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Abstract

The expeditious headway in the information and communication technologies has given rise to a new dimension of education, that is, E-Learning. Survey was conducted to find out the impact of "Student", "Instructor", "Course", "Design" and "Technical" factors on student satisfaction. The result of the survey showed that the learner's and instructor's attitude towards EL, their computer efficacy, interface of learning portal, quality of course content and administrative support were main aspects which affected student EL satisfaction. [1]

Empirical Study of Learner Contentment Towards E-Learning: Influential Role of Key Factors

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1. Introduction

The use of information technology these days is considered as a solution for multinational organizations or educational institutions' for their quality issues. The new technology has transformed the learning and instructing method in universities. Online education is a kind of fascinating approach for higher education universities and also for colleges. Both levels can gain competitive advantages from this educational method (Poehlein, 1996). The incredible development of Internet as a prospective course deliverance dais, along with the escalating attention in quality learning and financial limitations, has formed a noteworthy inducement for universities to build up online educational programs. The user-friendly nature of new technology and its availability at wide area has enabled the universities to implement and use the new technology for the growth of educational industry. The universities which are not utilizing technological resource will be left behind in globalization race. Identification and clarification of factors that are main cause of user acceptance towards new technology are very important. It is not the case of implementing same conventional educational paradigm for new technological learning interface. The use of old and passive delivering methodology in universities is not acceptable anymore. In the presence of new technology, the use of old methods for delivering lectures will just escalate financial budgets of institutions (Volery & Lord, 2000). It can be possible that with the use of new technology in courses raises questions of pedagogical content aptness,

[1] My hearty gratitude for my parents, Waheed and Naseem, my sisters, Faiqa and Kokab, my brothers, Waseem and Kaleem, and to my friend Ghazala.

technical facility, student dissatisfaction and craze. On the other hand, proper implementation of new technology can lead towards succeeding uptake of implemented technology. In the era of 80s the use of website, online chat session and shared white boards for educational purposes were considered as the helping tools for successful acceptance of web-based learning (WBL) environment. But now it is proved that proper implementation of these and many other media tools for web-based education will increase its acceptance rate among students and teachers (Weller, Pegler, & Mason, 2005).

1980 was the era when the internet boom came; it was also the time when universities were considering developing web-based educational programs. With the passage of time student's perspective about using computers for educational purpose is changing drastically. The new innovations in networks and software have raised the questions of effectiveness and use of these innovations for educational purpose. The storm of technology has changed the educational landscape with the use of WBL (Willging & Johnson, 2004). The concept of distance education is very old and famous concept. The target audience of this concept was the students living in distant areas and unable to reach the campus due to geographical remoteness problem (Volery & Lord, 2000).

1.1. Electronic Learning

The concept of Electronic learning (EL) has changed the student's learning and teacher's instructing methods. This is the information age and EL has emerged as a new interactive environment. The efforts in the field of EL are receiving colossal interest around the globe. Use of new interactive technology for delivering lectures and training sessions relate with the notion of EL. The expeditious headway in the information and communication technologies has born a new way of education that is EL. The EL paradigm in current era is very essential for educational institutions. Students and instructors; who are using this interactive Electronic Learning environment (ELE), have the advantage of all time interaction with each other. Moreover, they have the flexibility of time and space in using this online environment (Katz, 2000; Katz, 2002; Trentin, 1997). The characteristics of EL are enough to compete with the modern educational society and that is the reason of EL demand from higher educational institutions and multinational organizations. The major example of EL implementation is Massachusetts Institute of Technology (MIT) well known university in USA. MIT is offering its programs both in face to face (F-F) and in online mode, and trying to convince other institutions about strategic significance of EL (Wu, Tsai,Chen, & Wu, 2006).

The concept of EL is not a new thing; it has been in use for decades. The development of EL technology is the most momentous evolvement of information and communication technologies (ICT) (Wang, 2003).In this information age EL has emerged as a new learning environment. Due to the tremendous growth in ICT, EL is growing as a new pattern to deliver information in the educational area and is receiving enormous attention around the globe.

The term EL is referred to methodology using any electronic media either intranet or hyper media documents. The term EL is not only well-known in developing countries but also very trendy in developed countries (Anderson, 2005). If we enter the word E Learning in search engine, there would be millions of hits against this word. The EL concept is depicted with several tantamount, like flexible internet environment, distributed computing, virtual learning environment and general distance learning etc. The use of different words is according to the context in which they are used (Davoud, 2006). Literature explains and defines the word of EL in many different ways. There are so many synonymous of EL like, open-courseware, advanced distributed learning (ADL), internet based learning (IBL), web-based learning (WBL), e-education (E-E), open-learning (OL), virtual education (VE), virtual learning environment (VLE) (Govindasamy, 2002). Implementing new paradigm for any sector is a very difficult and challenging, but with the use of Web Technologies and efficient utilization of ICT these challenges can be handled.
In educational scenario EL is for improving learning and instructing experiences and used as a tool to instruct learners without any instructor using any form of new digital medium or via taking advantage of any ICT source (Laurillard, 2004). For the purpose of enriching educational system higher education sector is seriously considering towards the implementation of online education (Arabasz & Baker, 2003).

