instructor and learners (Katz, 2002). E-learning is a tool which is equipping institutes of higher education and businesses in meeting the demands of modern society. The e-learning market is observing a growth rate of around 35.6 percent (Wu, Tsai, Chen, & Wu, 2006). Various companies, training and educational institute are investing a large amount of money and devoting great efforts for the development of e-learning programs for users (Chiu, Sun, Pei-Chen, & Ju, 2007). The origin of the term e-Learning remains ambiguous and a comprehensive definition by Rosenberg (2001) has defined e-learning as “E-Learning refers to the use of internet technologies to deliver a broad array of solutions that enhance knowledge and performance” (p.28).

Significance of the study

The advent of ICT has revolutionized every dimension of human life. Technology has had a profound impact on the field of learning throughout the history, hence, the ICT revolution has impacted the educational landscape to an extent that it is completely embedded in every dimension of learning today (Kurti, 2009; Kravitz, 2004). The customization of technology in the field of learning has led to the concept of ‘Technology Enhanced Learning’ (TEL), which, consisting of

learners and technology provide socio-techno innovations to support educational practices in a variety of settings (Balacheff, 2006; Kurti, 2009).

Problems in Technology Acceptance

However, to remain competitive in the exponential growth in the ICT and increasingly affordable environment, online educational institutions imparting e-learning need to develop new online delivery methods (Olson, 2005). Technical problems in the acceptance of technology mediated learning environment include; limited the access to services; infrastructural inadequacies characterized by lack of internet connection (Aduwa-Ogiegbaen & Iyamu, 2005).

Research carried out on E-Learning in Pakistan

In Pakistan, many qualitative studies have been carried out on the area of ‘efficacy of e-learning’ by Farid, Ahmad, & Alam (2015), ‘challenges in implementation of e-learning in Pakistan’ (Farid S. , Ahmad, Niaz, Imtiaz, & Asghar, 2014). ‘M-Learning in Pakistan’ (Yasira, 2014), ‘failures of E-Projects of e-learning (Nawaz, 2014), attitude towards e-learning (Jawaid, Hafeez, Khan, & Khalique, 2013), ‘problem of implementing e-learning in comparison of developed countries (Ayesha & Mariam, 2013), ‘e-health initiatives in Pakistan (Qureshi, et al., 2013). Similarly, Nawaz (2012) and Hussain (2012) identified lack of knowledge about technology, ineffective user training, lack of user perception, borrowed e-learning models, lack of technical support and digital divide as the main stumbling blocks in implementation of e-learning in Pakistan. Another study carried out by Niwaz, Kayani, and Kayani (2011) was designed to highlight the contributions of ‘Virtual University of Pakistan’ and proffer some viable recommendations including the need for creation of awareness about e-learning in Pakistan and improving physical and human resources to attract a better talent in the e-learning stream (Niwaz, Kayani, & Kayani, 2011). Sind University conducted a study in 2011 to explore the impacts of information technology trends on e-learning process in Pakistan (Ali, Ahmed, Shaikh, & Bukhari, 2011).

However, there is dearth of literature concerning user unfavourable attitude after initial experiences. Research regarding information technology clearly shows that satisfaction is one of the significant contributors for the successful implementation of e-learning systems (DeLone & Mclean, 1992). There are several factors that may affect the satisfaction of e-learners like environmental dimensions, system design, technology (Arbaugh J. B., 2002; Chen and Bagaksa, 2003; Thurmond, Wambach, Connors, and Frey, 2002; system quality (Calisir, Gumussoy, Bayraktaroglu, and Karaali, 2014); perceived usefulness and ease of use (Pituch and Lee, 2006) etc. Based on extensive review of literature, the current study has three major objectives.

Research Objectives

- To investigate the impact of technology quality on consumer's perceived ease of use, and perceived usefulness in the context of e-learning.
- To investigate the impact of consumer's perceived ease on perceived usefulness in the context of e-learning.
- To investigate the impact of consumer's perceived ease and perceived usefulness on consumer's satisfaction in the context of e-learning.

