

Quality of E-Learning for User-Satisfaction of Higher Education E-Learners: An Empirical Study

¹Bhaskar Das & ²Dr Jyoti Kumari

¹Ph.D. Scholar, Banasathali Vidyapith, Rajasthan, India

²Assistant Professor, Department of Education, Banasthali Vidyapith, Rajasthan, India

¹Orchid ID: 0000-0002-6470-9356; ²Orchid ID: 0000-0001-5012-769X

Corresponding Author: **Bhaskar Das**

Abstract: Online learning in India has gained popularity, especially with the recognition and acceptance provided by the National Education Policy (NEP) 2020. The global advancement of educational practices owes much to e-learning, which ensures access to education for everyone (Kem, 2023). The quality of e-learning can be evaluated through seven fields: instructor support, collaboration, technology, cost-benefit, information technology, course structure, and didactics (Ehlers, 2004). However, literature on the quality of e-learning and its impact on user-satisfaction in India is sparse. This study employs an empirical methodology, analyzing data from 62 e-learners across various formats of online learning. The research framework utilizes the Unified Theory of Acceptance and Use of Technology model and the End User Computing Satisfaction model. Regression analysis reveals a significant relationship between e-learning quality and user-satisfaction. This study investigates learners' attitudes towards Learning Management Systems (LMS) and identifies quality as a crucial factor influencing user-satisfaction. These findings provide theoretical contributions and practical implications for educators, corporate entities in education, and policymakers.

Keywords: Quality of E-Learning, Higher Education, Information Technology, User-Satisfaction, E-Learners

1 Introduction

Online learning, also known as electronic learning, involves the dissemination of knowledge using advanced technologies like mobile phones, webinars, and tablets. The global advancement of educational practices has been supported by online learning, which has evolved to offer learning opportunities for everyone (Kem, 2023).

Defining quality means positioning oneself in multi-dimensional space and e-learning quality requirements can be structured in 7 fields of instructor support; collaboration; technology; cost-benefit; information technology; course structure; didactics (Ehlers, 2004). Online learning quality which includes system, information and service significantly impact students' acceptance of e-learning (Anthony, 2024). In order to design effective online learning environments, it is necessary to consider quality of e-learning as an important indicator of an effective LMS and user satisfaction (Rajasekaran et al, 2022). A research paper by (Laurillard, 2005) designed to assess the quality e-Learning used

multiple data collection methods across stakeholders, who in this case study are: e-learners, design team, and instructors found that five dimensions including structure, content, delivery, service, and outcomes must work in concert to implement a quality e-Learning course.

Existing Literature

A stepwise regression analysis was conducted by (Peng and Samah, 2006) to determine the factor affecting students' satisfaction, found that four factors namely facilities, instruction medium, course content and instructor are significant in affecting student satisfaction. Discussion and conclusion were formed based on the mean gap score and stepwise regression analysis suggesting that quality of e-learning (determined by facilities and contents) is significant for user-satisfaction.

(Asoodar et al., 2016), conducted a research study in online and blended environment titled "Framework to Improve User-satisfaction and Further Strengthen E-Learning Implementation" which investigated factors effecting user-satisfaction. Categorized in to 6 dimensions, the study identified 14 factors affecting user-satisfaction through factor analysis, followed by multiple regression and path analysis. The 6 dimensions and 14 factors are categorized as 1) Learner-Dimension [Factors: i) E-Learner's attitude towards course, ii) E-Learner's computer anxiety, iii) E-Learner's internet self-efficacy]; 2) Instructor-Dimension [Factors: iv) Instructor presence and guidance, v) Instructors ability in internet based course]; 3) Course-Dimension [Factors: vi) E-Course flexibility, vii) E-Course quality]; 4) Technology-Dimension [Factors: viii) Technology quality, ix) Internet quality]; 5) Design-Dimension [Factors: x) Perceived usefulness, xi) Perceived ease of use, xii) Diversity in assessment]; 6) Environment-Dimension [Factors: xiii) Learner perceived interaction with others, xiv) University support and services]. The study showed that user-satisfaction can be strongly predicted by user interaction with other e-learners.