The use of online education is now essential for higher education institutions and they are considering and accepting this fact in order to compete with other organizations and for meeting financial stability. The other reason of implementing this new learning paradigm in educational institutions by higher education officials is for enhancing

students learning experiences and for the improved learning outcomes and abilities. All the conventional universities should have a flexible institutional structure to integrate new technology in their setup for the better and improved learning outcomes (Al-Doub, Goodwin, & Al-Hunaiyyan, 2008).

There are two aspects of EL that are important for the strengthening of EL concept. The first aspect is total reliance on availability of technological resources and the other is personal learning thirst. These aspects can uptake EL effectiveness in a better form. The second aspect infers that the learner surmises responsibility for stipulating personal erudition desires, aims and upshot, arranging and systematizing the educational task, assessing its value and construct meaning from it. In online educational mode internet is the essential part. The availability of learning resources for students every time and at every place is very effective thing. The facilitation of exchange of information and mutual working between learners and academicians, the evaluation of single student or group of students, and the provision of directorial and learner support all of these are the positive advantages of EL. The anytime, anyplace, anywhere concept of online education is very useful for students in far away areas who can easily access course material (Volery & Lord, 2000).

1.2 Distance Education Vs Online Education

ICT is emerging as a new challenge for higher education institutions. The globalization trends, higher management and economy are strongly influenced by new technologies, and they have the potential to change the nature of learning environment, both in traditional and distance education institutions. The ICT has changed the educational trends in distance education system and emerged with new source of information delivery named EL. ICT as such can be referred to the new generation of distance education.

We cannot say that distance education is the same as ELearning or online education. According to Guri-Rosenblit (2005) there are three generations of distance education explained in his classic analysis. The correspondence teaching comes in first generation when students are able to interact with teachers directly without using any new technology. With the advancement in technology the concept of multimedia teaching emerged and it is referred as second generation. In this generation use of video tapes, audio recording and broadcast media is used for delivering lectures. The third generation is based on interactive EL methodology. These methodologies are used with different words, I-Camp, Tele-Matrics Environment, Computer Mediated Communication, Borderless Education, Interactive Communication, and Distributed Learning.

Most people confuse distance education with EL or online education. We can say that online education is the generation of distance education or this is the advanced technological form of distance education. There is a clear difference among distance education and EL. In distance education students are provided with study material and they have to study them self, there is not regular one-to one interaction with teacher; this can be referred as asynchronous medium. While in online case, there is online interactive session between learner and instructor, either regularly or on periodical basis. This medium is referred to synchronous way of delivery.

The enhanced form of distance education i.e EL; provides the facility of interactive online lectures and complete interaction between learner and instructor. Mostly users are resistant in using new technology like multimedia presentations, interactive sessions because of lack of computer efficacy and internet knowledge. This case is applied on developing countries where inadequate resource availability creates hurdles in using new technology. On the other hand, in developed countries like United States of America, where there is enough resources availability and mostly education is delivered via internet (Guri-Rosenblit, 2005).

2. Literature Review

In 1980s the need was felt to explore the factors that are important for the success and growth of organizations. It was the time when significance of influencing factors in the EL area was first considered by the organizations and included in the body of literature. Organizations were keen to know about the key areas which could be enhanced and would provide competitive achievement, comparing with other organizations (Ingram, Biermann, Cannon, Neil, & Waddle, 2000).

2.1. Prior Studies of EL

A study was conducted in West Texas A&M university on 15 MBA graduate courses offered in a span of three years. The courses were offered, both in face to face and in online environment. The same teachers were teaching in both environments. It was noticed that student enrollment in online education system was high as compared to the conventional face to face system. However, the attrition was also high in online system (Willging & Johnson, 2004).