Literature Review

Consumer Satisfaction in the context of e-learning

The success of e-Learning depends upon the user intention to continue using an e-learning service. Furthermore, critical success factor for building long term relationship is satisfaction (Lee M. , 2010). Satisfaction is defined as “affect or feeling or emotion resulting from one's evaluation of the situation”. The concept of satisfaction as affect includes both positive affect (satisfaction) and negative affect (dissatisfaction) (Savickas, 1994). Positive affective response to a situation determines consumer satisfaction from individual's point of view (Osipow & Fitzgerald, 1996). Consumer dissatisfaction is considered as the bipolar opposite of satisfaction; or consumer satisfaction and dissatisfaction may be viewed as two different dimensions (Giese & Cote, 2000). Studies have emphasised that the concept of satisfaction is associated with a number of factors like trust (Lim, Widdows, and Park, 2006; Kim, Kim, and Shin, 2009); justices (Pizzutti and Fernandes, 2010), perceived value (Ryu, Lee, and Kim, 2012); service quality (Sureshchandar, Rajendran, and Anantharaman, 2002), corporate image (Wu H.-C. , 2013); corporate social reasonability (Nilsson and Ballantyne, 2014) and customer loyalty (Martínez and Bosque, 2013) etc. Researchers also explored the outcomes of customer satisfaction as outcome of positive word-of-mouth; repurchase intention, and purchasing behaviour (Omar, Nazri, Abu, and Omar, 2009; Dholakia and Bagozzi, 2001; Seiders, Voss, Grewal, and Godfrey, 2005).

In the e-learning context, perceived e-learner satisfaction can be defined as “the degree of perceived learner satisfaction towards e-learning environments as a whole” (Sun, Tsai, Finger, Chen, & Yeh, 2008). Satisfaction in a blended/ hybrid learning environment has been defined by Wu, Tennyson, and Hsia (2010) as “the sum of an individual's behavioural beliefs and attitudes that results from aggregating all the benefits that an individual receives from using the blended system” (p.157). Based on previous research, e-learner satisfaction can be defined as a “summary affective response of varying intensity that follows asynchronous e-learning activities, and is stimulated by several focal aspects, such as content, user interface,

learning community, customization, and learning performance” (Wang, 2003, p. 77).

Technology Quality

In the present day environment, e-learning and technology application are now synonymous to each other and it has been found that the use of new technology will invoke consumers’/users’ interest in searching and upgrading their knowledge, hence the management need to maintain the technology to ensure the usefulness of e-learning (Yacob, Abdul Kadir, Zainudin, & Zurairahq, 2011). Similarly, system quality can be measured as system accessibility, flexibility of system, convenience of access, reliability and response time (Calisir, Gumussoy, Bayraktaroglu, & Karaali, 2014). Any problem in the system quality may result in the withdrawal of consumer. This withdrawal may affect the consumer/user perceptions regarding ease of use and usefulness of the system perception of (Chang and Tung, 2008; Lee and Lee, 2008). The quality of technology and reliability of technology are important determinants of the effectiveness of learning (Piccoli, Ahmad, and Ives, 2001; Hiltz S. R., 1995; Hiltz S. R., 1994). Wang and Xiao (2009) reported that services quality and system quality have a significantly positive impact on perceived ease of use and perceived usefulness (Calisir, Gumussoy, Bayraktaroglu, & Karaali, 2014). The higher the quality of technology, the higher would be learning effects (Piccoli, Ahmad, & Ives, 2001; Webster & Hackley, 1997). Based on previous grounding, it can be proposed that:

H1: There is significant and positive impact of technology quality on consumer’s perceived ease of use.

H2: There is significant and positive impact of technology quality on consumer’s perceived usefulness.

