

PERCEIVED EFFECTIVENESS OF E-LEARNING SYSTEM IN PAKISTAN: INSIGHTS FROM STUDENTS, TEACHERS, AND ICT SUPPORT STAFFAbdul Khalique^{*1}, Moomal Havi², Attia Agha³, Syeda Hira Fatima Naqvi⁴, Jamil Ahmed⁵¹M.Phil in Computer Science, Institute of Mathematics & Computer Science, University of Sindh, Jamshoro, Pakistan²Assistant Professor, Computer Science Department, Government Zubaida Girls College, Hyderabad, Pakistan^{3,5}Ph.D. in Computer Science, Institute of Mathematics & Computer Science, University of Sindh, Jamshoro, Pakistan⁴Assistant Professor, Institute of Mathematics & Computer Science, University of Sindh, Jamshoro, Pakistan¹gadani.khaliq@gmail.com, ²awaismoomal1@gmail.com, ³attiaagha017@gmail.com,⁴hira.naqvi@usindh.edu.pk, ⁵jamilmurad21@gmail.comDOI: <https://doi.org/10.5281/zenodo.19907706>**Keywords**

e-learning, e-learning in Pakistan, effectiveness of e-learning, students' perception of e-learning effectiveness, teachers' perception of e-learning effectiveness.

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Abdul Khalique**Abstract**

This study aimed to examine the effectiveness of e-learning systems in Pakistan from the perspectives of instructors, learners, and ICT support staff. The study adopted a quantitative cross-sectional research methodology using a survey method to collect responses from students, teachers, and ICT support staff in urban areas of Sindh, Pakistan. The study acquired participants' perception of DeLone and McLean Information Systems Success Model dimensions of System quality, information quality, service quality, system use, user satisfaction, net benefits, and additional factors of student training, teacher training, and native language. The study identified student and teacher training, and native language in e-learning as important factors in effective e-learning implementation. Further, results revealed positive perceptions of users regarding all major constructs of e-learning effectiveness, including System Quality, Information Quality, Service Quality, User Satisfaction, and Net Benefits. The study recommends systematic and continuous training programs for teachers and students, and the incorporation of native languages for the effective use of e-learning systems.

Introduction

E-Learning is a method that improves teaching and learning, facilitates effective communication among learners and teachers, content delivery, and work submissions (Stephen Cysewski, n.d.). E-learning is a learner-centered method that is used by education departments to make learning new paradigms or hard topics much easier. Along with the benefits of cost and time savings (Elkaseh et al., 2015), it also encourages students to stay engaged in the process of learning through multimedia ("Top 5

Benefits of Multimedia in ELearning," n.d.). Further, visual learning is more successful, and the knowledge gained through multimedia is retained in the memory for a longer period of time than typical classroom lectures.

E-Learning Modes

i) Synchronous Learning:

Synchronous learning mode is also known as a real-time learning method. This style of learning requires the student to listen and answer in real-time as the instructions are delivered. This method can be used when both the teacher and

the student have a high-speed internet connection and access to energy.

ii) Asynchronous learning:

When learners are unable to view live streaming video lectures due to a lack of a fast internet connection or a power outage, this location and time-independent method is used. This may be an appropriate form of e-learning in underdeveloped nations, such as Pakistan, due to the lack of fast internet and a lack of electricity (Hafsa Mushtaq & Mujahid Shah, 2023).

Problem statement:

The closure of educational institutions during the COVID-19 epidemic may have negative effects on students' performance, including disrupted learning, as a result of depriving learners of the opportunity for growth and development (Mazrekaj & De Witte, 2024). Natural disasters like floods also have a negative impact on schooling. Online learning methods can be used to solve this issue.

Aim & objective

- To explore users' perception of e-learning effectiveness in Pakistan.

Literature Review

E-learning takes several forms, including online learning, remote learning, blended learning (a combination of online and classroom learning), synchronous learning, and asynchronous learning. "Using electronic equipment for learning, including lesson delivery via electronic platforms such as the World Wide Web, audio/video, satellite broadcasting, interactive television, CD-ROM, and so on. The use of multimedia equipment and the World Wide Web can enhance the quality of learning by expanding the reach to services and resources. It also aids in distant exchange and collaboration. E-learning is defined as a type of learning that uses technology and interactive information to engage students. It entails online contact between learners, instructors, and classmates.