In a research by (Meng, et al 2019) in Online and Blended environment a user-satisfaction study of online learning teachers was carried out. 'Teaching Ecosystem Design: Teacher's Satisfaction with the Integrated Course Service System', is a study of teacher-satisfaction in Online Learning. 253 teachers from primary, Junior and High schools in Taiwan participated in the research study for teacher-satisfaction across six factors including 1/ system content, 2/ system accuracy, 3/ Ease-of-use, 4/ Report Format, 5/ System timeliness, 6/ Community building. The resultant outcome indicated influence of all six factors namely 1/ system content, 2/ system accuracy, 3/ Ease-of-use, 4/ Report Format, 5/ System timeliness, 6/ Community building on teachers-satisfaction. Moderating attributes of age, school level, teaching experience and position also played significant role leading to system quality. The study implied quality of e-learning is one of the factors of the study positively impacts user-satisfaction.

(El Firdoussi et al, 2020) conducted study, which involved 3037 students and 231 professors across various higher education programs, explored the constraints of e-learning platforms. It offered suggestions for improving distance education, including providing technical support and training to both educators and students in utilizing these tools effectively.

This research also suggests that making a conclusion on the quality of online learning need future studies.

Done in Blended and Hybrid environment, [Safsouf et al. \(2020\)](#) carried out a research to analyse and understand the success of students in Higher Education. 127 UG students familiar in Online Learning in Morocco participated in the research study through questionnaire survey. The research model weighed in many factors from available literature, expert opinion and tested models to check the student's success. The analysis shows computer-self-efficacy, computer-anxiety, perceived-playfulness/enjoyment directly related to perceived-ease-of-use. Factors including social interaction, system quality, service quality, course and information-quality, course-flexibility and diversity in assessment leads to student's satisfaction.

[Abdurrahaman et al, 2020](#), in Online and Blended environment study evaluated factors affecting User-satisfaction in University LMS. The study was conducted in a Malaysian University to find out influencing factors in LMS setup leading to intention to use LMS through User-satisfaction. 132 UG students using the LMS platform participated in the research done through questionnaire survey. Through the small sample size, response from participants belonging to various ethnicity including Arab, African, Asian were captured thus giving this research a Global reach. Three factors shortlisted leading to User-satisfaction were 1/ System-quality, 2/ Information-quality, 3/ Service-quality. Identified in the analysis of the research revealed significant influence of 1/ System-quality and 2/ Information-quality on user-satisfaction while 3/ service-quality remained insignificant. Further user-satisfaction influences Intention to use.

A research study by [Rajasekaran et al. 2022](#)) evaluated the factors of quality of e-learning identified under three variables of information quality; service quality and system quality on student satisfaction in a virtual learning environment. The outcome indicate that Information Quality had a greater impact on Satisfaction and Use, followed by Service Quality and System Quality.

The review of literature revealed that the research studies has emphasized the importance of user-satisfaction as key to Student's motivation and intention to use learning platforms in future. Also the literature review pointed that factor of quality of e-learning is related to user-satisfaction. With online learning environment becoming the new normal, Student's satisfaction is set to play a significant role in both motivation and intention to continue to use online learning platforms. Given these scenarios, there are no significant research done on the quality ofonline learning (e-learning) in Indian context and this is the gap that I would contribute to through my proposed research study.

2 Materials and Methods

Participants

A total of 62 respondents participated in the survey, comprising students enrolled in education institutions offering online learning courses. The sample represented diverse academic disciplines and varying levels of familiarity with online learning platforms.

In this study, internal consistency reliability was assessed using Cronbach's alpha coefficient. Cronbach's alpha measures the extent to which items within a measurement

instrument are correlated. A higher alpha coefficient indicates greater reliability and internal consistency among the items.