Perceived ease of use & Perceived usefulness

Perceived ease-of-use (PEOU) is the degree to which a person believes that using a particular system would be free from effort (Davis F. D., 1989). Theory of reasoned action (TRA) argued that behaviors are controlled by cognitive factors which can be measured by predicting behavioral intentions. Moreover, Technology acceptance model (TAM) postulates that individual’s intention to use technology is determined by perceived ease of use and perceived usefulness (Davis F. D., 1989) and are considered as fundamental determinants of user acceptance (Adams, Nelson, and Todd, 1992; Sun, Tsai, Finger, Chen, and Yeh, 2008; Arbaugh J. B., 2002). Davis, Bagozzi and Warshaw (1989) identified perceived usefulness as a most significant contributing factor of behavioral intentions. Perceived usefulness and ease of use have been applied consistently in marketing and IT areas to investigate new products or systems.

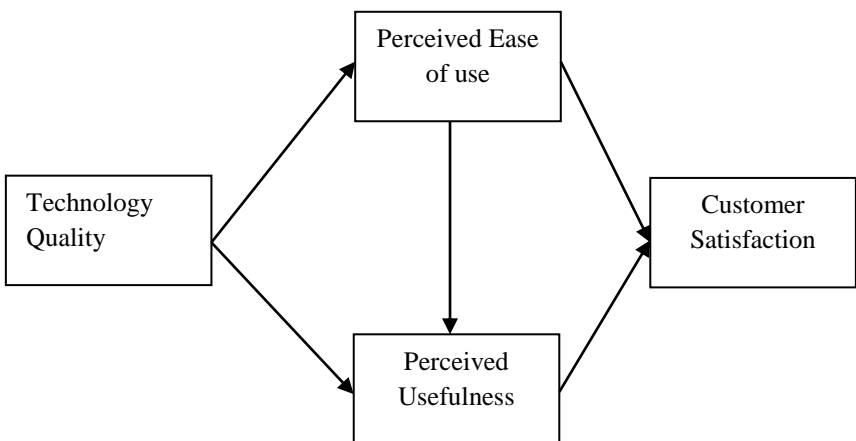
Particularly, improved consumer's perceived ease of use resulted in increased performance because it would generate a positive impact on perceived usefulness (Venkatesh & Davis, 2000). Prior marketing literature validates a significantly positive relationship between ease of use and perceived usefulness in online context (Bigné-Alcaniz, Ruiz-Mafé, Aldàs-Manzano, and Sanz-Blaz, 2008; Wu H.-C. , 2013). Arbaugh (2000) and Chiu, Chang, Cheng and Fang (2009) documented a significantly positive impact of perceived usefulness on satisfaction. Prior studies have also confirmed the positive relation between perceived ease of use and favourable attitude or satisfaction (Chang & Wang, 2008; Stoel & Lee, 2003), among individual's ease of use, perceive usefulness and intentions in the context of e-learning (Arbaugh & Duray, 2002; Pituch & Lee, 2006). Specifically, a consumer is more likely to develop satisfaction and have favourable intentions toward online experiences if it is perceived to be useful (Bhattacharjee, 2001). Consumers have favourable feeling of satisfaction with online experiences when it is perceived to be useful and easy to use (Devaraj, Fan, & Kohli, 2003; Pavlou, 2003). Extent of research has verified that ease of use and usefulness has a significant impact on satisfaction of consumers (Lin, 2008).

H3: There is significant and positive impact of consumer's perceived ease of use on perceived usefulness

H4: There is significant and positive impact of consumer's perceived ease of use on his/her satisfaction

H5: There is significant and positive impact of consumer's perceived ease of use on his/her satisfaction.

Theoretical Framework



Research Methodology

Data Collection and Measures

To identify the institutions offering education through e-learning, hybrid/ blended learning or distance education, all the HEIs, Universities and Territory Educational institutions were contacted through email. List of these institutions was drawn from the website of HEC (<http://www.hec.gov.pk/OurInstitutes/Pages/Default.aspx>). After evaluation, it was determined that presently only 3 universities are offering education through e-learning mode, namely; Allama Iqbal Open University (AIOU), Virtual University of Pakistan (VUP) and Virtual Campus of COMSAT (VCOMSAT). Accordingly, the students were considered as sampling unit and these universities were considered as population for the study.