In Pakistan, organizations like Allama Iqbal Open University and Virtual University have been providing online education for a long time; along with these, Preston University, COMSATS University, and University of Peshawar are currently offering e-learning programs.

e-learning from the perspective of Pakistan:

Inadequate or nonexistent institutional and technological infrastructure, computer literacy, poor English proficiency, inadequate teacher preparation, and a decline in student-teacher interaction have all been noted as the major obstacles to the successful implementation of e-learning systems. Other challenges include student evaluation, security and privacy, computer access, in-person interaction, and resistance to change and inadequate funding from the government (Almaiah et al., 2020).

eLearning users' problems also include lack of user training, lack of technological awareness, underestimation, lack of technical and administrative end-user help, and unwillingness to change." Their primary concern was user pleasure. Additionally, by examining the experiences of higher educational institutes in developing nations and Pakistan (Ghulam Muhammad Kundi et al., 2010). Other problems in implementing E-learning in Higher Educational Institutions include a lack of user perception, ineffective user training, digital divide, lack of technical support, and borrowed e-learning models. Access to e-learning resources, usage issues, and a lack of technological knowledge have been identified as obstacles in e-learning systems (Shahid Farid et al., 2014).

Research gap

In Pakistan, little research has been conducted on e-learning systems and the DeLone and McLean Information Systems Success Model. Improving information quality, service quality, and system quality is necessary to increase user satisfaction and usage.

One of the main issues with e-learning implementation Teachers in underdeveloped nations lack the necessary training to operate e-learning platforms. For this reason, this research incorporates teacher and student training into the service quality characteristics. It suggests that prior to the implementation of an e-learning system, teacher and student training is crucial. It will raise the caliber of services.

Additionally, we are not fluent in English. In order to ensure that the content is in local languages, the study included a native language construct in information quality.

RESEARCH METHODOLOGY

The study adopted a quantitative research design using a survey method. The nature of the research is explanatory. quantitative research design using a survey method, using responses from respondents on a 5-point Likert scale questionnaire.

Population, Sampling, and Sample

The study's population consists of individual students, teachers who use the internet, and ICT support staff from across the country.

Accessing every member of a specified group may be impractical due to the amount of effort, time, and money required. In such instances, researchers must select a smaller representative group, known as a sample from the larger population. This technique is called sampling. Sampling is an important stage in research. It assists us in selecting the appropriate persons to answer our questions and fulfill our study objectives (IAN BRACE, 2004).

This study selected a group of internet users, with a focus on those who utilize e-learning, to discover suitable participants from the general public for their study.

This study sought to divide the sample into separate groups based on shared traits. The study employed stratified random sampling, which involved randomly selecting samples from three distinct groups of stakeholders in the e-learning system. These groups include students, academic staff, and ICT personnel. The study's goal was to

assess the success of the e-learning system by taking into account these various perspectives. Stratified random sampling entails selecting random samples from multiple sub-populations within a large overall population.

Data Collection

The data collection involved the development and validation of a questionnaire. The same was made available online using Google Forms, and the link was distributed to social media, WhatsApp groups, and Facebook, and also sent directly to many students. A Google form filled out by respondents was then analyzed.

Data Analysis

The study used descriptive data analysis to gain an understanding of respondents' perception of e-learning effectiveness in Pakistan.

RESULTS AND DISCUSSION

Reliability Testing

Cronbach's alpha test in SPSS measures the internal consistency. Cronbach's alpha test produces results between 0 & 1. Cronbach's alpha value of 0 is acceptable in general, while in some cases, 0.6 is acceptable (Ahmed et al., 2023).