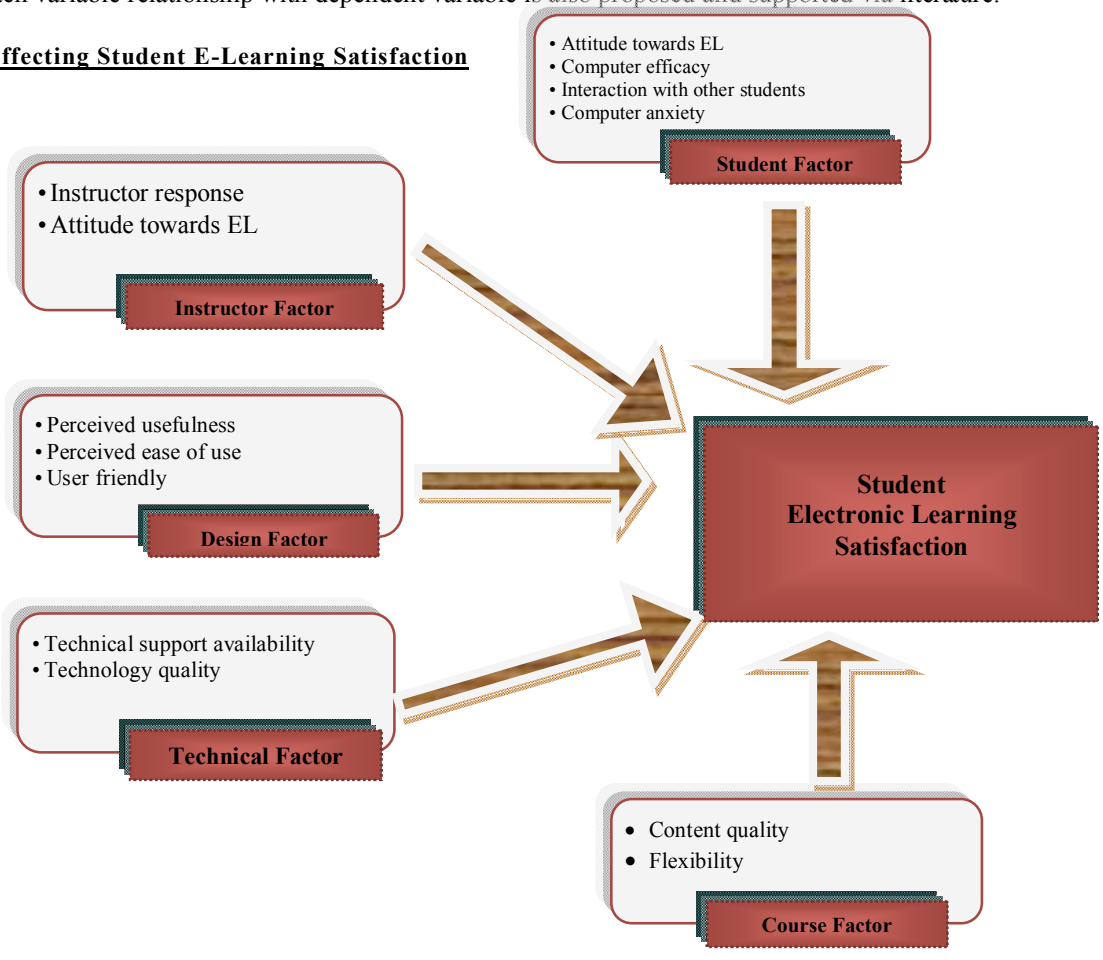
Being based on an empiric study involving university students Volery (2000) had suggested a framework which appeared in outlines for the critical success factors in the on-line education, concentrating on three aspects in the EL. You connect technology (comfort of use and navigation, design and height of the dealings); the teacher (setting towards students, teacher technological capability and classroom dealings); and the prior use of the technology or student earlier computer familiarity (Volery, 2000).

Soong, Chan, Chua and Loah (2001) had conducted several case studies and at last established that the EL vital success agents were: human factor, technological ability of both teacher and learner, EL approach of the student as well as teacher, echelon of the relationship, teamwork and communication. Seven important success factors for the successful implementation of EL environment were discussed by Govindasamy (2002) those were: institutional support, course improvement, instructing method & learning, course formation, learner support, faculty support, assessment and consideration. Selim (2007) had conducted a study and proved that there were eight agents that were responsible for the success of EL environment. Selim concluded that according to the student's perspective there were three areas required for successful web-based learning: trainer factor (approach towards and command of technology and instructing style), learner characteristics (computer proficiency, interactive teamwork, EL course material and interface) technology (alleviation of access and technical facilities) and support.

Theoretical Framework

To accomplish this study, a theoretical model is designed based on the previous research. In total, six variables are discussed; five are independent variables, namely, student factor, instructor factor, course factor, design and technical factor. The student satisfaction is discussed as a dependent variable. In later section hypotheses for testing each variable relationship with dependent variable is also proposed and supported via literature.

Factor Effecting Student E-Learning Satisfaction



2.2. Variable and Hypothesis

As shown in the theoretical model, there are five independent variables and one dependent variable. Each variable is considered as a separate factor that is influencing student's EL satisfaction which is my dependent variable. There are five factors which are responsible for student satisfaction towards online education. Each factor has its own sub attributes or qualities that are collectively affecting dependent variable. Each variable's sub-attribute is discussed. In total five hypotheses are proposed to prove the relationship of each variable separately with dependent variable.