For data collection, questionnaires were floated online among students of three universities i.e. VU, VCOMSAT, and VAIYOU as these universities have virtual education system for students. Sample size of 1338 complete questionnaires were received and included in study. Technology quality is first construct for which Amorosos and Cheney (1991) scale is used. This scale has four items (e.g. I feel the information technologies used in e-Learning are very easy to use).

Table 1. *Measurement scales*

Variables	Code	Authors(year)	items	Measurement Scale
Technology Quality	TINEQU	Amorosos & Cheney (1991)	4	1 = Strongly Agree, 5=Strongly
Perceived ease of use	TPEO	Arbaugh (2000)	4	1 = Strongly Agree, 5=Strongly
Perceived Usefulness	TPUF	Arbaugh (2000)	4	1 = Strongly Agree, 5=Strongly
Customer Satisfaction	TCSAT	Oliver (1997)	4	1 = Strongly Agree, 5=Strongly

Consumer’s perceived ease of use is second construct for which Arbaugh (2000) scale is used. This scale has four items (e.g. It would be easy for me to become skillful at using web-based learning systems). Consumer’s perceived usefulness is third construct and Arbaugh (2000) scale is used. This scale has four items (e.g. using web-based learning system would enhance my effectiveness in the program). Customer satisfaction is fourth construct and (Oliver, Rust, and Varki (1997) scale

is used. This scale also has four items (e.g. I am satisfied the fact that the content provided in e-learning part of the course is up to date).

Data Analysis and Result

Demographic Statistics

Data was collected from 1338 respondents. Out of these 1338 respondents, 500 were males and remaining 838 were females. Mode for gender was 2 with 0.48 standard deviation. Skewness and kurtosis were -0.53 and -1.73 for gender which represented normality of data.

Respondents were also asked about their age groups. Most of respondents (434 respondents) were from 25 to 30 years age group. Mean age was 3.06 with 1.36 standard deviation. Skewness and kurtosis were 1.07 and 1.34 for age which represented normality of data. Respondents were also inspected about their education level and most students have 16 year education. Mode for education was 3 with 0.93 standard deviation. Skewness and kurtosis were -0.07 and -0.91 for education which represented normality of data (table 2). Most of the students were from VU (866 students). Mode for university was 1 with 0.81 standard deviation. Skewness and kurtosis were 0.97 and 0.80 for university which represented normality of data.

Respondents were also inspected about study mode and most of respondents (695 students) were taking education at their homes. Mean for study mode was 1.63 with 0.73 standard deviation. Skewness and kurtosis were 0.70 and -0.85 for study mode which represented normality of data. Respondents were also asked about their degree/certificate which they earned. Most of respondents (495 students) have MBA/MSc/MA degree. Mean for degree was 2.04 with 1.00 standard deviation. Skewness and kurtosis were 0.92 and 0.73 for degree/certificate which represented normality of data.

Correlation Analysis

To find out relationship among study variables, correlation analysis was used. Results represented that perceived usefulness has strong positive relation with technology quality as $r = 0.70$. In the same way, perceived ease of use has strong relationship with customer satisfaction as $r = 0.82$. Mean values of study variables are from 2.11 to 2.17 and standard deviation is from 0.70 to 0.72. to check normality of data, skewness and kurtosis test was executed as results lies between -2 to +2 as per criteria (Table 3).

Table 2. Correlation and Descriptive Analysis of constructs

	1	2	3	4	M (S.D)	Skewness	Kurtosis
1. Technology Quality					2.13 (0.72)		0.16
2. Perceived Ease of Use	1				2.13 (0.70)	0.28	
3. Perceived Usefulness	.73	1			2.11 (0.71)	0.20	0.01

4. Customer Satisfaction	.70	.82	1	2.17 (0.72)	0.23	-0.04
	.70	.82	.77	1	0.33	0.33

** Correlation is significant at the 0.01 level (2-tailed).

Multicollinearity Test

Multicollinearity is also checked for studied variables with customer satisfaction. Due to the value of r among all variables is around 0.7, therefore, it is required to analyze this issue. Test results presented no issue of multicollinearity as tolerance and variance inflation factor (VIF) values are above 0.10 and below 10 respectively as per criteria (O’Brien, 2007).