Research Method

This study assesses the internal consistency reliability of its survey using Cronbach's alpha. Data were collected from 62 respondents who had engaged in various online learning courses. The survey included 32 statements across five constructs:

- E-learning Course Flexibility (ECF): 7 statements
- E-learning Course Quality (ECQ): 7 statements
- Technology Quality (TQ): 7 statements
- Internet Quality (IQ): 4 statements
- University Support and Services (USS): 7 statements

The collected data were analyzed using SPSS to identify correlations between e-learning quality and user-satisfaction.

Procedure

1. **Survey Development:** The survey was designed to measure the quality of e-learning and its impact on user-satisfaction. It included 32 items grouped under five constructs: ECF, ECQ, TQ, IQ, and USS. Each item was rated on a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree."
2. **Sampling:** A total of 62 participants were selected using purposive sampling. The respondents were students enrolled in online learning courses across different educational institutions in India.
3. **Data Collection:** Data were collected through an online survey distributed via email and social media platforms. Respondents provided information on their experiences with e-learning systems, including course flexibility, quality, and institutional support.
4. **Data Analysis:** The collected data were processed and analyzed using SPSS software. Reliability was assessed through Cronbach's alpha, while correlations between constructs and user-satisfaction were examined through Pearson correlation analysis. Regression analysis was also conducted to determine the predictive power of the constructs on user-satisfaction.

Tools Used

The survey is aimed to assess the quality of e-learning towards user-satisfaction in online learning (Higher Education). Tools used included:

Cronbach's Alpha

Cronbach's alpha is a statistical tool used to measure the internal consistency or reliability of a set of survey or test items. It indicates how closely related the items in a group are, ensuring that they measure the same construct. The value of Cronbach's alpha ranges between 0 and 1, where higher values indicate better reliability. For example, an alpha value above 0.7 is generally considered acceptable, while values above 0.9 signify excellent

consistency. In this study, the Cronbach's alpha values for the five constructs demonstrated high internal consistency, with values ranging from 0.690 to 0.919.

Correlation Analysis

Correlation analysis examines the strength and direction of relationships between two variables. It is used to identify whether an increase or decrease in one variable corresponds to an increase or decrease in another. The correlation coefficient, denoted by "r," ranges from -1 to 1, where:

- "r > 0" indicates a positive relationship.
- "r < 0" indicates a negative relationship.
- "r = 0" implies no relationship.

In this study, correlation analysis was used to explore the relationships between the quality of e-learning constructs (e.g., course flexibility, technology quality) and user-satisfaction. Positive correlations indicated that improvements in e-learning quality factors are associated with increased user-satisfaction.

Data analysis and Results

The survey is aimed to assess the quality of e-learning towards user-satisfaction in online learning (Higher Education).

Sample Description: A total of 62 respondents participated in the survey, comprising students enrolled in education institutions offering online learning courses. The sample represented diverse academic disciplines and varying levels of familiarity with online learning platforms.

The statistical analysis of the respondents in the pilot survey are detailed below:

Frequency Table:

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Male	33	53.2	53.2	53.2
Valid Female	29	46.8	46.8	100.0
Total	62	100.0	100.0	

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Short term course	29	46.8	46.8	46.8
Valid Long term course	16	25.8	25.8	72.6
Valid Continuous Online Learning	4	6.5	6.5	79.0
Valid All	13	21.0	21.0	100.0
Total	62	100.0	100.0	

The prerequisite of participation in the survey was completion of online courses of short-term duration (3 months), long-term duration (6 months), continuous online learning or all the options. The outcome of the pilot survey shows students participants included 46.8% of short-term online course duration, 25.8% long-term online course duration, 6.5% from continuous online courses and 21% from all online course options.

Gender analysis of the students participation in the pilot survey shows 53.2% participation by males and 46.8% by female students.