Student Factor. The first factor is the student himself. Satisfaction of student from EL or online education is based on the student's attitude towards information and communication technologies (Arbaugh, 2002; Arbaugh & Duray, 2002). If the student has positive perspective about EL, then he would definitely participate in an online course environment effectively. EL needs student proficiency in computers. The results will be quite effective when student shows positive attitude towards computers (Piccoli et al., 2001).

For scheming successful EL surroundings, Liaw (2003) indicated three considerations: Student's individuality, instructor's way of coaching and dealings. Considering the target population in establishing ELE is very important. It is obvious that the target population in ELE is the learners. First, beginner's qualities, like settings, motivation, faith, and trust must be identified. As for educational structure, the multimedia coaching method allows students to build up multifaceted perceptive skills, such as comprehending essential fundamentals of conceptual intricacy, capability to use obtained thoughts for analysis and presumption and capability to implement conceptual understanding to novel circumstances with suppleness. Finally, EL surroundings offer group communication, like beginner to beginners, or beginners to teachers. Group communication is a sort of mutual wisdom that facilitates learners to step forward through their region of proximal progress by the actions in which they are employed. When students boost their relations with coach and other students, they in turn lift up their probability of constructing their own understanding for the reason that much of learning certainly takes place inside a societal circumstance, and the course consists of the shared building of understanding (Liaw, Huang, & Chen, 2007).

We can't refer computer efficacy as simple efficacy, because it is a different type of efficacy. To define computer self- efficacy, wood and Bandura (1989) had explained the meaning in one simple sentence, belief in one's ability to ''mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands''. So it is clear from previous definition that it is thinking and ability of a person to use the computer in his own manner. Bandura (1986) said that this thinking leaves strong impact on the selection of behaviors, the amount of endeavor used for that purpose and the determination to fulfill that job. As a result the individuals who are less confident about their computer efficacy and determination to seek the work goal are not able to perform the task in a proper manner.

Satisfaction of student from EL is very much influenced from computer anxiety (Piccoli et al., 2001). In ELE, computer is the main part and the student who is reluctant in using computer and feels anxiety will definitely negatively influence student satisfaction. The term computer anxiety mostly refers to the fear of computer, when individual keeps thinking that he can not work on computer and the probability of accomplishing the task on computer is less (Chua, Chen, & Wong, 1999). Computer anxiety is not the same as computer attitude towards computer. One must not confuse this concept that an individual's personal's emotional reaction towards using computer and attitude towards computer is the same. According to Kanfer and Heggestad (1997), when a participant has negative feeling along with the high computer anxiety then the result of task performance must be very poor. When a person is feeling anxiety to work in particular IT environment then obviously his satisfaction with that environment will be less. The computer self-efficacy is comprised of four main beliefs: the prior experience in the field of computers, general observation on the basis of other's experience, the know-how of terminologies used in IT industry and at last the positive arousal to use and understand the computer system. Therefore, these four main factors are the cause of increasing or decreasing computer anxiety. According to the context explained above about computer anxiety and computer efficacy, there is a strong association between computer self-efficacy and computer anxiety and the behaviors related with computers (Barbeite & Weiss, 2004). All of the above discussed attributes i.e. student's attitude towards EL, learner computer efficacy and anxiety and interaction among students are included in student factor variable. On the basis of these attributes hypothesis 1 is proposed which says,

Hypothesis 1. Student factor is positively related to students' Electronic Learning satisfaction.

Instructor Factors. The instructor is the second factor that is contributing towards students' satisfaction of EL. The successful implementation of online education is purely based on the teacher's attitude towards EL. Attitude towards Information and communication technologies is not the only factor that is influencing successful EL implementation. It's the teacher who plays a vital role; his way of instruction affects the student's attitude towards course and readings (Collis, 1995; Willis, 1994). Mostly, the students' satisfaction and acceptance of online education is influenced by the teacher's teaching style, his attitude towards delivering lectures in friendly manner, and providing quality content (Webster & Hackley, 1997). The behavior of instructor is shown through his dealings and approach and these attitudes can have significant impact on the learner's attitude towards EL environment (Piccoli et al., 2001).

In a study by Volery and Lord (2000) it has been shown that instructor friendly behavior with students, understandability of students' problems, proper understanding of IT, and persuasion of interaction between students is the factors that lead towards students' satisfaction. Liaw, Huang, and Chen (2007) explains that when teachers are more interested in the use of new EL technology then it is obvious that they have more constructive behavioral intent to use that. If the individuals have positive attitude towards using new technology then the implementation and success of new technology is not a big issue.