Table 3. *Multicollinearity Analysis*

Variables	Collinearity Statistics	
	Tolerance	VIFactor
1. Technology Quality	0.44	2.28
2. Perceived Ease of use	0.28	3.61
3. Perceived Usefulness	0.30	3.35

¹. Customer Satisfaction (Dependent variable)

Structural Equation Modeling (SEM)

Testing of Measurement Model

Confirmatory factor analysis is carried out for measurement model. Factor loading (FL) and squared multiple correlation (SMC) values measured to check reliability of items and observed errors. If FL value is less than 0.50 with SMC value is less than 0.20 of an item then this item is excluded (Hu & Bentler, 1999).

First latent variable is technology quality and its items produced FL and SMC values among 0.75-0.90 and 0.57-0.81 respectively. Second latent variable is perceived ease of use and its items produced FL and SMC values among 0.83-0.89 and 0.68-0.79 respectively. Third latent variable is perceived usefulness and its items produced FL and SMC values among 0.83-0.91 and 0.68-0.82 respectively. Fourth latent variable is customer satisfaction and its items produced FL and SMC values among 0.76-0.92 and 0.58-0.84 respectively.

At end, goodness fit indices also examined for measurement model that represented satisfactory results i.e. CMIN/DF = 9.60; GFI = 0.92; AGFI = 0.88; CFI = 0.96; RMSEA = 0.08. Convergent validity also tested for measurement model (Fornell & Larcker, 1981). Satisfactory results are found for convergent validity i.e. internal consistency ranged among 0.80 and 0.93, composite reliability (CR) ranged among 0.80 and 0.92 and average variance extracted (AVE) ranged among 0.71 and 0.76. R² also tested and its values are explaining variability of responses around their means.

Table 4. *Convergent Validity Verification*

Latent Variables	R ²	SMC	St. FL	Alpha	CR	AVE
1.Technology Quality	0.50	0.57-0.81	0.75-0.90	0.90	0.91	0.71
2.Perceived Ease of Use	0.68	0.68-0.79	0.83-0.89	0.92	0.92	0.74
3.Perceived Usefulness	0.59	0.68-0.82	0.83-0.91	0.93	0.80	0.76
4.Customer Satisfaction	-	0.58-0.84	0.76-0.92	0.80	0.92	0.74

Testing of Structural Model

Structural model contained four latent variables and sixteen observed variables. Conceptual model contained one stimulus variable i.e. technology quality (TINEQU) which were stated as exogenous variable, two organism variables i.e. perceived ease of use (TCPEO) and perceived usefulness (TCPUF), and one response variables i.e. customer satisfaction (TCSAT) which was stated as endogenous variables.

Hypotheses Testing

The first hypothesis (H₁) demonstrates significant relationship exist technology quality and consumer perceived ease of use. Thus results of H₁ represented that standardized regression coefficient is 0.80 with p<0.00 which presented significant positive relationship and accepted this hypothesis. The results of hypothesis (H₂) represented that standardized regression coefficient is 0.15 with p<0.00 which presented significant positive relationship among technology quality and perceived usefulness. The results of hypothesis (H₃)represented that standardized regression coefficient is 0.77 with p<0.00 which presented significant positive relationship among perceived ease of use and perceived usefulness. The result of hypothesis (H₄)represented that standardized regression coefficient is 0.75 with p<0.00 which presented significant positive relationship among perceived ease of use and customer satisfaction. Similarly, the last hypothesis also demonstrates significant and positive relationship among perceived usefulness and customer satisfaction. Thus results of hypothesis (H₅)represented that standardized regression coefficient is 0.18 with p<0.00 which presented significant positive relationship among perceived usefulness and customer satisfaction.