Reliability Statistics

Cronbach's Alpha = .946

N of Items = 24

Table 1. Constructs codes and items

Items	Constructs	Codes	
Students should be trained before using E-Learning systems. A trained student learns better than an untrained one.	Student training	ST	
A teacher should be trained before using E-Learning systems. Learned teachers teach better than an untrained one.	Teacher training	TT	
Learning is easy through electronic devices when it's offered to us in our local languages (Urdu/Sindhi). E-Learning in local languages makes our concepts clear	Native language	NL	
E-learning systems are always available to learn. E-Learning systems are always up-to-date. E-Learning systems are easy to use E-Learning systems provide high-speed information access	System quality	SQ	
Information from E-Learning systems is easy to understand. Information from E-learning systems is formatted well. Information from E-learning systems is concise Information from E-learning systems is relevant to my work	Information quality	I.Q	

The e-learning systems quickly answer user queries The e-learning system allows students to discuss some issues with their lecturers. The e-learning system enables users to comment and share information The e-learning system has student services representatives available online	Service quality	Ser. Q	
I frequently use E-learning. I prefer the use of E-learning to Traditional hard-copy notebook learning.	Use	USE	
My work with the e-learning system gives me a great sense of personal satisfaction. I feel comfortable using the electronic Learning system for learning and teaching purposes.	User Satisfaction	US	
E-learning improves the performance of a student. Students using e-Learning systems obtain more marks in exams than their fellow students.	Net benefit	NB	

Demographics

Demographics Gender

Table 2. Demographic gender statistics

Variable	Categories	Frequency	Percentage
Gender	Male	79	85.87
	Female	12	13.04
	Prefer not to say	1	1.09
	Total	92	100%

Results show that the majority of respondents are male; this male dominance is due to males being more easily accessible and ready to

participate as compared to males in countries like Pakistan.

Demographic Age

Table 3. Demographic Age statistics

Variable	Categories	Frequency	Percentage
Occupation	Student	45	48.91
	Teacher	19	20.65
	Student as well as Teacher	4	4.35
	Govt/ Private Job	24	26.09
	Total	92	100%

The occupation statistics show that nearly half of the respondents are students, and the other half comprises almost equally of teachers and

ICT support staff. In sum, the statistics indicate an adequate representation of the targeted respondents.

Demographic Education

Table 4. Demographic education statistics

Variable	Categories	Frequency	Percentage
Education	Up to Intermediate	13	14.13
	14 Years	26	28.26
	16 Years	46	50.0

	Higher Education	7	7.61
	Total	92	100%

The education statistics show that the respondents represented different education levels from school education to higher

education. The majority belonged to the 16-year and 14-year education level, indicating that the majority of respondents were youth.

Demographic Internet Use

Table 5. Demographic Internet use experience statistics

Variable	Categories	Frequency	Percentage
Internet Use in Years	Up to 2	18	19.57
	Up to 5	36	39.13
	Up to 8	7	7.61
	Up to 10 or more	31	33.70
	Total	92	100%

The internet use data demonstrates that the respondents have enough internet usage experience to express their views regarding the effectiveness of eLearning systems. A significant

39.13% reported having internet use experience of up to five years, and in addition, 33.70% reported using the internet for 10 or more years.

Descriptive Analysis of Perceptions Regarding eLearning Effectiveness Teacher Training (T.T)

Table 6. Descriptive analysis statistics of Teacher Training items

Variable	Mean	Standard deviation
T.T1	4.19565	1.018932
T.T2	4.09783	1.038382

T1 and T2, both items of Teacher Training, have a 4+ Mean, which means people have an inclination towards agree and strongly agree.

Standard deviation is around 1, which means the values are not very spread out.

Student Training (S.T)

Table 7. Descriptive analysis statistics of Student Training items

Variable	Mean	Standard deviation
S.T1	4.04348	1.057813
S.T2	4.08696	1.001671

S1 and S2, both the items of Student Training have a 4+ Mean, which means people incline towards agree and strongly agree. Standard

deviation is around 1, which means the values are not very spread out.

Native Languages (N.L)

Table 8. Descriptive analysis statistics of Native Languages items

Variable	Mean	Standard deviation
N.L1	4.18478	1.015586
N.L2	4.18478	1.004707

NL1 and NL2, both items of our proposed constructs, Native Languages have a 4+ Mean, which means people have an inclination towards

agree and strongly agree. Standard deviation is around 1, which means the values are not very spread out.