It's not the issue of technology implementation, it's the teacher instruction method that plays a vital role in the successful implementation of EL technology and also affects learners' satisfaction in this new environment (Collis, 1995; Volery & Lord, 2000). The effectiveness of online system is strongly based on the instructor's attitude, dealings with students and perception about new technology and all of these attributes are tapped in one instructor variable.

Hypothesis 2: Instructor factor influence positively on students' Electronic Learning satisfaction.

Course Factors. Course is the third factor affecting student's satisfaction. EL has removed the barrier of physical class attendance. The most attractive feature of EL according to students and teachers, both is its flexibility of location and time. Commuting was the main problem for students in traditional classes. EL came with new virtual (any where, any time, any place) class concept (Arbaugh, 2000). This is more attractive for the people who are on job and want to continue their education. The flexible nature of ELE increases learner's satisfaction (Arbaugh & Duray, 2002).

The flexible nature of the course helps the group of students to interact with each other from different and distant parts of the country. The relational intimacy becomes more in online environment as compared to face to face learning. Time independence and flexibility in the course helps the students to communicate according to their flexible time and place. It is also noted that the range of the faculty, speakers and students is becoming vast day by day due to avoiding the time and place barriers. The major advantage of the flexibility of the course is for the students who want to get higher education but in previous times, was not able to pursue. Now the course flexibility has made the impossible dream of competent students a real happening (Arbaugh, 2002).

When considering implementation of any new environment, the level of quality comes first. Quality of course content is the most important attribute that leads towards student's satisfaction and successful implementation of EL. The quality of well-made EL course contents is the most important and essential factor especially for the students who want to learn something from the course instead of getting degree only. Quality of course content makes a very strong influence on the satisfaction level of students who are studying in EL environment and also for the students who are encouraged to take this mode of study. The multimedia presentations, the new advancement of information and communication technologies make a constructive learning model for the students. The uniqueness of virtual learning environment includes, the online discussion forums, chat sessions among learners and instructors, presentations of course material and other useful material from the universities covering that particular topic, all of these characteristics motivate the students to continue using this learning environment (Piccoli et al., 2001). The course flexibility and content quality are the two attributes of course factor and thus hypothesized as,

Hypothesis 3: Course factor is positively related to students' Electronic Learning satisfaction.

Design Factors. The fifth factor is the design or interface of web-portal. Interface of the EL system

significantly influences student's satisfaction of EL. Students' adoption of EL system is influenced by PU and PEOU. The user friendly interface of the online course will affect student's satisfaction. The easy going interface of online course will attract the student to take class via internet, when he already has the time and place flexibility. The student's positive attitude towards interface of the online environment will automatically increase the chances of taking classes via internet in future. The result of user friendly interface will directly influence student's satisfaction of EL. Apart from all other factors in EL environment, interface quality or design of the online portal is very decisive factor. Moving back in the literature shows that the interface design is related with two aspects for which highly technical and creative skills are needed. There is a strong fusion between these two extremes and these skills have the important scopes like user-friendly navigations; look and feel of interface and functionality of portal (Volery & Lord, 2000). There are students who want to use online mode for their studies but they report that the quality and interface of the online portal is not very easy to use and efficient, like a sample response from respondent; I want to take the classes in online mode but the interface of the online portal was very unproductive and ineffective. Moreover, the online course material was not that much useful. Another response from a student; in my opinion, class was very useful and knowledge seeking but the navigations was not user-friendly (Lord, 2000).

Davis (1989) had also perceived in his study that the efficient utilization of technology made the attitude of learner or individual more positive. The thinking of an individual that a particular technology use could give him benefit at some level, then his performance regarding using that technology were enhanced. If a new technology is easy to use and gives positive results then obviously the probability of success is more. The PU and PEOU are two behavioral intentions of an individual that have strong influence on the satisfaction level and student's attitude towards EL. Design and interface of EL system, PU and PEOU are the attributes included in design factor and hypothesis is proposed.

Hypothesis 4: Electronic Learning satisfaction of students is positively influenced by design factor.

Technical Factors. Quality of the system that includes proper maintenance of software and hardware recourses plays an essential role in the satisfaction of students of EL. The worth of the system settles excellence of information and system, these concepts are essential for the victory of information system in this global world (DeLone & McLean, 1992). The important technical aspects that need to be considered for successful EL environment are the quality, media richness and reliability of technology. The quality of internet is essential for both the synchronous and asynchronous delivery system along with the access of material any time with any server problem. The students with unavailability of computer or internet access feel reluctance, like a response from student that's; it's hard for me to find computer for taking classes, therefore I feel that I can't study on computer. The irritation with technological problems may also be disguising more basic foundation of frustration. When proper assistance is available for the use of ELE, the reluctance level will become low. Proper availability of technical resource and administrative support positively influence student's satisfaction towards ELE (Liaw, Huang, & Chen, 2007).