	Frequency	Percent	Valid Percent	Cumulative Percent
Government	2	3.2	3.2	3.2
Private	30	48.4	48.4	51.6
Autonomous	1	1.6	1.6	53.2
EdTech Platform (Coursera/Khan Academy)	29	46.8	46.8	100.0
Total	62	100.0	100.0	

	Frequency	Percent	Valid Percent	Cumulative Percent
Business	14	22.6	22.6	22.6
Fashion	25	40.3	40.3	62.9
Architect-Interior	1	1.6	1.6	64.5
Commerce	5	8.1	8.1	72.6
Humanities	3	4.8	4.8	77.4
Science	2	3.2	3.2	80.6
Engineering	2	3.2	3.2	83.9
8	10	16.1	16.1	100.0
Total	62	100.0	100.0	

Students participation in the pilot survey shows 3.2% from government-run, 48.4% from privately-run, 1.6% from autonomous and 46.8% from EdTech online education platforms thus evidencing and increased presence of opportunity in this sector. The majority of the participating students in the pilot survey comprising of 40.3% are from Fashion education background, with 22.6% from business, 16.1% from others- denoted by 8 (medical, pharmacy, armed forces, skill development,etc), 8.1% from commerce, 4.8% from humanities, 3.2% from science and engineering and 1.6% from architecture & interior streams.

	Frequency	Percent	Valid Percent	Cumulative Percent
Delhi NCR	41	66.1	66.1	66.1
Northern India	1	1.6	1.6	67.7
Western India	2	3.2	3.2	71.0
Southern India	2	3.2	3.2	74.2
Online	16	25.8	25.8	100.0
Total	62	100.0	100.0	

	Frequency	Percent	Valid Percent	Cumulative Percent
on laptop or desktop	35	56.5	56.5	56.5
on both laptop-desktop & mobile	27	43.5	43.5	100.0
Total	62	100.0	100.0	

Region wise segregation of the pilot survey samples shows participation of 66.1% from Delhi NCR, 1.6% from Northern India, 3.2% from Western India, 3.2% from Southern India and 25.8% from online participants. The devices in use for undertaking online courses as stated by the participating students shows 56.5% on laptop or desktop, 43.5% on laptop, desktop & mobile while no one chose mobile as an option for undertaking online courses.

Findings:

The Cronbach's alpha coefficient for the measurement instrument used in this study was calculated to assess its reliability. The value of Cronbach's alpha ranges from 0 to 1.

A coefficient closer to 1 indicates high internal consistency among the items in the instrument.

In overall scale of all 62 respondents in pilot survey, Cronbach's alpha value of .952 suggests that the measurement instrument used in this study demonstrates high internal consistency.

Case Processing Summary			Case Processing Summary			Case Processing Summary			Case Processing Summary			Case Processing Summary			
	N	%	Valid	N	%	Valid	N	%	Valid	N	%	Valid	N	%	
Cases	Excluded ^a	0	.0	62	100.0	0	.0	62	100.0	0	.0	62	100.0	0	.0
Total		62	100.0			62	100.0			62	100.0			62	100.0
a. Listwise deletion based on all variables in the procedure.			a. Listwise deletion based on all variables in the procedure.			a. Listwise deletion based on all variables in the procedure.			a. Listwise deletion based on all variables in the procedure.			a. Listwise deletion based on all variables in the procedure.			
Reliability Statistics			Reliability Statistics			Reliability Statistics			Reliability Statistics			Reliability Statistics			
Cronbach's Alpha	N of Items		Cronbach's Alpha	N of Items		Cronbach's Alpha	N of Items		Cronbach's Alpha	N of Items		Cronbach's Alpha	N of Items		
.952	66		.881	7		.895	7		.919	7		.690	4		

Case Processing Summary			Case Processing Summary		
	N	%	Valid	N	%
Cases	Excluded ^a	0	.0	62	100.0
Total		62	100.0		
a. Listwise deletion based on all variables in the procedure.			a. Listwise deletion based on all variables in the procedure.		
Reliability Statistics			Reliability Statistics		
Cronbach's Alpha	N of Items		Cronbach's Alpha	N of Items	
.888	7		.888	7	