Information Quality (IQ)

Table 9. Descriptive analysis statistics of Information Quality items

Variable	Mean	Standard deviation
I.Q1	3.93478	1.02501
I.Q2	3.86957	1.050561
I.Q3	4.04348	0.993529
I.Q4	3.96739	1.03192

IQ1, IQ2, IQ3, and IQ4, all the items in Information Quality have a 4+ Mean, which means people have an inclination towards agree

and strongly agree. Standard deviation is around 1, which means the values are not very spread out.

System Quality (SQ)

Table 10. Descriptive analysis statistics of System Quality items

Variable	Mean	Standard deviation
S.Q1	4.06522	0.923495
S.Q2	3.96739	1.042515
S.Q3	4.09783	0.926529
S.Q4	3.95652	1.015409

SQ1, SQ2, SQ3, and SQ4, all the items in System Quality have a 4+ Mean, which means people have an inclination towards agree and

strongly agree. Standard deviation is around 1, which means the values are not very spread out.

Service Quality (Ser. Q)

Table 11. Descriptive analysis statistics of Service Quality items

Variable	Mean	Standard deviation
Ser.Q1	4.08696	0.956782
Ser.Q2	4.05435	1.009451
Ser.Q3	3.92391	1.018873
Ser.Q4	3.93478	0.767533

Ser. Q1, Ser. Q2, Ser. Q3, and Ser.Q4, all the items in Service Quality have a 4+ Mean, which means people have an inclination towards agree

and strongly agree. Standard deviation is around 1, which means the values are not very spread out.

USE(USE)

Table 12. Descriptive analysis statistics of Use items

Variable	Mean	Standard deviation
USE1	3.66304	0.975267
USE2	3.51087	1.084299

USE1 and USE2, both items of USE (USE), have a 4+ Mean, which means people incline towards agree and strongly agree. Standard

deviation is around 1, which means the values are not very spread out.

User Satisfaction (U.S)

Table 13. Descriptive analysis statistics of User Satisfaction items

Variable	Mean	Standard deviation
US1	3.70652	1.032846
US2	3.93479	1.035675

US1 and US2, both items of User satisfaction have a 4+ Mean, which means people have an inclination towards agree and strongly agree.

Standard deviation is around 1, which means the values are not very spread out.

Net Benefits

Table 14. Descriptive analysis statistics of Net Benefits items

Variable	Mean	Standard deviation
NB1	3.98913	0.870702
NB2	3.72826	1.028209

NB1 and NB2, both items of Net Benefits, have a 4+ Mean, which means people have an inclination towards agree and strongly agree. Standard deviation is around 1, which means the values are not very spread out.

student training constructs. A structured questionnaire was used to gather data from 92 respondents, who represented students, instructors, and ICT staff, using a quantitative, explanatory approach.

Overall, the findings indicate that perceptions are generally positive for all major dimensions, including System Quality, Information Quality, Service Quality, Use, User Satisfaction, and Net Benefits. The study broadens the model by including Native Language, Teacher Training, and Student Training as new variables.

As indicated by mean values near or above 4 on a five-point Likert scale, the results showed that respondents generally have favorable opinions of all major constructs of e-learning effectiveness, including System Quality, Information Quality, Service Quality, User Satisfaction, and Net Benefits. Additionally, the study validates the extended constructs' applicability. The significance of capacity-building in e-learning environments was highlighted by the perception that teacher and student training were crucial components of increased service quality. In a similar vein, respondents significantly supported the inclusion of Native Language, suggesting that localized content increases comprehension and information quality.

According to the findings, respondents strongly believe that training and localized language support are essential for improving the effectiveness of e-learning systems (Gary Schulties, 2021). Teacher and student training were thought to improve service quality, whereas native language material improved information quality. Overall, the study suggests that e-learning systems are regarded as effective when supported by both technological quality and user-centered features.

CONCLUSION

Recommendations

This study examined how Pakistani users perceived the efficacy of e-learning systems using the DeLone and McLean Information Systems Success Model as well as other teacher and

Aligned with the findings, this study recommends the arrangement of systematic and continuous training programs for teachers and students in order to improve their ability to use e-learning systems effectively. The study further

recommends the incorporating local languages into e-learning systems to enhance content comprehension, accessibility, quality, and improved outcomes. Furthermore, it is recommended that institutions should invest in reliable, user-friendly, and fast e-learning platforms. Furthermore, e-learning platforms should offer responsive support and real-time guidance.

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