Attributes of technical factor are better quality of internet, proper availability of technical assistance and quality of online program; on the basis of these attributes hypothesis is proposed,

Hypothesis 5: Technical factor is positively related to students' EL satisfaction.

3. Research Methodology

The procedure of collecting data, the targeted population and focused sample is discussed. To find the results of hypotheses multiple linear regression is applied.

3.1. Data Collection and Sample

Quantitative research technique has been used in this study. Survey was conducted to collect primary data and to prove the hypotheses. Questioner was used as an instrument for data collection.

Population. The population of this study was the students, but specifically the students who were enrolled in the online learning courses. As this study was measuring the graduate and master level student's satisfaction that was enrolled in online learning environment, so only the specific online students were contacted to fill the questionnaires.

The sample was taken from the students of three semesters; who were enrolled in spring 2008, autumn, 2008 and spring 2009 sessions. The targeted area for conducting research was Allama Iqbal Open University. The completed received questionnaires were 350, but from 350, 276 questionnaires were filled correctly. There were four departments (Management science department, English department, Computer department, French, PGD (Post Graduate Diploma)) in university that were completely utilizing the online learning facility, while a program of PGD was also offered by computer department in online mode. The final N=276 sample size comprise of the students who had filled the forms voluntarily. The web survey in the form of questioner is available in Appendix for reference and giving the idea of questions asked from students.

Instrument. Questioner was used as a survey instrument. All the respondents were asked to mark only one option from Likert scales. The female respondents of the survey sample was 30 % (N=83) from the total sample, while the male respondents from the total sample was 70 % (N= 193). For each variable there was different number of items, and all were measured on 5 point Likert scale.

Measures

All the items were measured on five-point likert scale. The 1 is referring to strongly agree, 2 is used for agree, 3 is showing neutral response, disagreement of students was measured at 4 scale and at last strong disagreement was measured at 5. All the measures were extracted from reliable source and reliability of each variable item is also measured and explained in Table 1.

Table 1. Reliability Statistics scale Extraction

Variables	Cronbach's Alpha	N of Items	Scale Extracted From
Student satisfaction	.705	3	Arbaugh (2000)
Student factor	.807	10	Webster and Hackley (1997)
Instructor factor	.710	5	Volery and Lord (2000)
Design Factor	.731	4	Arbaugh (2000).
Course factor	.743	5	Soong, Chan, Chua, and Loh (2001)
Technical Factors	.684	4	Amoroso and Cheney (1991)

3.2. Control variables

To check the impact of demographic variables on dependent variable one-way ANOVA was applied. There were five demographic variables. Table 2 is showing their significance level.

Table 2. Significance value of Demographic variable

Demographic Variables	Sig.
Gender	.966
Age	.798
Program Enrolled	.709
Student Initial Computer Skills	.000
Student experience of E-Learning environment	.000

After applying one-way ANOVA the variable with P value less or more then .05 or .01 was showing its significance level. Dummy variables are created for student initial computer skills and Student experience of ELE. At the stage of data analysis, these dummy variables were used with independent variables. In this study SPSS version 15 was used for the arithmetic analysis of data. (SPSS) is well-known and authenticated software used for testing the collected

data from different scenarios by statistician and researchers. Data is examined using proper regression analysis steps. Total of 11 variables were used, Student EL satisfaction as dependent and all the other were used as independent variable.

4. Results

4.1. Descriptive Statistics and Bivariate Correlation

The Table 3 in Appendix shows the descriptive statistics of all the demographic and interaction variables. The descriptive statistics shows the mean, Standard deviation for each variable. Table is also showing the correlation between independent and dependent variable separately. The correlation result shows the accepting or rejecting of hypothesis.

4.2 Regression Analysis

In order to find the effects mentioned in each hypothesis concerning the student EL satisfaction, multiple linear regression was applied via using the interaction and dummy variables. Table4. Regression Analysis in Appendix

Hypothesis 1. Student factor is positively related to students' Electronic Learning satisfaction.

The results of the regression analysis revealed that student factor was significantly associated with the student EL satisfaction (β= .41, p<.001) and shows the high significance level. Student factor was accounted for 4.7% variance (ΔR2 = .047) in student EL satisfaction. The results of regression for student factor was strongly supporting the first hypothesis, in which the strong positive influence of computer efficacy, interaction among students, their level of anxiety and attitude towards EL on student's EL satisfaction was found.

Hypothesis 2: Instructor factor influence positively on students' Electronic Learning satisfaction.

The combine effect shows the positive relationship between instructor factor and student EL satisfaction (β= .31, p<.001). The significant level was also high in this relation and 4% (ΔR^2 = .04) variance was found in student EL satisfaction. Hence it was proved that the relation among instructor factor/independent variable (attitude towards EL, timely response) and student EL satisfaction was very strong and positive as it was hypothesized.