Fore-learning course flexibility (ECF), Cronbach's alpha value of .881 suggests that the measurement instrument used in this study demonstrates high internal consistency. For e-learning course quality (ECQ), Cronbach's alpha value of .895 suggests that the measurement instrument used in this study demonstrates high internal consistency. For technology quality in online courses (TQ), Cronbach's alpha value of .919 suggests that the measurement instrument used in this study demonstrates high internal consistency. For internet quality in online courses (IQ), Cronbach's alpha value of .690 suggests that the measurement instrument used in this study demonstrates intermediate internal consistency. For university support and services in online courses (USS), Cronbach's alpha value of .888 suggests that the measurement instrument used in this study demonstrates high internal consistency.

Correlation

A total of 32 statements formed from the 5 constructs were included in the research survey as (ECF-7; ECQ-7; TQ-7; IQ-4; USS-7). The result outcome is discussed here.

		Correlations						
		Overall_Stu_Sat	ECF	ECQ	TQ	USQ	USCQ	USCQ
Overall_Stu_Sat	Pearson Correlation	1	.589 ^{**}	-.405 ^{**}	-.592 ^{**}	-.744 ^{**}		
	Sig. (2-tailed)		.000	.001	.000	.000		
	N	62	62	62	62	62	62	62

		Correlations						
		Overall_Stu_Sat	ECF	ECQ	TQ	USQ	USCQ	USCQ
ECF	Pearson Correlation	.589 ^{**}	1	-.357 ^{**}	-.387 ^{**}	-.387 ^{**}	-.387 ^{**}	-.387 ^{**}
	Sig. (2-tailed)	.000		.001	.001	.001	.001	.001
	N	62	62	62	62	62	62	62

		Correlations						
		Overall_Stu_Sat	TQ1	TQ2	TQ3	TQ4	TQ5	TQ6
TQ1	Pearson Correlation	.747 ^{**}	1	.688 ^{**}	.596 ^{**}	.507 ^{**}	.609 ^{**}	.557 ^{**}
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	62	62	62	62	62	62	62

Construct-I: E-learning Course Flexibility (ECF): User-satisfaction is positively correlated with e-learning course flexibility. This suggests that with the increase in the flexibility component in the e-learning, student’s satisfaction also increases. This indicates the importance of this factor in enhancing user-satisfaction.

Construct-II: E-learning course quality (ECQ): User-satisfaction significantly correlated with e-learning course quality. This implies that this factor influences user-satisfaction. This suggests that with the increase in the e-learning course quality in the online education, student’s satisfaction also increases. This indicates the importance of ECQ in enhancing user-satisfaction.

Construct-III: Technology quality in online courses (TQ): User-satisfaction is positively correlated with technology quality in online courses. This suggests that with enhancement of the technology quality in online courses, student’s satisfaction increases. This indicates the importance of this factor in enhancing user-satisfaction.

		Correlations				
		Overall_Stu_Sat	IQ1	IQ2_n	IQ3_n	IQ4
Overall_Stu_Sat	Pearson Correlation	1	.589 ^{**}	-.405 ^{**}	-.592 ^{**}	-.744 ^{**}
	Sig. (2-tailed)		.000	.001	.000	.000
	N	62	62	62	62	62

		Correlations						
		Overall_Stu_Sat	USQ1	USQ2	USQ3	USQ4	USQ5	USQ6
USQ1	Pearson Correlation	.558 ^{**}	1	-.391 ^{**}	.721 ^{**}	.487 ^{**}	.396 ^{**}	.833 ^{**}
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	62	62	62	62	62	62	62

Construct-IV: Internet quality in online courses (IQ): User-satisfaction is significantly correlated with internet quality in online courses. This suggests that as internet quality in online courses increases, user-satisfaction also increases. This indicates the

importance of this factor in enhancing user-satisfaction. Results are detailed in the correlation chart as below:

Construct-V: University support and services in online courses (USS): User-satisfaction is positively correlated with perceived ease of use in online learning. This suggests that as university support and services in online course increases, user-satisfaction also increases. This indicates the importance of this factor in enhancing user-satisfaction. Results are detailed in the correlation chart as below:

Discussion

The findings align with existing literature, emphasizing that the quality of online learning significantly impacts user satisfaction. E-learning course flexibility and quality were found to be crucial for positive learner experiences. Technology readiness and institutional support also play a vital role. These insights provide valuable guidance for educators and policymakers to enhance online learning platforms.

Conclusion

The study highlights the importance of quality in e-learning to enhance user-satisfaction. All 5 constructs show positive correlation towards user-satisfaction. It recommends that future research employ a larger and more diverse sample to validate these findings and explore additional factors influencing e-learning adoption in India.

List of References:

1. Abdurrahaman, D. T., Owusu, A., & Bakare, A. S. (2020). Evaluating factors affecting user satisfaction in university enterprise content management (ECM) systems. *Electronic Journal of Information Systems Evaluation*, 23(1), 1-16.
2. Anthony Jnr, B. (2024). Examining Blended Learning Adoption Towards Improving Learning Performance in Institutions
3. Asoodar, M., Vaezi, S., & IZanloo, B. (2016). Framework to improve student's satisfaction and further strengthen e-learning implementation. *Computers in Human Behavior*, 63, 704-716.
4. Doll, W. J., & Torkzadeh, G. (1988). The measurement of end-user computing satisfaction. *MIS Quarterly*, 12(2), 259-274.
5. Ehlers, U. D. (2004). Quality in e-learning from a learner's perspective. *European Journal of Open, Distance and E-learning*, 7(1).
6. El Firdoussi, S., Lachgar, M., Kabaili, H., Rochdi, A., Goujdami, D., & El Firdoussi, L. (2020). Assessing distance learning in higher education during the COVID-19 pandemic. *Education Research International*, 2020, 1-13.
7. Geng, S., Law, K. M. Y., & Niu, B. (2019). Investigating self-directed learning and technology readiness in blending learning environment: *Revista de universidad y sociedad del conocimiento. International Journal of Educational Technology in Higher Education*, 16(1), 1-22

8. Kem, D. (2023). Implementing E-Learning Applications and Their Global Advantages in Education. In Handbook of Research on Learning in Language Classrooms Through ICT-Based Digital Technology (pp. 117-126). IGI Global.
9. Laurillard, D. (2005). E-learning in higher education. In Changing higher education (pp. 87-100). Routledge.
10. Lazar, I. M., Panisoara, G., & Ion, O. P. (2020). Digital technology adoption scale in the blended learning context in higher education: Development, validation and testing of a specific tool. *PLoS One*, 15(7)
11. Meng-Hua, L., Ming-Chien, H., Wen-Hsu Hsian, Won-Fu, H., Mai-Lun Chiu, & Shen-Tsu, W. (2019). Teaching ecosystem design: Teachers' satisfaction with the integrated course service system. *Education Sciences*, 9(3)
12. Peng, P. J., & Samah, A. (2006). Measuring students' satisfaction for quality education in a e-learning university. *UNITAR e-journal*, 2(1), 11-21.
13. Rajasekaran, V. A., Kumar, K. R., Susi, S., Mohan, Y. C., Raju, M., & Hssain, M. W. (2022). An evaluation of e-learning and user satisfaction. *International Journal of Web-Based Learning and Teaching Technologies (IJWLTT)*, 17(2), 1-11.
14. Safsouf, Y., Mansouri, K., & Poirier, F. (2020). An analysis to understand the online learners' success in public higher education in Morocco. *Journal of Information Technology Education: Research*, 19, 87-112
15. Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157-178