For structural model, goodness of model fit indices were also examined which showed satisfactory results i.e. CMIN/DF = 9.77; GFI = 0.91; AGFI = 0.88; CFI = 0.96; RMSEA = 0.08.

Table 5. Hypotheses Summary

Hypotheses	Structural Paths	St. Reg. weights	Sig.	Result
H ₁	TINEQU → TCPEO	0.80	p<0.05	Confirmed
H ₂	TINEQU → TCPUF	0.15	p<0.05	Confirmed
H ₃	TCPEO → TCPUF	0.77	p<0.05	Confirmed
H ₄	TCPEO → TCSAT	0.75	P<0.05	Confirmed
H ₅	TCPUF → TCSAT	0.18	p<0.05	Confirmed

Discussion

It was assumed that the technology of the quality would have significant and positive impact on the perceived ease of use and

perceived usefulness of e-learning. Results of this study indicate that the technology quality is a powerful predictor of ease of use and perceived usefulness of the e-learning. These results support the findings of the previous studies (Chang & Tung, 2008; Lee & Lee, 2008; Wang & Xiao, 2009) where it was concluded that consumers perceive a high quality e-learning system to be useful with respect to their needs and they also consider a high quality technology easy to use (Calisir, Gumussoy, Bayraktaroglu, & Karaali, 2014).

Study results also indicate that e-learning systems that are considered easy to be used are the ones which actually provide utility. A complex system will not be able to deliver its core purposes as far as e-learning is concerned. Study results compliment previous studies where researches argue that improved ease of use resulted in increased performance as well as it would generate a positive impact on perceived usefulness (Venkatesh & Davis, 2000). Prior marketing literature validates a significantly positive relationship between ease of use and perceived usefulness in online context (Bigné-Alcaniz, Ruiz-Mafé, Aldàs-Manzano, and Sanz-Blaz, 2008); Wu H.-C. , 2013).

Study results indicate that perceived ease of use and perceived usefulness have a significant impact on customer satisfaction. It can be inferred from the results that easy to use e-learning systems are of central importance in satisfying the customers. Findings support the long held understanding that individual's intention to use technology is determined by perceived ease of use and perceived usefulness (Davis, 1989). Similarly the results also indicate that perceived ease of use has a significant influence on customer satisfaction. The results imply that the customer would be satisfied if an e-learning system is useful. Consumers have favourable feeling of satisfaction with e-learning when it is perceived to be useful and easy to use (Devaraj, Fan and Kohli, 2002; Pavlou, 2003). When a customer is obtaining the required utility from a system then he/she would be satisfied. Chiu et al. (2009) also documented a significantly positive impact of perceived usefulness on satisfaction. Overall the study results indicate that a high quality easy to use e-learning system is of prime importance in creating customer satisfaction. A useful and relevant e-learning system is also of equal importance in satisfying the customers.

Limitations and Future Research

Several contributions in extent theory and practice notwithstanding, like every other study, limitations are inherent to this study as well. Foremost limitation of this study is the cross sectional design. Cross sectional design does not permit us to observe and predict the level of satisfaction consumer experience over time. A longitudinal design or experimental designs in particular are advised to be adopted for future research. Consumers of e-learning in educational sector in Pakistan are in large numbers because there are only three institutes in

Pakistan that are in this sector. Consumers from other sectors such as IT industry may also be included in future researches. Convenient sampling is criticized every now and then by researcher over its ability to generalize results. Probability sampling techniques are another opportunity for future researchers to achieve better generalizability. A larger sample size is also advised for achieving a greater level of understanding with e-learning in future. Consumers of other backgrounds such as government or private office workers, students etc. may also be included in future researchers. Other constructs from TAM, TAM 2 and UTAUT models can be incorporated in future researches along with other constructs that are used to better explain consumer's satisfaction in e-learning context. Also future studies can be conducted to explore the outcomes of e-learning satisfaction such as e-learning loyalty. Gender education interest in e-learning can be incorporated as controls to see the differences in level of satisfaction with respect to demographics. Other causal models may also be tested in future endeavors to test mediating influences on satisfaction with e-learning.

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