Hypothesis 3: Course factor is positively related to students' Electronic Learning satisfaction.

The favorable association was found between course factors and EL satisfaction of student (β= .32, p<.001), moreover the significance level was also high. Course factor explained 4% (ΔR^2 = .04) variance in student EL satisfaction. Hence the course factors that includes, content quality and course flexible nature were positively related to the dependent variable (EL satisfaction of student) and providing a solid support to hypothesis.

Hypothesis 4: Electronic Learning satisfaction of students is positively influenced by design factor.

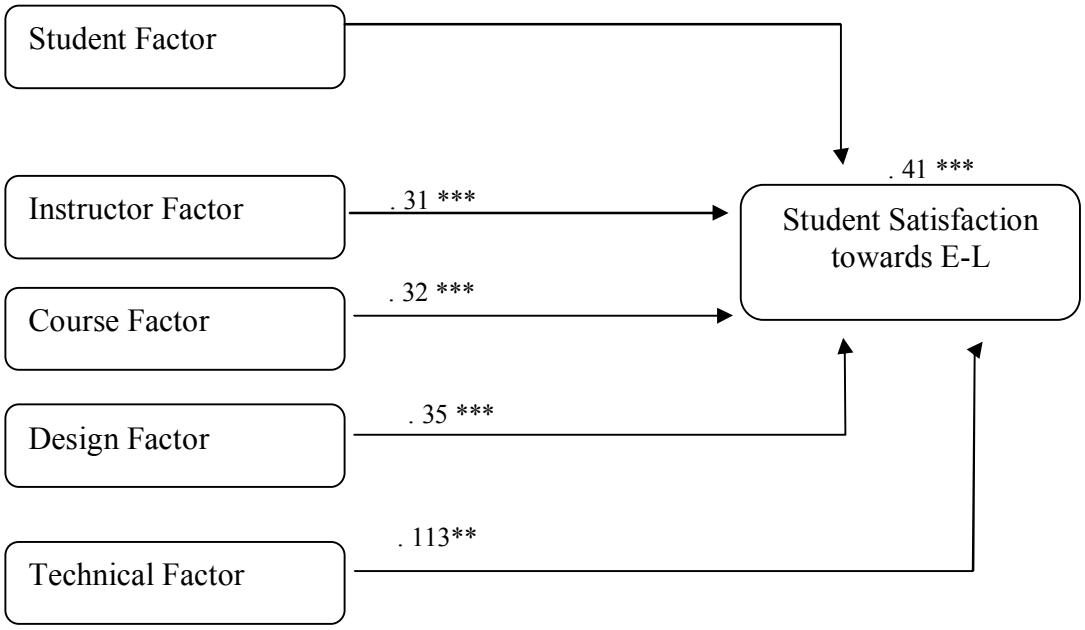
The positive relationship among dependent and independent variable (β= .35, p<.001) was encountered in regression results. Course factor had incremental 5% (ΔR2 = .05) variance in student EL satisfaction. Hence the design factor with user friendly, perceived ease of use and perceived usefulness attributes were showing the significant impact on student EL satisfaction. The results were fully supporting the hypothesis.

Hypothesis 5: Technical factor is positively related to students' EL satisfaction.

There was positive relation between technical factor and student EL satisfaction (β= .113, p<.01) with the 0% (ΔR2 = .006) incremental variance in student EL satisfaction. The significance level was at moderate level.

4.3. Theoretical Model after Regression

The theoretical model after applying multiple linear regression showing the results.



The regression results were supporting the hypothesis but in comparison with the student, course, design, instructor factor, technical factor results were less significant.

Implications and Limitations

Though a vigilant and systematic endeavor has been made to integrate essentials of EL, but we cannot deny the presence of limitations. I tried my best to tap all the main factors that were influencing student satisfaction and proposed an incorporated research model, but it, possibly not be the inclusive due to the time and recourses limitation. The major limitation was about the population who was using EL for their education.

Conclusion

The implementation of web-based learning environment is very useful for students and teachers. Both, the time and money, can be saved by implementing new technologies. The implementation cost for once is not comparable with the student's learning demands. The implementation of virtual learning environment can provide many benefits to students. Students can learn more from new environment and without restrictions of class boundaries.

The results of this study are highly significant and all hypotheses are supportive. Five independent variables have been measured i.e student factor, instructor factor, design factor, course factor and technical factor and the results show that all of these factors are strongly influencing on the dependent variable (student satisfaction towards EL)

The results of this study can be useful for the educational institutions before implementing EL environment. Administration should consider the factors that have been pointed out in this study, for successful implementation.

Appendix

Table 3. Correlation Matrix

		Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1	Gender	.70	.459	1										
2	Age	1.62	.707	.035	1									
3	Program Enrolled	2.01	.928	.14*	-.06	1								
4	Student Initial Computer Skills	1.89	.733	.06	.006	-.025	1							
5	E-L Experience	1.56	.753	.035	-.129*	.038	.225**	1						
6	Student Factor	2.03	.598	-.029	.059	-.064	-.382**	-.459**	(.807)					
7	Instructor Factor	1.84	.697	-.01	.048	-.093	-.445**	-.525**	.763**	(.710)				
8	Course Factor	1.84	.697	-.01	.048	-.093	-.45**	-.53**	.762**	1.00**	(.743)			
9	Design Factor	1.76	.670	-.002	.004	-.127*	-.341**	-.473**	.678**	.85**	.85**	(.731)		
10	Technical Factor	1.77	.594	-.022	.069	-.069	-.328**	-.464**	.841**	.709**	.709**	.601**	(.684)	
11	Student EL Satisfaction	1.83	.729	-.003	.025	-.042	-.124*	-.403**	.787**	.682**	.685**	.743**	.627**	(.705)

* Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed).

Reliabilities (Cronbach's α depicted in parenthesis)

Table 4. Regression Analysis

	B	**R^2**	**ΔR^2**
Step 1:			
Controls		.71	
Step 2:			
Student Factor	.41 ***	.76	.05
Instructor Factor	.31***	.75	.04
Course Factor	.32***	.76	.04
Design Factor	.35***	.77	.05
Technical Factor	.113**	.7	.006

QUESTIONNAIRE

The purpose of this survey is to find the factors affecting student satisfaction towards E-Learning in Allama Iqbal Open University. Please take a moment to fill-out the relevant fields.

Gender	☐ Male ☐ Female
Age	☐ 20-30 ☐ 31-40 ☐ 41-50
Program Enrolled	_____ Roll #: _____ Reg # : _____
Student Initial Computer Skills	☐ Beginner ☐ Intermediate ☐ Expert
Student experience of E-Learning environment	☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ More then 4

Student factor	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
1. Working with computers is not very complicated and difficult.	1	2	3	4	5
2. There is no need of extra technical ability when doing work on computer	1	2	3	4	5
3. Working with computer makes a person more productive.	1	2	3	4	5
4. I get nervous when I am working on computer.	1	2	3	4	5
5. I can easily run any internet program	1	2	3	4	5
6. I can download any material from internet easily	1	2	3	4	5
7. I can use any search engine (yahoo, Google, AltaVista) efficiently and can search for any topic easily.	1	2	3	4	5
8. Student-to-student interaction was easy in online course environment.	1	2	3	4	5
9. I learned more from my fellow students in this online class.	1	2	3	4	5
10. I felt that the quality of class discussions was high throughout the course	1	2	3	4	5
Teacher Factor	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
11. I received comments on assignments or examinations for course in a timely manner.	1	2	3	4	5
12. Instructor was enthusiastic about teaching the online class	1	2	3	4	5
13. Instructor handled the Web technology effectively	1	2	3	4	5
14. Instructor explained how to use the Website	1	2	3	4	5
15. We were encouraged to participate in class	1	2	3	4	5
Course Factor	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
16. I can give time to other activities also, when I am taking class via internet.	1	2	3	4	5
17. I can take class anywhere, without going to the class that saves a lot of time.	1	2	3	4	5
18. Conducting the course via the Internet improved the quality of the course compared to other courses.	1	2	3	4	5
19. I feel the quality of the course I took was not largely affected by conducting it via the Internet.	1	2	3	4	5
20. The e-learning system provides up-to-date and useful content	1	2	3	4	5
21. The e-learning system provides sufficient content	1	2	3	4	5
Technical Factor	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
22. Technology used in E-Learning is easy to use	1	2	3	4	5
23. The online portal has many useful functions	1	2	3	4	5
24. I am satisfied with the speed of internet	1	2	3	4	5
25. Technical support is available most of the time	1	2	3	4	5
Design Factor	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
26. Using built-in help facility for e-learning environment I can complete my job easily.	1	2	3	4	5
27. I found web-based learning system useful in the program	1	2	3	4	5
28. Using web-based learning system in the program has enhanced my productivity	1	2	3	4	5
29. It was easy for me to become skillful at using e-learning environment.	1	2	3	4	5
30. Learning to operate e-learning environment was easy for me.	1	2	3	4	5
Student E-Learning Satisfaction	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
29. I am satisfied with my decision to take the course via the Internet	1	2	3	4	5
30. If I had an opportunity to take another course via the Internet, I would gladly do so	1	2	3	4	5
31. I was very satisfied with the course.	1	2	3	4	5
32. I feel that this course served my needs well	1	2	3	4	5
33. I was satisfied with the way this course worked out	1	2	3	4	5

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